

TO CR of JICA Timor-Leste OFFICE

Project Title: The Project for the Capacity Development of Road Services in the Democratic Republic of Timor-Leste

Version of the Sheet: Ver.8 (Term: April 2019 – September 2019)

Name: Hisashi MUTO

Title: Team Leader/ Road Maintenance1

Submission Date: 30th September, 2019

< I. Summary (all achievements are as of 30th September, 2019) >

1. Progress

1-1 Progress of Inputs

1-1-1 Japanese side

< Short-term experts dispatched to Timor-Leste >

NO	Name	Title	Dispatched Period to Timor-Leste	Changes or delay
1	Hisashi MUTO	Team Leader/ Road Maintenance 1	(1 st) 8 th Mar – 10 th Apr, 2016 (2 nd) 14 th Jun – 25 th Jun, 2016 (3 rd) 1 st Sep – 18 th Sep, 2016 (4 th) 23 rd Jan – 19 th Feb, 2017 (5 th) 24 th Mar – 2 nd Apr, 2017 (6 th) 18 th Aug – 10 th Sep, 2017 (7 th) 24 th Nov – 14 th Dec, 2017 (8 th) 2 nd Feb – 4 th Mar, 2018 (9 th) 8 th Jun – 1 st Jul, 2018 (10 th) 19 th Sep – 12 th Oct, 2018 (11 th) 14 th Nov – 8 th Dec, 2018 (12 th) 10 th Mar – 31 st Mar, 2019 (11 th) 14 th Jun – 9 th Jul, 2019 (12 th) 27 th Aug – 21 st Sep, 2019	None
2	Makoto MATSUURA	Deputy Team Leader/ Road Maintenance 2	(1 st) 8 th Mar – 15 th Apr, 2016 (2 nd) 14 th Jun – 13 th Jul, 2016 (3 rd) 20 th Sep – 14 th Oct, 2016 (4 th) 1 st Dec – 16 th Dec, 2016 (5 th) 23 rd Jan – 19 th Feb, 2017	None
3	Mitsuhide SAITO	Deputy Team Leader/	(1 st) 24 th Mar – 9 th Apr, 2017	Note: Mr.

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		Road Maintenance 2	(2 nd) 9 th Jun – 25 th Jun, 2017 (3 rd) 16 th Oct – 12 th Nov, 2017 (4 th) 16 th Feb – 11 th Mar, 2018 (5 th) 26 th Apr – 16 th May, 2018 (6 th) 7 th Sep – 28 th Sep, 2018 (7 th) 15 th Feb – 17 th Mar, 2019 (8 th) 18 th Jun – 11 th Jul, 2019 (9 th) 9 th Aug – 20 th Sep, 2019	Mitsuhide Saito replaced Mr. Matsuura in Deputy Team Leader post.
4	Johji KOIZUMI	Road Construction Supervision	(1 st) 19 th Jul – 17 th Aug, 2016 (2 nd) 24 th Sep – 14 th Oct, 2016 (3 rd) 19 th Jun – 5 th Jul, 2017 (4 th) 21 st Aug – 4 th Oct, 2017 (5 th) 14 th Nov – 21 st Dec, 2017 (6 th) 30 th Jan – 4 th Mar, 2018 (7 th) 8 th Jun – 1 st Jul, 2018 (8 th) 7 th Sep – 13 th Oct, 2018 (9 th) 7 th Feb – 23 rd Mar, 2019 (10 th) 7 th Apr – 28 th Apr, 2019	None
5	Sueo HIROSE	Quality Control/ Road Repair	(1 st) 28 th Mar – 17 th Apr, 2016 (2 nd) 13 th May – 11 th Jun, 2016 (3 rd) 14 th Aug – 12 th Sep, 2016 (4 th) 7 th Oct – 14 th Oct, 2016 (5 th) 23 rd Jan – 22 nd Feb, 2017 (6 th) 4 th Aug – 3 rd Sep, 2017 (7 th) 16 th Feb – 18 th Mar, 2018 (8 th) 1 st Mar – 23 rd Mar, 2019 (9 th) 27 th Aug – 20 th Sep, 2019	None
6	Shutaro SAKANAKA	Disaster Restoration	(1 st) 11 th May – 31 st May, 2016 (2 nd) 28 th Jun – 21 st Jul, 2016 (3 rd) 12 th Sep – 6 th Oct, 2016 (4 th) 13 th Feb – 8 th Mar, 2017 (5 th) 17 th Apr – 7 th May, 2017 (6 th) 23 rd Oct – 12 th Nov, 2017 (7 th) 16 th Jan – 4 th Feb, 2018 (8 th) 2 nd Mar – 18 th Mar, 2018 (9 th) 1 st Jun – 17 th Jun, 2018	None

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7	Kazuharu KOISHIKAWA	Disaster Restoration2	(1 st) 3 rd Mar – 25 th Mar, 2018 (2 nd) 15 th Jun – 8 th Jul, 2018 (3 rd) 7 th Sep – 30 th Sep, 2018 (4 th) 23 rd Apr – 16 th May, 2019	Note: Disaster Restoration 2 has been created as a new position; Mr. Koishikawa was assigned to this position in March 2018.
8	Yoshiyuki AKAGAWA	Road Design/ Project Coordinator	(1 st) 17 th Mar – 15 th Sep, 2016 (2 nd) 21 st Jun – 13 th Jul, 2016 (3 rd) 12 th Sep – 6 th Oct, 2016 (4 th) 13 th Feb – 5 th Mar, 2017	None
9	Nicholas BROOKER-JONES	Road Design/ Project Coordinator	(1 st) 31 st Jul – 30 th Aug, 2017 (2 nd) 16 th Oct – 23 rd Nov, 2017 (3 rd) 2 nd Feb – 4 th Mar, 2018 (4 th) 8 th Jun – 1 st Jul, 2018 (5 th) 7 th Sep – 30 th Sep, 2018 (6 th) 26 th Feb – 21 st Mar, 2019 (7 th) 30 th Aug – 22 nd Sep, 2019	Note: Mr. Brooker-Jone s replaced Mr. Akagawa in Project Coordinator post.
10	Kenji MINEGISHI	Structure Design	(1 st) 5 th Apr – 24 th Apr, 2016 (2 nd) 5 th Jul – 4 th Aug, 2016 (3 rd) 14 th Nov – 13 th Dec, 2016 (4 th) 12 th May – 11 th Jun, 2017 (5 th) 1 st Sep – 1 st Oct, 2017 (6 th) 3 rd Nov – 17 th Dec, 2017 (7 th) 6 th Apr – 13 th May, 2018 (8 th) 24 th Aug – 30 th Sep, 2018 (9 th) 23 rd Apr – 16 th May, 2019	None
11	Takashi SAITO	Database	(1 st) 19 th Jul – 24 th Aug, 2016 (2 nd) 3 rd Oct – 14 th Oct, 2016 (3 rd) 13 th Mar – 12 th Apr, 2017	None

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			(4 th) 16 th Jun – 2 nd Jul, 2017 (5 th) 18 th Aug – 1 st Oct, 2017 (6 th) 16 th Feb – 4 th Mar 2018 (7 th) 5 th May – 19 th May, 2018 (8 th) 28 th Aug – 11 th Oct, 2018 (9 th) 19 th Feb – 21 st Mar, 2019 (10 th) 26 th Jul – 31 st Aug, 2019 (11 th) 8 th Sep – 15 th Sep, 2019	
12	Masahiko HAYASHI	Landslide	(1 st) 16 th Jun – 28 th June, 2017 (2 nd) 27 th Oct – 9 th Dec, 2017 (3 rd) 18 th Mar – 18 th Apr, 2018	Note: Activity on Landslide analysis was approved by 2 nd JCC; Mr. Hayashi was assigned in June 2017.
13	Sohshi MIKAMI	Topographical Analysis	(1 st) 19 th Jun – 16 th Jul, 2017 (2 nd) 18 th Mar – 18 th Apr, 2018	Note: Activity on Landslide analysis was approved by 2 nd JCC; Mr. Mikami was assigned in June 2017.
14	Nao TSUJIMURA	Evaluation/Monitoring	Resident in Timor-Leste	None

< Equipment and materials >

NO	Items	Qty	Unit price	Unit	Total amount
1	Desktop computer	1	1,150	USD	1,150
2	Inclinometer assembly	1	1,585,800	JPY	1,585,800
3	Borehole casing	1	404,400	JPY	404,400
4	Dokenbo assembly	1	133,000	JPY	133,000

(Remark: Equipment and materials which have a service life of 2 years and are more than JPY 50,000 are listed.)

1-1-2 Timor-Leste side

- **Counterpart (C/P) personnel (from MPWTC and NDRBFC)**

NO	Name	Title of the Project	Engaged Period
1	Rui Hernani F. Guterres	Project Director	20 th Feb, 2018, to date
2	Milton Ramanata C. Monteiro Joao Mario Gama de Sousa	Project Manager	20 th Feb, 2018, to 28 th Feb, 2019 1 st Mar, 2019, to date
3	Simao G. Armindo Laranjinha	C/P staff	1 st Mar, 2019, to date
4	Joao Pedro Amaral	C/P staff	8 th Mar, 2016, to date
5	Joao Gregorio	C/P staff	8 th Mar, 2016, to date

- **Equipment and materials for the project office**

NO	Items	Qty	Unit
1	Office space (including desks and chairs)	1	room

1-2 Progress of Activities

NO	Activity	Achievement level
1.1	To review existing management structure condition of maintenance and rehabilitation for major roads.	<ul style="list-style-type: none"> ● This activity was completed in 2016 June. ● Conditions of roads and roads structures are collected continuously in the NDRBFC's database. ● Changes in road conditions are grasped by reports of roads users via social media of the NDRBFC.
1.2	To conduct periodic/routine inspection.	<ul style="list-style-type: none"> ● Periodic/routine inspections have been completed along the A03. During inspections, the JICA Expert Team provided on-the-job training to show the whole inspection procedure from data collection to data input.
1.3	To update the database based on the inspection result and repair/rehabilitation works of road and bridges.	<ul style="list-style-type: none"> ● The JICA Expert Team repeated training about operation of the GIS database and made a video of instructions about operating procedures in order to support the C/P. ● Data from national road survey was inputted into the GIS database (684 km). <ul style="list-style-type: none"> - Total length of national roads (target): 1,427 km - Roads that have not been entered into the GIS database: 93 km - Roads that are being rehabilitated (not yet entered into GIS database): 650 km
1.5	To implement emergency inspections and repair/rehabilitation works when necessity arises.	<ul style="list-style-type: none"> ● During this monitoring period, the C/P did not request support from the JICA Expert Team regarding emergency inspections. ●
1.6	To undertake appropriate road maintenance/ rehabilitation works by following annual work and budget plans which reflect priorities within the limited budget.	<ul style="list-style-type: none"> ● The NDRBFC has started maintenance and rehabilitation works based on the annual work and budget plans for 2019. As of September 2019, the NDRBFC have started the procurement process for 50% of the works. ● Progress of the works will be monitored up to the end of project, and will be reported in the final report.

1.7	To propose appropriate framework of road maintenance and rehabilitation for major roads.	<ul style="list-style-type: none"> At 6th/final JCC in September 2019, the JICA Expert Team presented project results and made the following recommendations, which were accepted by the NDRBFC: <ol style="list-style-type: none"> using multiple-year budgets for maintenance works; continuing collaboration with other organizations to improve inspection methods; and using fuel taxation to secure funds for road maintenance in the future. 												
2.1	To identify typical rehabilitation and repair works of major roads in the whole country as case studies.	<ul style="list-style-type: none"> This activity was completed in February 2018. 												
2.2.	To conduct the case studies for the planning, design check and construction supervision of the project.	<ul style="list-style-type: none"> IPG and NDRBFC integration team conducted monitoring of the slope mass movement through data collection by inclinometer and underground water level indicator (Site: Aituto landslide). On-the-job training for quality control of stone masonry retaining walls using checklists was conducted (site: A03, Tibalau-Carimbala). Review of on-the-job training results for construction supervision in Tibalau-Carimbala using checklists was carried out. (debriefing and evaluation of OJT) The JICA Expert Team examined knowledge improvement of trained NDRBFC staff. The test results for each subject were as follows: <table border="1" data-bbox="660 1133 1423 1720"> <thead> <tr> <th data-bbox="660 1133 1023 1227">Subject</th> <th data-bbox="1023 1133 1423 1227">Number of the people whose test scores have improved after training</th> </tr> </thead> <tbody> <tr> <td data-bbox="660 1227 1023 1319">Landslide investigation</td> <td data-bbox="1023 1227 1423 1319">17 people out of 17</td> </tr> <tr> <td data-bbox="660 1319 1023 1444">Bridge substructure protection (Scouring and protection block)</td> <td data-bbox="1023 1319 1423 1444">5 people out of 14</td> </tr> <tr> <td data-bbox="660 1444 1023 1536">Culvert planning and design</td> <td data-bbox="1023 1444 1423 1536">6 people out of 11</td> </tr> <tr> <td data-bbox="660 1536 1023 1628">Quality control, Safety control and Construction management</td> <td data-bbox="1023 1536 1423 1628">12 people out of 19</td> </tr> <tr> <td data-bbox="660 1628 1023 1720">Slope protection</td> <td data-bbox="1023 1628 1423 1720">3 people out of 7</td> </tr> </tbody> </table> 	Subject	Number of the people whose test scores have improved after training	Landslide investigation	17 people out of 17	Bridge substructure protection (Scouring and protection block)	5 people out of 14	Culvert planning and design	6 people out of 11	Quality control, Safety control and Construction management	12 people out of 19	Slope protection	3 people out of 7
Subject	Number of the people whose test scores have improved after training													
Landslide investigation	17 people out of 17													
Bridge substructure protection (Scouring and protection block)	5 people out of 14													
Culvert planning and design	6 people out of 11													
Quality control, Safety control and Construction management	12 people out of 19													
Slope protection	3 people out of 7													
2.3	To propose preferable structures for construction management for repair/rehabilitation works through case studies.	<ul style="list-style-type: none"> The JICA Expert Team prepared checklists for construction in order to guarantee efficiency and quality of construction management. The JICA Expert Team supported the C/P in carrying out construction supervision using the checklists. 												
3.1	To review existing technical documents for road maintenance and rehabilitation.	<ul style="list-style-type: none"> This activity was completed in September 2016. 												

3.2	To review and identify factors of failure from past examples of damaged rehabilitation and construction works.	<ul style="list-style-type: none"> This activity was completed in September 2016.
3.3	To acquire necessary knowledges of civil engineering for design through classroom lectures and case studies.	<ul style="list-style-type: none"> Classroom lectures for civil engineering design were implemented on schedule. (It was completed in June 2018.) During this monitoring period, additional lectures on culvert design, disaster investigation, and measurement of the Comoro River cross section were provided.
3.4	To prepare the technical guideline of investigation and design.	<ul style="list-style-type: none"> This activity was completed in September 2018. After 6th/final JCC in September 2019, the Vice Minister of Public Works gave approval for the products of the CDRS Project to be official documents of the NDBRFC. (When the Minister approves the products, the pages signed by the Vice Minister will be replaced.)
3.5	To reflect the lessons learned from case studies to the technical guideline.	<ul style="list-style-type: none"> DNEPCC staff conducted the second case study to confirm the usability / applicability of the guidelines with monitoring / support from the JICA Expert Team. Through this activity, the JICA Expert Team checked whether DNEPCC staff can actually use / apply the guidelines.
3.6	To disseminate the technical guideline for concerned parties	<ul style="list-style-type: none"> The JICA Expert Team organized several seminars to disseminate the technical guidelines: the NDRBFC inter-departmental working groups presented seminars about the contents of the guidelines and checklists, and these documents were disseminated to the professors and students of civil engineering course at Dili Technical Institute (DIT). In order to confirm their applicability, the JICA Expert Team carried out workshops for dissemination. Checklists were disseminated to the representatives of municipal public works through on-the-Job training.

1-3 Achievement of Output

Indicators of Outputs		Achievement level
1.1	More than 30% of requested budget for road maintenance are distributed.	<p>During project implementation, budget distribution occurred 3 times. Fiscal year 2019 attained the target level; however, 2017 and 2018 did not achieve the target level.</p> <p>The JICA Expert Team scrutinized the cause of failure and advocated securing road maintenance budgets in the form of multiple year budgets.</p> <p>The road maintenance budget for 2020 was planned following these recommendations. The budget will be distributed in February 2020. It is expected that the target level will be achieved after the end of this project.</p>
1.2	Improved road database is utilized for preparation of the annual work plan of road maintenance.	<p>75% achieved</p> <p>The existing database created by the CDRW Project was transferred into a GIS system, and road alignments and structures have been shown</p>

		on GIS maps. However, the data entry work has taken an unexpectedly long time and it has not been completed to date. In 2017, after the national election, the NDRBFC proposed a 5-year plan for road maintenance to the new government while referring to the results of road inspections supported by the CDRS Project. However, after that, the database of the Department of Maintenance shows no sign of having been used for preparation of annual plans for road maintenance; therefore, utilization of the database for preparation of annual work is inadequate.
2.1	At least 3 case studies for both construction and design are conducted. (Totally 6 case studies)	100% achieved Three case studies for construction have been completed using the by-pass road of the A02 called the Ex-Japan Road and the Humboe-Letefoho emergency work along the A10. On the Ex-Japan Road, two case studies were conducted: the first one focused on safety management and quality control, and the second one targeted culvert construction. Three case studies to improve the capacities of surveying and design have been completed using sites in Aitutu on the A05, in Sesurai on the A05 and at the Sahen Bridge on the A07. Respectively, the three case studies focused on landslide surveying, cross drainage design and countermeasures for bridge pier scouring.
2.2	More than 60% of trainees pass the achievement test for construction supervision and design.	100% achieved The baseline survey results showed that the percentage of examinees that exceeded the passing grade by subject was a) 28% for design, and b) 8% for quality control. The final survey conducted in July 2019 found that 60% of trainees achieved the passing grade for quality control and 64% achieved the passing grade for design.
3	Technical guideline of investigation and design for slope protection, drainage and measures against scouring are prepared.	100% achieved Four technical guidelines for slope protection, bridge substructure protection, culvert design, and landslide investigation have been prepared. After 6th/final JCC in September 2019, the Vice Minister of Public Works gave provisory approval for the products of the CDRS Project to be official documents of the NDBRFC. (When the Minister approves the products, the pages signed by the Vice Minister will be replaced.)

1-4 Achievement of the Project Purpose

Indicators of Project Purpose	Achievement level
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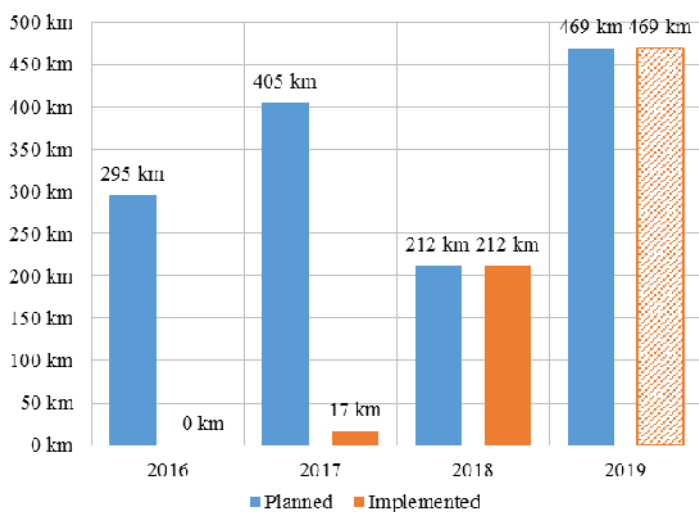
<p>Total length of maintained national roads were became 400km.</p>	<p>57% achieved The planned lengths of road maintenance by year exceeded the target value. However, the actual implemented lengths fell short of these plans (see Table 1, Graph 1 and Graph 2 below). It is expected that actual value will be close to the target by the end of the fiscal year of Timor-Leste (December 2019). The level of achievement of the Project Propose was expected to be medium at 6th/final JCC in September 2019.</p>
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Table 1: Transition of maintained roads lengths by year

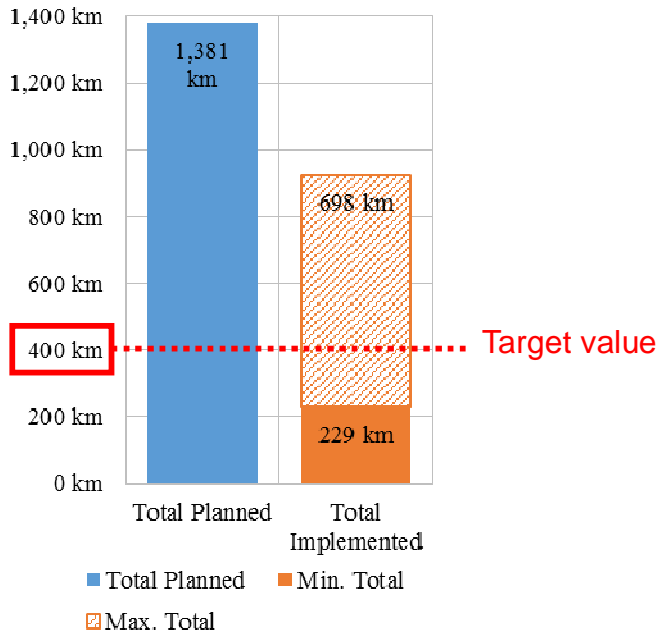
Lengths of maintained roads	Target	2016	2017	2018	2019	Total
Planned	N/A	295 km	405 km	212 km	496 km	1,381 km
Implemented	400 km	0 km	17 km	212 km	To be confirmed	229 km

Resource: JICA Expert Team

Graph 1: Length of planned and implemented maintenance work by year



Graph 2: Total length of maintenance work during the project period



1-5 Changes of Risks and Actions for Mitigation

1-6 Progress of Actions undertaken by JICA

- JICA Timor-Leste shared important information and documents with the JICA Expert Team.
- JICA Timor-Leste assisted with the visa acquisition process for the JICA Expert Team.

1-7 Progress of Actions undertaken by Gov. of Timor-Leste

- DRBFC shared the necessary information and documents with the JICA Expert Team.
- DRBFC has prepared drawings for road and bridge maintenance based on the road inspections.

1-8 Progress of Environmental and Social Considerations (if applicable)

- Not applicable so far.
- No activities for the progress of Environmental and Social Considerations were undertaken.

1-9 Progress of Considerations on Gender/Peace Building/Poverty Reduction (if applicable)

- Not applicable so far.

1-10 Other remarkable/considerable issues related/affect to the project (such as

other JICA's projects, activities of counterparts, other donors, private sectors, NGOs etc.)

- No other issues have occurred so far.

2. Delay of Work Schedule and/or Problems (if any)

- Based on the PDM, the project activities have been implemented as planned.

3. Modification of the Project Implementation Plan

3-1 PO

- No relevant issues were confirmed during this monitoring period.

3-2 Other modifications on detailed implementation plan

- No relevant issues were confirmed during this monitoring period.

4. Preparation of Gov. of Timor-Leste toward after completion of the Project

- The Gov. of Timor-Leste in trying to secure the budget for road maintenance so that the capacity enhancement of the NDRBFC for road maintenance, which is the Project Purpose, will be sustainable and will contribute to the achievement of the Overall Goal.
- The agenda of the Eighth (VIII) Constitutional Government of Timor-Leste prioritizes investment in road maintenance and the government continues to secure the necessary budget.
- The Gov. of Timor-Leste established the Strategic Development Plan (SDP) 2011-2030, and high priority has been given to infrastructure development and maintenance. To date, the Gov. of Timor-Leste has formulated and is implementing plans based on the SDP.

< II. Project Monitoring Sheet I & II >

- Project Monitoring Sheet I & II are attached as PM Form I and II.

Project Monitoring Sheet I (Revision of Project Design Matrix)

Project Title: The Project for Capacity Development of Road Services in Timor-Leste (CDRS)
Implementing Agency: Ministry of Public Works, Transport and Communications
Target Group: Officials of Directorate of Roads, Bridges and Flood Control (DRBFC)
Period of Project: (Three (3) years and nine(9) month)
Project Site: Whole Timor-Leste

Version 4
 Dated 30th September, 2019

Narrative Summary		Objectively Verifiable Indicators		Means of Verification	Important Assumption	Achievement	Remarks
Overall Goal							
The maintenance conditions of major roads are improved in TL.		OG 1 More than 60% of major national roads is in good		Periodic Road Inspection	Budget and staff will be secured at satisfactory levels. Traffic volume is not increased more than expected.	At the time of 6th/final JCC in September 2019, the level of achievement of Overall Goal was expected to be high.	These levels of achievement were evaluated, and the evaluation results were approved at 6th/final JCC in September 2019.
Project Purpose							
Capacity of DRBFC for maintenance of major roads in the whole country is enhanced.		Total length of maintained national roads become 400km.		Periodic Road Inspection	Enough number of DRBFC staff in the HQs and regional offices is ensured as planned. Budget for road maintenance and management is ensured.	At the time of 6th/final JCC in September 2019, the level of achievement of Project Purpose was expected to be medium.	
Outputs							
Output 1: Appropriate road maintenance and rehabilitation for major roads is realized in accordance with annual work plan and annual budget plan.		1-1 More than 30% of requested budget for road maintenance are distributed. 1-2 Improved road database is utilized for preparing the annual work plan of road maintenance.		Budget Report Monitoring Sheet	Budget for road maintenance and management is ensured. The trained DRBFC personnel continue to work for the Project (They do not quit the Project)	1-1. 65% 1-2. 75%	
Output 2: Capacity of DRBFC construction management for maintenance and rehabilitation including slope protection is improved through case studies in the whole country.		2-1. At least 3 case studies for construction and 3 case studies for design are conducted (Totally 6 case studies). 2-2. More than 60 % of trainees pass the achievement		Monitoring Sheet Achievement test	Unforeseen natural disasters will not occur which may destroy construction works under case studies.	2-1. 100% 2-2. 100%	These levels of achievement / project progress were approved at 6th/final JCC in September 2019.
Output 3: Technical guideline of investigation and design for maintenance and rehabilitation are provided as a tool for more appropriate design including slope protection.		3. Technical guideline of investigation and design for slope protection, drainage and measures against scouring are prepared.		Technical guideline prepared		3. 100%	

Activities	Inputs	Pre-Conditions
<p>1.1 To review existing management structure condition of maintenance and rehabilitation for major roads.</p> <p>1.2 To conduct periodic/routine inspection.</p> <p>1.3 To update the database based on the inspection result and repair/rehabilitation works of roads and bridges.</p> <p>1.4 To formulate maintenance and repair/rehabilitation plans for next cycle.</p> <p>1.5 To implement emergency inspections and repair/rehabilitation works when necessity arises.</p> <p>1.6 To undertake appropriate road maintenance/rehabilitation works by following annual work and budget plans which reflect priorities within the limited budget.</p> <p>1.7 To propose appropriate framework of road maintenance and rehabilitation for major roads.</p>	<p>The Japanese Side</p> <p>1. Dispatch of the Japanese experts Short-term experts: - Team leader / Road maintenance 1 - Deputy team leader / Road maintenance 2 - Road construction supervision - Quality control / Road repair - Disaster restoration - Road design / Project coordinator - Structure design - Database - Evaluation / Monitoring - Other areas if needed</p> <p>2. Facilities and equipment In accordance with necessity of activities</p> <p>3. Training in Japan In accordance with necessity of activities</p>	<p>DRBFC's budget necessary for the Project is allocated by TL government.</p>
<p>2. To identify typical rehabilitation and repair works of major roads in the whole country as case studies.</p> <p>2.2 To conduct the case studies for the planning, design and construction supervision of the project.</p> <p>2.3 To propose preferable structures for construction management for repair/rehabilitation and maintenance works through case studies.</p> <p>3.1 To review existing technical documents for road maintenance and rehabilitation.</p> <p>3.2 To review and identify factors of failure from past examples of damaged rehabilitation and construction works.</p> <p>3.3 To acquire necessary knowledges of civil engineering for design through classroom lectures and</p> <p>3.4 To prepare the technical guideline of investigation and design.</p> <p>3.5 To reflect the lessons learned from case studies to the technical guideline.</p> <p>3.6 To disseminate the technical guideline for concerned parties.</p>	<p>The Timor-Leste Side</p> <p>1. Assignment of C/Ps - Project Director - Project Manager - DRBFC Staff</p> <p>2. Assignment of Trainees In accordance of necessity</p> <p>3. Facilities and Equipment - Project office Equipment and tools</p> <p>4. Recurrent costs - Expenses for equipment maintenance - Spare parts - Transportation fees of C/Ps and trainees - Expenses for contract-out of works - Necessary expenditures for case studies - C/Ps' wages and allowances</p>	<p><Issues and countermeasures></p> <p>Issue: The budget for 2019 was approved in February 2019 and procurement of maintenance works started in August. Activities 1.3, 1.4, 1.6 and 1.7 have not achieved their targets. Moreover, at the 6th/final JCC in September 2019, data about planned lengths for road maintenance and probability of enough budget distribution for 2020 could not be grasped.</p> <p>Countermeasure: Based on the progress of tendering, the level of achievement of Project Propose/total length of maintained roads was evaluated. The probability of achieving the Overall Goal was predicted based on the 5-year road work plans and the Strategic Development Plan (2011-2030) of TL.</p> <p>In order to confirm the levels of achievement of the above issues and activities, monitoring will continue until the end of the project (December 2019).</p>

Activities	2016		2017				2018				2019				2020				Responsible Organization Japan GOTL	Achievements	Issue & Countermeasures			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II				III	IV	
Output 1: Appropriate road maintenance and rehabilitation for major roads	1.1 To review existing management structure and condition of maintenance and rehabilitation for major roads																				JICA expert team	This activity was completed in June 2016.	- Conditions of roads and road structures are collected continuously in NDRBFC database; - Changes in road conditions are grasped by reports of roads users via NDRBFC social media	
1.2 To conduct the periodic/routine inspection	Plan	Actual	done																			GOTL, NDRBFC Dept. of Maintenance and Dept. of Projects	Periodic / routine inspection has been completed along A03.	Issue: Data entry work has taken an unexpectedly long time and the GIS database has not been completed to date.
1.3 To update the database based on the inspection result and repair/rehabilitation works of roads and bridges	Plan	Actual																				NDRBFC Dept. of Maintenance and Dept. of Projects, JICA Expert Team assists this activity.	National road survey results were inputted into GIS database (684 km). Total length of national roads (target): 1,427 km Roads that have not been entered into the GIS database: 93 km Roads that are being rehabilitated (not yet entered into GIS database): 650 km	Countermeasures: 1) During inspections, JICA Expert Team provided on-the-job training (OJT) to show the whole inspection procedure from data collection to data input. 2) JICA Expert Team repeated training about operation of GIS database and made a video of instructions about operating procedures in order to support C/P.
1.4 To formulate maintenance and repair/rehabilitation plans for next cycle	Plan	Actual																				NDRBFC Dept. of Maintenance and Dept. of Projects, JICA Expert Team assists this activity.	Maintenance and rehabilitation work plans for 2020 were formulated based on the 5-year plans.	
1.5 To implement emergency inspections and repair/rehabilitation works when necessity arises	Plan	Actual																				NDRBFC, JICA expert team assists this activity.	JICA Expert Team monitored C/P carrying out emergency inspections. If there had been a request by C/P, JICA Expert Team was ready to support.	During this monitoring period, C/P did not request support from JICA Expert Team regarding emergency inspections.
1.6 To undertake appropriate road maintenance/rehabilitation works by following annual work and budget plans which reflect priorities within the limited budget	Plan	Actual																				NDRBFC Dept. of Maintenance and Dept. of Projects, JICA Expert Team assists this activity.	NDRBFC secured 3.7 million USD as annual budget for maintenance works in 2019. This budget was formulated following the 5-year plan. In September 2019, NDRBFC have started the procurement process for 50% of the works.	
1.7 To propose appropriate framework of road maintenance/rehabilitation for major roads	Plan	Actual																				JICA expert team	At 6th/final JCC in September 2019, JICA Expert Team presented project results; at this time, an appropriate framework was recommended, and these recommendations have been accepted by NDRBFC.	
Output 2: Capacity of DRBFC construction management for maintenance and rehabilitation is improved through case studies in the whole country including slope protections	2.1 To identify typical rehabilitation and repair works of major roads in the whole country as case studies																				JICA expert team	This activity was completed in February 2018.		
2.2 To conduct the case studies for the planning, design check, and construction supervision of the project	Plan	Actual																				Responsibility of TL government: secure budget for the projects which were	1) OJT for quality control of stone masonry retaining walls using checklists was conducted. 2) Review of OJT for construction supervision using checklists was conducted (debriefing and evaluation of OJT).	
2.3 To propose preferable structures for construction management for repair/rehabilitation works through case studies	Plan	Actual																				JICA expert team	1) JICA Expert Team prepared checklists for construction in order to guarantee efficiency and quality of construction management. 2) JICA Expert Team supported C/P in carrying out construction supervision using checklists.	

Attachment 1

OJT- Practice of Using Checklist for Construction in Liquica on 11 April 2019

Review of Construction Supervision on 24 April 2019

Aituto Landslide Monitoring on 30 April 2019

Enclosure :

12 April, 2019

Record of Practice of using Check List for PW Liquica Office on Emergency Road at Tibalaw and Karibala, A03

(For Case Study activity of CDRS Project; Supervising for Road Construction)

Sabino Da Costa Ventura, Coordinator of Region 4, Maintenance Department

This is the record of Practice of using Check List for Construction (CL) for Public Works (PW) Liquica municipality Office, infrastructure supervising staff, by DRBFC's Trainer on Emergency Road at Tibalaw and Karibala, A03.

Date/Places and the record of Practice of using CL for PW Liquica Office are follows. Reference information is shown in the attachments herewith.

1. Date and Places

- 1) Date: 11:30 – 14:00, Thursday 11 Thurs, 2019
- 2) Place: PW Liquica municipality Office and the site of Emergency Road, STA 0+400 – STA 0+500 at Karibala, A03
- 3) Project Name: Road and Drainage Rehabilitation Project, Emergency Road at Tibalaw and Karimbaia Liquica, (on A03, Infra Fund 2018 No.287)
- 4) Contractor: Montana Diak, Unip. Lda
- 5) work item: Stone Masonry Retaining Wall
- 6) Trainer: Eng. Sabino Da Costa Ventura, Region4 coordinator, Maintenance Department, DRBFC
- 7) Participants: Mr. Cleto Ximenes, infrastructure supervising of PW Liquica Office
Mr. Jose Perla de Costa, ditto
Mr. Allino Fernandes Da Costa, Region 2 Maintenance Dept., DRBFC

2. Summary of Practice of using CL for PW Liquica Office and comments from Participants

1) Stone Masonry Retaining Wall:
The section of the Works, STA0+400 – STA0+500 from the beginning point in Karibala A03, Stone Masonry Retaining Wall is under construction. Using Check List for Stone Masonry Retaining Wall, Practice for PW Liquica Office supervisors are carried out. Checking the excavated ground condition, size of material (stone), mixture of concrete and installation of weep holes and others are made according to the Check List.

ATTENDANCE LIST

Date : 11 April 2019

Subject : Practice of using checklist for construction in Liquica

Venue : Emergency road Liquica A03 (Tibalaw-Karimbaia)

No./Mr/Ms	Name	Affiliation/Duty	Department	E-mail	Mobile	Signature
1	Mr/Ms EKO PURWANJO	SPONSOR	MANAJA			[Signature]
2	Mr/Ms SABINO DA COSTA VENTURA	TRAINER	MAINTENANCE			[Signature]
3	Mr/Ms Cleto Ximenes	Supervisor	DRBFC			[Signature]
4	Mr/Ms Jose Perla de Costa	Supervisor	DRBFC			[Signature]
5	Mr/Ms Cleto Ximenes	Supervisor	DRBFC			[Signature]
6	Mr/Ms Jose Perla de Costa	Supervisor	DRBFC			[Signature]
7	Mr/Ms Cleto Ximenes	Supervisor	DRBFC			[Signature]
8	Mr/Ms Jose Perla de Costa	Supervisor	DRBFC			[Signature]
9	Mr/Ms Cleto Ximenes	Supervisor	DRBFC			[Signature]
10	Mr/Ms Jose Perla de Costa	Supervisor	DRBFC			[Signature]
11	Mr/Ms Cleto Ximenes	Supervisor	DRBFC			[Signature]
12	Mr/Ms Jose Perla de Costa	Supervisor	DRBFC			[Signature]
13	Mr/Ms Cleto Ximenes	Supervisor	DRBFC			[Signature]
14	Mr/Ms Jose Perla de Costa	Supervisor	DRBFC			[Signature]
15	Mr/Ms Cleto Ximenes	Supervisor	DRBFC			[Signature]
16	Mr/Ms Jose Perla de Costa	Supervisor	DRBFC			[Signature]
17	Mr/Ms Cleto Ximenes	Supervisor	DRBFC			[Signature]
18	Mr/Ms Jose Perla de Costa	Supervisor	DRBFC			[Signature]

Allino Fern

2) Comments from Participants:

Participant	Comments from Participants	Trainers Comment (Mr. Sabino)
Mr. Cleto Ximenes	-this check list is a good, but we need more training for more understanding, because so far, we have never used it before -we can use the checklist at site for knowing clearly all the ongoing work at site	Through the practice how o using checklist, it's means that the checklist is important to the all engineer, and in the future, it's will be use by 1) consultant 2) contractor 3) supervisor 4) Technical staff
Mr. Jose P. da Costa	-the checklist form is need to translate to tetun for every work item -recommended for consultation within the contractor engineer and supervisor -supervisor must have the drawing so that it's can help fill filling the CL during the inspection	Yes, technical staff is need to use to checklist in the future when the get instruction for doing supervision or inspection on site.
Mr. Allino Fernandes	Regarding the construction base on the drawing -dimension of the stone masonry wall same as the drawing -compaction that utilize blade excavator not accordance with the specification -using a checklist is important, because all the question is detail and complete -regarding the safety on site is good because all the workers using safety tools such as safety vest and helmet	As a professional engineer for the roads and bridges we have to use checklist form for site inspection and site check

3. Comments from Trainer and proposal for further Practices using CL

- 1) Counter measures for outstanding work items in Check List during the Practice
Compacted Ground (2) 1: "Did you use the compactor for compaction?" => "No"
Compaction for the excavated surface of original ground under the Retaining Wall should be compacted before starting structural Stone Masonry base. The Contractor was instructed to do so.

Weep Holes (4): "Was diameter hole appropriately?..." => "No"

On the site, diameter of weep holes is 50mm, but standard Specification 100mm. If the different size and interval of weep holes are desired, the Contractor should submit the request for such variation to the supervisor in charge of the Works prior to commencement of works.

Backfill (5): "Did you check the backfill material?" => "No"

The actual works are not yet progress of backfilling. The backfill material and the manner of compaction will be made properly and will be checked by the supervisor.

2) Proposal for further Practices using CL at other municipal Offices

In order to make sure the quality of works and to learn how to carry out the Quality Control, further "Practice of using Check List for other PW municipality Office" is required. Such requirement has been already made at the CDRS Work Shop held on 15 March 2018 by other Directors of PW municipality Offices, such as Ermera Office.

Attachment 1: Attendance List

- 2: Photos of the Practice using CL in Emergency Road at Tibalaw and Karibala, A03 on 11 April, 2019
- 3: Used sheets of Check List for Stone Masonry on the Practice

ATTENDANCE LIST

Date : 11 April 2019
 Subject : Practice of using checklist for construction in Liquiça
 : Emergency road Liquiça A03 (Tibalan-Karimabala)

No./Mr/Ms	Name	Affiliation/Duty	Department	E-mail	Mobile	Signature
1	Mr/Ms EKO PURWAKO	Supervisor	MANORANG			
2	Mr/Ms SABINTO DC. VENTY TRIANEN	MAINTENANCE	MANORANG			
3	Mr/Ms JOSEPH BERENSON BT FERNING	Supervisor of Maintenance	MANORANG			
4	Mr/Ms JOE HENRIK DA GODO	Supervisor of Maintenance	MANORANG			
5	Mr/Ms CLETO XIMENES	Supervisor	MANORANG			
6	Mr/Ms Irlisio SA Bando	Supervisor	MANORANG			
7	Mr/Ms JELI KOEUMI	Supervisor	MANORANG			
8	Mr/Ms					
9	Mr/Ms					
10	Mr/Ms					
11	Mr/Ms					
12	Mr/Ms					
13	Mr/Ms					

4 Record of Practice using Check List for PW Liquiça Office on Emergency Road, A03

Attachment2: Photos for Record of Practice using Check List on Emergency Road, A03 Liquiça on 11 April, 2019

5 Record of Practice using Check List for PW Liquiça Office on Emergency Road, A03

6 Record of Practice using Check List for PW Liquiça Office on Emergency Road, A03

Attachment 3: Check List used for Practice for PW Liquiça Office works

(4) Stone Masonry Retaining Wall
 (Masa Retenasaha Fatuk)

CHECKLIST for Stone Masonry Retaining Wall
 (LISTA VERIFIKASION ba Masa Retenasaha Fatuk)

Name of Project: ROAD AND MAINTENANCE REPAIR/RECONSTRUCTION PROJECT (EMERGENCY ROAD)
 (Nomon Projeitu: TIKORANAN ANO KARIMABALA LIQUIÇA (EMERGENCY ROAD) A03)
 Location: ALBERT COAST EAST LIQUIÇA COAST Date: 11 / 4 / 2019
 Fabric: PAUSA DR A03
 Name of Contractor: MONTANA DIKALOA Location: STA 0 km+00 - 0 km+00 (Fatuk)
 Name of Inspector: CLETO XIMENES Name of Department: MANORANG
 (Masa Inspektur: CLETO XIMENES Masa Departamentu: MANORANG)
 SPC: Technical Specifications of MNTIC-ROADS-14-2010
 (Instruksion teknika spesifika MNTIC-ROADS-14-2010)

No.	Check Items (Verifika Item)	Compliance (Korrespondensi) (Yes/No)	Remarks (Observasion) (If not comply, please refer to the inspection report)
0	Preparatory activity (Aktividade preparatoriu)		
1	Did you confirm the drawings? (Ba hebe konfirmasion desenhon?)	Yes/No	Yes
2	Did you confirm the consistency with photo? (Ba hebe konfirmasion konsistensia foto rekord konstruksion mian?)	Yes/No	Yes DRAKATA TIKORANAN

7 Record of Practice using Check List for PW Liquiça Office on Emergency Road, A03

CHECKLIST for Stone Masonry Retaining Wall
(LISTA VERIFIKASIAUN ba Alvaru Retensuan ba Patub)

No	Check Items (Verifika Item)	Actual/As Found (Observada/Encontrada)	Desired/As Required (Observada/Encontrada)	Remarks (Observasaoes/Notas) (Observasoes/Notas)
1	Did you check the thickness of mortar coat? (Ha heit iustika mortar about its thick ka?)	Yes	No	OK
2	Was cement mortar composed appropriately? (Simentu mortar miud komposto apropriadu ka?)	Yes	No	Correct 1: Smentu Correct 2: Can be OK

CHECKLIST for Excavation

* Note, Remark and/or Comment (Nota, observasao e / ou comentario)

Fizemos Check List preciso para o trabalho de abertura de trincheira em defesa de servico de agua. A supervisao foi feita com a supervisao da obra. O supervisor no local participou da verificacao. Para mais detalhes veja o checklist. Precisa fazer de novo a verificacao para antes de prosseguir com o trabalho.

Lop duni pascol teknik sika periksa liu lisamos formasi check list ba oia konsultasi sika orientasao teknik ba halo supervisao ou inspeksio proyekto retensi.

Inspector: (Signature/Date)
Inspector: (Signature/Date)
Inspected By: (Signature/Date)
Checked By: (Signature/Date)
Checked By: (Signature/Date)
Checked By: (Signature/Date)
Checked By: (Signature/Date)

Region 4 of Maintenance, CDRS

Practice using Check List at Hq/ro Office

The Project for the Capacity Development of Road Services in The Democratic Republic of Timor-Leste

ATTENDANCE LIST

Date: 20 April 2019
Subject: Bairro Landslide Monitoring

No	Mr/Ms	Name	Affiliation/Duty	Department	E-mail	Mobile	Signature
1	Mr/Ms	Oktoviano Viegas Tilman	Geologist	IPG			
2	Mr/Ms	Cristovao Monteiro	Engineer	Maintenance			
3	Mr/Ms	Koji MINEGISHI		CDRS			
4	Mr/Ms	Kazuharu KOISHIKAWA					
5	Mr/Ms	Mariano	Driver				
6	Mr/Ms	Antonio	Driver				
7	Mr/Ms						
8	Mr/Ms						
9	Mr/Ms						
10	Mr/Ms						
11	Mr/Ms						
12	Mr/Ms						
13	Mr/Ms						
14	Mr/Ms						
15	Mr/Ms						
16	Mr/Ms						
17	Mr/Ms						
18	Mr/Ms						

Attachment 2

OJT- for Disaster Investigation on 10 May 2019

OJT-Introduction for Measurement of river cross section in Comoro river on 13 May 2019

Follow up of Disaster investigation sheet on 13 May 2019

ATTENDANCE LIST

Date : 24 April 2019
 Subject : Review of Construction Supervision
 Venue : CDRS Office

No	Mr/Ms	Name	Affiliation/Duty	Department	E-mail	Mobile	Signature
1	Mr/Ms	Manoel, Otilio, Pereira	Analisis Equipamento	Highway Department			[Signature]
2	Mr/Ms	Kosha A da Silva Pires	Shop Technico	Construction Dept			[Signature]
3	Mr/Ms	Veronica da Silva de Andrade	Proj Technico	Project Dept			[Signature]
4	Mr/Ms	Everson, Ana Paula de Silva	Site Technico	Project Dept			[Signature]
5	Mr/Ms	Durante, Soledad	Proj Technico	Project Dept			[Signature]
6	Mr/Ms	Francisco, Feliciano	Proj Technico	Project Dept			[Signature]
7	Mr/Ms	Jacinto, Germano	Proj Technico	Project Dept			[Signature]
8	Mr/Ms	Muhammad Saevans	STTT Technico	DRBFC			[Signature]
9	Mr/Ms	Alibichu, S. A. Estrada	Engineer	CDRS			[Signature]
10	Mr/Ms	(Job): KOTIMH	Engineer	CDRS			[Signature]
11	Mr/Ms						
12	Mr/Ms						
13	Mr/Ms						
14	Mr/Ms						
15	Mr/Ms						
16	Mr/Ms						
17	Mr/Ms						
18	Mr/Ms						

Enclosure : 25 April, 2019

Record of Work Shop: Review of Construction Supervision & Small Test 2
 (For Case Study activities of CDRS Project; Supervising for Road Construction)

Case Study Team for the said Case Study,
 Construction & Maintenance Department, DRBFC

This is the record of Work Shop, Review of Construction Supervision & Small Test 2. Date/Places and the record of the Work Shop and the Result of Small Test are follows. Reference information is shown in the attachments herewith.

- 1. Date and Places**
 - 1) Date: 10:00 – 12:00, Wednesday 24 April, 2019
 - 2) Place: CDRS Office (JICA Experts room) in DRBFC premises
 - 3) Presenter: Johji Kozumai, CDRS Expert for Road Construction Supervision
 - 4) Participants: Engineering staff from Construction, Maintenance, Project, Training/Cooperation and Highway Departments, DRBFC
 < Some staff takes part in only responding "Small Test 2">
 - 5) Agenda of Work Shop: I. Presentation: Key Points of Construction Supervision
 II. Small Test 2 for Construction Supervision
 III. Q/A and Discussion
- 2. Summary of Discussion and Comments from Participants**
 - 1) Q/A and discussions during the Work Shop
 - A1: Photos of question No.2 of Small Test are not clear, so it is difficult to consider which worker is safer in clothe. And even (c) worker provides safety helmet and caution vest, but he wear short pants, then he cannot to be said to wear in safe clothe.
 - A2: It is sorry the photos are too small to see clearly. Among 4 workers, the worker in (c) is relatively safer than other 3 workers.
 - A3: Only 2 (two) example progress chart are shown on the question No.9 of Small Test and Progress Chart (b) (net-work progress chart) is not explained in the Presentation. It is not understandable to the question.
 - A4: On the Lecture of "Progress Control" held on September 2017, detailed explanation has been made but we will show such Training Material by soft copy for your reference.

- Q3: "Chlorine volume checking" in the field test for casting concrete in Japan are explained in the presentation regarding "Slump" test. What does "Chlorine volume checking" mean?
- A3: Contents of chlorine in the reinforcement concrete should be tested in Japan. Reinforcement is steel bar and steel is likely rusted and deteriorated by the condition of many Chlorine contents and water in the concrete. So, as possible as little chlorine contents is desired for reinforcement concrete.

2) Comments from Participants:

1) Comment for Using CI	2) Any other comment regarding supervising of construction
In my opinion, using checklist for construction it's a good advantage for all Engineers in site, because checklist for construction it's a good Evaluation in site for control the quality according to the Procedure of the specification.	In my opinion, for now and in the future better to using checklist for construction site when we made a monitoring in site
In my opinion, using checklist for construction is a good way to facilitate the engineer as a supervisor in construction site to check the work item more details according to each work item, that's why using a checklist will make engineer work easier to verify every work item step by step.	When supervise construction in site, it's will be good to make a good control in site to increase construction quality on site, so that it's will minimize any failure and we will not get any problem on site. That why construction supervision is needed to control and verify construction project.

3. Result of Small Test 2 and Analysis of the tests result
- 1) Result of Small Test 2
 Other than 8 participants of Work Shop, total 19 personnel from DRBFC took the Small Test 2 reviewing Construction Supervision. The result of Small Test 2 is shown on the attached "Table of Responses for Small Test 2 for Construction supervising". Total Average of marks is 62.1% of 100% of full marks.
 - 2) Analysis of the results of Small Test 2
 1. Each Type of Control
 Review of Construction Supervision is made in different field, three (3) Control points:
 1. Quality Control (QC):

- 64.5% marks are obtained from QC fields. It means that participants understand knowledge and techniques of QC better than the same Test on last year.
2. Safety Control (QC):
 63.2% marks are obtained from Safety activities fields. Almost all participants can be said that they have already basic understanding about Safety Control.
 3. Construction management:
 Only 42.1% marks are obtained from Construction Management fields. Further practice and training is required in this field. When staff of DRBFC will carry out "Inspection for work done" as a daily their assignments, such occasion will be good chances to acquired "Construction Management", such as checking "Progress Chart" of work done and whether records of documents are properly or not.
 - II. Requirement for each Department
 Results show that marks of Maintenance Department is a little bit lower than marks of other Departments. It seems that further practice and training are needed for the technical staff of Maintenance Department.

- Attachment 1: Attendance List
2. Photos of the Work Shop: Review of Construction SV on 24 April, 2019
 3. Questions and Answer of Small Test 2
 4. Result Table of Small Test 2

Attachment 4: Result Table of Small Test

Table of Responses for Small Test 2 for Construction Supervising

No.	Mr/Ms	Name	Affiliation/Duty	Department	E-mail	Mobile	Signature
1	Mr/Ms	Noutinho Tilmor		Municipal			[Signature]
2	Mr/Ms	Affonso F. da Costa		Dep. Municipal			[Signature]
3	Mr/Ms	Sabino de J. Blycke		Dep. Protec			[Signature]
4	Mr/Ms	Armando Soares		Dep. Protec			[Signature]
5	Mr/Ms	Julius L. Kelly		Dep. Protec			[Signature]
6	Mr/Ms	Louisco Louca		IPG			[Signature]
7	Mr/Ms	Orlando Viegas Tilmor					[Signature]
8	Mr/Ms						
9	Mr/Ms						
10	Mr/Ms						
11	Mr/Ms						
12	Mr/Ms						
13	Mr/Ms						
14	Mr/Ms						
15	Mr/Ms						
16	Mr/Ms						
17	Mr/Ms						
18	Mr/Ms						


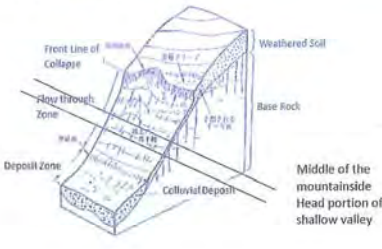
ATTENDANCE LIST

Date : 13 May 2019
 Subject : Site Training For Disaster Investigation
 Venue : Ex-Jaram Road

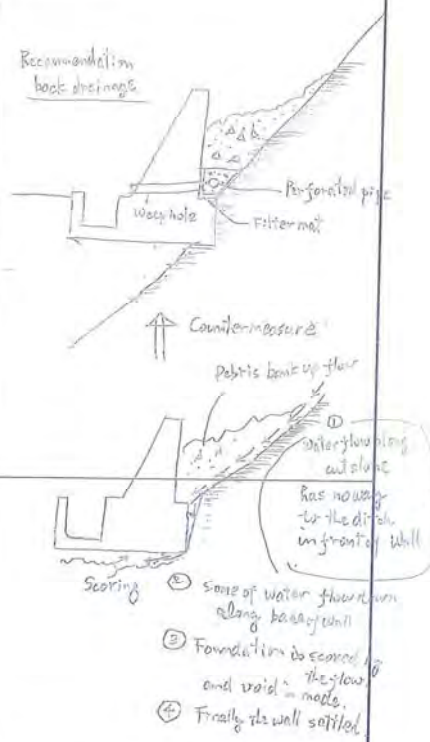
No.	Mr/Ms	Name	Affiliation/Duty	Department	E-mail	Mobile	Signature
1	Mr/Ms	José Pedro Amal	M. Insp.				[Signature]
2	Mr/Ms	ALVARO F. DA COSTA	Dep. Protec				[Signature]
3	Mr/Ms	ALVARO F. DA COSTA	Dep. Protec				[Signature]
4	Mr/Ms	ALVARO F. DA COSTA	Dep. Protec				[Signature]
5	Mr/Ms	ALVARO F. DA COSTA	Dep. Protec				[Signature]
6	Mr/Ms	ALVARO F. DA COSTA	Dep. Protec				[Signature]
7	Mr/Ms	ALVARO F. DA COSTA	Dep. Protec				[Signature]
8	Mr/Ms	ALVARO F. DA COSTA	Dep. Protec				[Signature]
9	Mr/Ms	ALVARO F. DA COSTA	Dep. Protec				[Signature]
10	Mr/Ms	ALVARO F. DA COSTA	Dep. Protec				[Signature]
11	Mr/Ms	ALVARO F. DA COSTA	Dep. Protec				[Signature]
12	Mr/Ms	ALVARO F. DA COSTA	Dep. Protec				[Signature]
13	Mr/Ms	ALVARO F. DA COSTA	Dep. Protec				[Signature]
14	Mr/Ms	ALVARO F. DA COSTA	Dep. Protec				[Signature]
15	Mr/Ms	ALVARO F. DA COSTA	Dep. Protec				[Signature]
16	Mr/Ms	ALVARO F. DA COSTA	Dep. Protec				[Signature]
17	Mr/Ms	ALVARO F. DA COSTA	Dep. Protec				[Signature]
18	Mr/Ms	ALVARO F. DA COSTA	Dep. Protec				[Signature]

Table of Responses for Small Test 2 for Construction Supervising

No.	Mr/Ms	Name	Affiliation/Duty	Department	E-mail	Mobile	Signature
1	Mr/Ms	José Pedro Amal	M. Insp.				[Signature]
2	Mr/Ms	ALVARO F. DA COSTA	Dep. Protec				[Signature]
3	Mr/Ms	ALVARO F. DA COSTA	Dep. Protec				[Signature]
4	Mr/Ms	ALVARO F. DA COSTA	Dep. Protec				[Signature]
5	Mr/Ms	ALVARO F. DA COSTA	Dep. Protec				[Signature]
6	Mr/Ms	ALVARO F. DA COSTA	Dep. Protec				[Signature]
7	Mr/Ms	ALVARO F. DA COSTA	Dep. Protec				[Signature]
8	Mr/Ms	ALVARO F. DA COSTA	Dep. Protec				[Signature]
9	Mr/Ms	ALVARO F. DA COSTA	Dep. Protec				[Signature]
10	Mr/Ms	ALVARO F. DA COSTA	Dep. Protec				[Signature]
11	Mr/Ms	ALVARO F. DA COSTA	Dep. Protec				[Signature]
12	Mr/Ms	ALVARO F. DA COSTA	Dep. Protec				[Signature]
13	Mr/Ms	ALVARO F. DA COSTA	Dep. Protec				[Signature]
14	Mr/Ms	ALVARO F. DA COSTA	Dep. Protec				[Signature]
15	Mr/Ms	ALVARO F. DA COSTA	Dep. Protec				[Signature]
16	Mr/Ms	ALVARO F. DA COSTA	Dep. Protec				[Signature]
17	Mr/Ms	ALVARO F. DA COSTA	Dep. Protec				[Signature]
18	Mr/Ms	ALVARO F. DA COSTA	Dep. Protec				[Signature]

Disaster Investigation Sheets 1/4			
Code/Number		Ex-Japan Road	
Place Information	Road Number	STA 5+340 (Blue letters on the wall)	
	Station	-8	39 49.6
	Latitude	125	32 10.0
	Longitude	Training site for DIS	
Special Note			
Birds-eye Photo			
			
Road Location on the mountainside			
			
Middle of the mountainside Head portion of shallow valley			
Others			
Alluvial Fan Along a river Along seaside			

Disaster Investigation Sheets 3/4			
Time line	Occurrence	No data	
	Primary Investigation	No data	Executioner
	Removing Debris	No data	
	Disaster Investigation	10th May 2019	CDRS Minegishi Maintenance D. 2, Project D.4
	Conference		
Geological Information	Cover Soil	Hardly weathered Rock becomes clay. Less than 1m, No colluvial deposit (Observation on the cut slope)	
	Base Rock	Sedimentary Rock, Schistosity, some portion shows fold Some weak portion was scored all bench width.	
Drainage /Water Information	Roadside Ditch	Mountain side 1m ditch Valley side shallow channel on bare road bed	
	Cross Culvert	None	
	Stream /Spring	No clear traces of streams on the cut slope No spring	
	Others		
Slope Classification	Natural slope	Cut slope	Embankment
	Natural slope involving cut slope Phenomena area cannot be fix Natural slope involving embankment Natural slope involving both of cut slope and embankment		
Classification of Slope Disaster	Type1 Slope Collapse	Type2 Rock Fall	
	Type3 Rock Mass Failure	Type4 Mass Movement	
Description of Damages	Type5 Debris Flow Type6 Road Collapse		
	Comment It seems some phenomenon overlap		
Trend of Continuity and Expansion	Cut slope: Collapse, Scoring, clear traces of stream Catch wall and ditch: Fracture, Subsidence Road surface (no pavement): no evidence of damage Guard wall: Turn over to valley direction These damages are not on reasonable line of one phenomena		
	Unclear so far		
Open or Close for Traffic	Until Now	All Width Open	One Lane Open Close
	From Now	All Width Open	One Lane Open Close
	Comment	No influence for the traffic	

Disaster Investigation Sheets 4/4	
Recommendation for Rehabilitation Plan	Nothing is necessary
	Rehabilitation just same as before
Additional Investigation for Design	Enhancement/Renovation
	

Disaster Investigation Photo Sheets 2/3	
Code/Number	
	
Google	

Attachment 3

Orientation for End Line Test on 28 June 2019

End Line Test on 1 July 2019

ATTENDANCE LIST

Date : 23 June 2019
 Subject : Opening of End Line Test
 Venue : DRBEC Conference room

No./Mr/Ms	Name	Affiliation/Duty	Department	E-mail	Mobile	Signature
1	Mr/Ms LOISELINA DA COSTA	7	Dep. de Proj.			[Signature]
2	Mr/Ms MARCELO SOARES	1				[Signature]
3	Mr/Ms LUIS LUIZ SOARES	1				[Signature]
4	Mr/Ms Celestino E. Soares	1	Highway Dep.			[Signature]
5	Mr/Ms Maria da Rosa B. Soares	1	Dep. Constr.			[Signature]
6	Mr/Ms Lidio G. Soares	Intern	Dep. Constr.			[Signature]
7	Mr/Ms LUIS S. DA COSTA		Dep. Constr.			[Signature]
8	Mr/Ms Sabino de J. Lobato	Staff Dep.	Dep. Constr.			[Signature]
9	Mr/Ms Antonio de A. Soares	Staff Dep.	Dep. Constr.			[Signature]
10	Mr/Ms Maria da Rosa B. Soares	1	Dep. Constr.			[Signature]
11	Mr/Ms ALTINO FERREIRA DA COSTA	1	Dep. Constr.			[Signature]
12	Mr/Ms Estevão de Sousa	1	Dep. Constr.			[Signature]
13	Mr/Ms Domingos de C. Monteiro	1	Dep. Constr.			[Signature]
14	Mr/Ms					
15	Mr/Ms					
16	Mr/Ms					
17	Mr/Ms					
18	Mr/Ms					

ATTENDANCE LIST

Date : 1st July 2019
 Subject : End Line Test
 Venue : DRBEC Conference room

No./Mr/Ms	Name	Affiliation/Duty	Department	E-mail	Mobile	Signature
1	Mr/Ms Sabino de J. Lobato	Staff Dep.	Dep. Constr.			[Signature]
2	Mr/Ms ALBERTO SOARES	Staff	Dep. Constr.			[Signature]
3	Mr/Ms ALBERTO FERREIRA DA COSTA	Supervisor	Maintenance			[Signature]
4	Mr/Ms VALERIA E. G. DE JESUS	Staff	PROJECT DEP.			[Signature]
5	Mr/Ms Lidio G. Soares	Intern	Dep. of Construction			[Signature]
6	Mr/Ms Celso Soares	Staff	Highway Dep.			[Signature]
7	Mr/Ms Helio de Sousa	Staff	Dep. Constr.			[Signature]
8	Mr/Ms Sabino de J. Lobato	Staff	Dep. Constr.			[Signature]
9	Mr/Ms FERREIRA DA COSTA	Supervisor	Dep. of Construction			[Signature]
10	Mr/Ms Domingos Monteiro	Staff	Dep. Constr.			[Signature]
11	Mr/Ms Nelson M. L. A. de A. B. Soares	Staff	Dep. Constr.			[Signature]
12	Mr/Ms FRANCISCO SOARES	Staff	Dep. Constr.			[Signature]
13	Mr/Ms Domingos Monteiro	Staff	Dep. Constr.			[Signature]
14	Mr/Ms Sabino de J. Lobato	Staff	Dep. Constr.			[Signature]
15	Mr/Ms Domingos Monteiro	Staff	Dep. Constr.			[Signature]
16	Mr/Ms Domingos Monteiro	Staff	Dep. Constr.			[Signature]
17	Mr/Ms Domingos Monteiro	Staff	Dep. Constr.			[Signature]
18	Mr/Ms Domingos Monteiro	Staff	Dep. Constr.			[Signature]

No./Mr/Ms	Name	Affiliation/Duty	Department	E-mail	Mobile	Signature
19	Mr/Ms DOMINGOS MONTEIRO	Staff	Dep. Constr.			[Signature]
20	Mr/Ms ALBERTO SOARES	Staff	Dep. Constr.			[Signature]
21	Mr/Ms ALBERTO SOARES	Staff	Dep. Constr.			[Signature]
22	Mr/Ms ALBERTO SOARES	Staff	Dep. Constr.			[Signature]
23	Mr/Ms ALBERTO SOARES	Staff	Dep. Constr.			[Signature]
24	Mr/Ms ALBERTO SOARES	Staff	Dep. Constr.			[Signature]
25	Mr/Ms ALBERTO SOARES	Staff	Dep. Constr.			[Signature]
26	Mr/Ms ALBERTO SOARES	Staff	Dep. Constr.			[Signature]
27	Mr/Ms ALBERTO SOARES	Staff	Dep. Constr.			[Signature]
28	Mr/Ms ALBERTO SOARES	Staff	Dep. Constr.			[Signature]
29	Mr/Ms ALBERTO SOARES	Staff	Dep. Constr.			[Signature]
30	Mr/Ms ALBERTO SOARES	Staff	Dep. Constr.			[Signature]
31	Mr/Ms ALBERTO SOARES	Staff	Dep. Constr.			[Signature]
32	Mr/Ms ALBERTO SOARES	Staff	Dep. Constr.			[Signature]
33	Mr/Ms ALBERTO SOARES	Staff	Dep. Constr.			[Signature]
34	Mr/Ms ALBERTO SOARES	Staff	Dep. Constr.			[Signature]
35	Mr/Ms ALBERTO SOARES	Staff	Dep. Constr.			[Signature]
36	Mr/Ms ALBERTO SOARES	Staff	Dep. Constr.			[Signature]
37	Mr/Ms ALBERTO SOARES	Staff	Dep. Constr.			[Signature]
38	Mr/Ms ALBERTO SOARES	Staff	Dep. Constr.			[Signature]
39	Mr/Ms ALBERTO SOARES	Staff	Dep. Constr.			[Signature]
40	Mr/Ms ALBERTO SOARES	Staff	Dep. Constr.			[Signature]

ATTENDANCE LIST

Date : 13 May 2019
 Subject : Follow up of Disaster Investigations sheet Training
 Venue : CDRES Office

No./Mr/Ms	Name	Affiliation/Duty	Department	E-mail	Mobile	Signature
1	Mr/Ms DOMINGOS MONTEIRO	Staff	Dep. Constr.			[Signature]
2	Mr/Ms DOMINGOS MONTEIRO	Staff	Dep. Constr.			[Signature]
3	Mr/Ms DOMINGOS MONTEIRO	Staff	Dep. Constr.			[Signature]
4	Mr/Ms DOMINGOS MONTEIRO	Staff	Dep. Constr.			[Signature]
5	Mr/Ms DOMINGOS MONTEIRO	Staff	Dep. Constr.			[Signature]
6	Mr/Ms DOMINGOS MONTEIRO	Staff	Dep. Constr.			[Signature]
7	Mr/Ms DOMINGOS MONTEIRO	Staff	Dep. Constr.			[Signature]
8	Mr/Ms DOMINGOS MONTEIRO	Staff	Dep. Constr.			[Signature]
9	Mr/Ms DOMINGOS MONTEIRO	Staff	Dep. Constr.			[Signature]
10	Mr/Ms DOMINGOS MONTEIRO	Staff	Dep. Constr.			[Signature]
11	Mr/Ms DOMINGOS MONTEIRO	Staff	Dep. Constr.			[Signature]
12	Mr/Ms DOMINGOS MONTEIRO	Staff	Dep. Constr.			[Signature]
13	Mr/Ms DOMINGOS MONTEIRO	Staff	Dep. Constr.			[Signature]
14	Mr/Ms DOMINGOS MONTEIRO	Staff	Dep. Constr.			[Signature]
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16	Mr/Ms DOMINGOS MONTEIRO	Staff	Dep. Constr.			[Signature]
17	Mr/Ms DOMINGOS MONTEIRO	Staff	Dep. Constr.			[Signature]
18	Mr/Ms DOMINGOS MONTEIRO	Staff	Dep. Constr.			[Signature]

1 Surveying

Questions	Answer: Choose the one of them as the most appropriated answer.				
1-1 If the result of measured coordinates of national bench mark on project is different to the coordination which you were officially informed before the measurement, what will you do ?	To check the coordination of the BM	To order re-survey	To change the measured coordination based on the BM's coordination	To check the survey instrument	To re-training surveyor team
1-2 How do you protect the coordination of control points physically and formally ?	To cover with a little soil	To cover with a much soil	To install peg and instruct the resident to protect	To set up by reference points for restoration	To train the surveyor to remember the correct position
1-3 How do you check the topographic data on the drawing at the site on the project ?	To check the direction of compass	To check the planned center line	To check the existing center line	To check the location of existing houses	To check the location of existing utilities
1-4 When you check road design drawing, which subject you are concerned ?	To check with the standard drawing	Strength of the road bed	Boundary on the road reserve	Direction of compass	Direction of destination of drainage system
1-5 Regarding mobile GPS operation, which subject you shall give the attention when you survey x, y, z coordinates ?	Accuracy	Coordination z (i.e. elevation)	Speed of the surveying	Continuous of the surveying	Battery charger

2 Drainage and Culvert

Questions	Answer: Choose the one of them as the most appropriated answer.				
2-1 When you will conduct a field survey for planning and design of road drainage facilities, which point of view is not appropriate ?	To check a flow direction of surface water	To check a traffic volume and origin and destination of traffic	To check a surrounding condition of outlet point	To check a location and volume of spring water and seepage water from natural ground	Sorry I don't know
2-2 Which data you do not need when you estimate the quantity of water due to rainfall i.e. runoff ?	Catchment area	Rainfall data	Return period	Traffic speed	Sorry I don't know
2-3 Which data you do not need when you estimate the flow capacity passed under the road embankment ?	Dimension of the crossing	Water quality	Velocity of flow	Slope of crossing	Sorry I don't know
2-4 What is the minimum earth covering thickness you will apply for culvert structure ?	15cm	30cm	50cm	100cm	Sorry I don't know
2-5 Which description is not appropriate for hydraulic study on bridge project, comply with the draft Bridge Design Manual in TL ?	In preliminary survey, waterway openings should be able to pass 500-year flood without causing structural failure	In the hydraulic analysis the design discharge is 50-years discharge	Minimum vertical clearance between the highest flood level and the lowest point of the girder should be more than 150mm	Maximum discharge can be estimated by using a Rational method	The velocity obtaining in the stream under the flood condition is calculated using Lacey's formula

3 Retaining Wall

Questions	Answer: Choose the one of them as the most appropriated answer.				
3-1 Which factor is not appropriate for damage and collapse of retaining wall ?	Recovery of vegetation and animal	Increase in earth pressure and hydraulic pressure	Settlement of ground	Riverbed erosion	Sorry I don't know
3-2 Which subject is not appropriate for stability analysis of retaining wall ?	Safety for sliding	Safety for overturning	Environmental and social consideration	Bearing capacity of ground	Sorry I don't know
3-3 Which item is not appropriate as primary load for design of retaining wall ?	Self weight of retaining wall	Earth load	Hydraulic pressure	Loaded weight	Sorry I don't know
3-4 Which item is not appropriate for design condition of retaining wall ?	Angle of share resistance (ϕ) of sandy soil, which is assumed according to soil classification, is 35 degree	Unit weight of sandy soil used as backfilling material is 19 kN/m ³	Friction coefficient (μ) between a concrete and gravel ground is 0.6	Allowable bearing capacity (qa) of gravel ground is 600 kN/m ²	Sorry I don't know
3-5 Which description is not appropriate for design of masonry retaining wall ?	Masonry without back fill concrete is used only for a river revetment	It is not necessary to install a drain pipe for retaining wall on land (non-river)	Masonry wall is often used at the site of small earth load	High permeable material such as crushed stone should be used as a back fill material	Sorry I don't know

4 Slope Protection

Questions	Answer: Choose the one of them as the most appropriated answer.				
4-1 Which item is not appropriate reason for set up a terrace on slope surface	Ensure a stability	Drainage on the surface	Cost saving	Maintenance and operation	Sorry I don't know
4-2 Which subject you will consider in case of the determination for cut slope?	Height of cutting	Drainage system	Type of the soil	Availability of equipment	Sorry I don't know
4-3 What is the minimum slope gradient you will apply for cutting slope on hard rock ground ?	Vertical cut	1 : 0.3	1 : 0.5	1 : 1.0	Sorry I don't know
4-4 What is the standard slope gradient you will apply for embankment slope with normal material ?	1 : 1.0	1 : 1.5	1 : 1.8	1 : 2.0	Sorry I don't know
4-5 Which description is not appropriate for bio-engineering work ?	The first purpose of the work is to protect a slope from rain erosion and prevent from surface failure	The work can not expect the effect which prevents deep failure	Selection of the work depend on the vegetable seed, soil type, slope gradient and meteorological condition	The work is also applicable in steep slope	Sorry I don't know

Department : Maintenance

Your name : _____

1 Concrete

Questions	Answer: Choose the one of them as the most appropriated answer.				
1- 1 How much is the Slump for Class A of concrete in accordance with the SPC (ITEM 506) ?	0 - 50mm	50 - 100mm	100 - 200mm	more than 100mm	Sorry I don't know
1- 2 How much is the Minimum Cement Content for Class A of concrete in accordance with the SPC (ITEM 506) ?	360 kg	320 kg	380 kg	440 kg	Sorry I don't know
1- 3 How much is the Maximum Water/Cement Ratio for Class A of concrete in accordance with the SPC (ITEM 506) ?	0.49	0.53	0.55	0.58	Sorry I don't know
1- 4 When do you check the Compressive Strength Test for specimen of concrete in accordance with the SPC (ITEM 506) ?	at 4 days and 28 days after casting of concrete	at 5 days and 28 days after casting of concrete	at 7 days and 28 days after casting of concrete	at 10 days and 28 days after casting of concrete	Sorry I don't know
1- 5 What do you use the Class of Concrete for retaining wall in accordance with SPC (ITEM 506) ?	Class A	Class B	Class C	Class P	Sorry I don't know

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2 Aggregate Subbase Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
2- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 20%	Max. 30%	Max. 35%	Max. 40%	Sorry I don't know
2- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 10	Max. 12	Max. 14	Max. 16	Sorry I don't know
2- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 40%	Max. 45%	Max. 50%	Max. 60%	Sorry I don't know
2- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Subbase Course in accordance with the SPC (ITEM 301) ?	±0mm	±10mm	±20mm	+10mm -20mm	+20mm -30mm
2- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Subbase Course in accordance with the SPC (ITEM 301) ?	±0mm	±5mm	±10mm	±15mm	±20mm

SPC-MPWTC Standard Specifications - November 2014 Edition

3 Aggregate Base Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
3- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	0 - 10%	0 - 15%	0 - 20%	0 - 25%	Sorry I don't know
3- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	Max. 10	Max. 15	Max. 20	Max. 25	Sorry I don't know
3- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	0 - 30%	0 - 35%	0 - 40%	0 - 45%	Sorry I don't know
3- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Base Course in accordance with the SPC (ITEM 303) ?	±0mm	±5mm	±10mm	+5mm -10mm	+10mm -20mm
3- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Base Course in accordance with the SPC (ITEM 303) ?	±0mm	±5mm	±10mm	±15mm	±20mm

SPC-MPWTC Standard Specifications - November 2014 Edition

4 Aggregate Surface Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
4- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 20%	Max. 25%	Max. 30%	Max. 35%	Sorry I don't know
4- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 8	Max. 10	Min. 4 Max. 9	Min. 6 Max. 12	Sorry I don't know
4- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 30%	Max. 35%	Max. 45%	Max. 50%	Sorry I don't know
4- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Surface Course in accordance with the SPC (ITEM 401) ?	±0mm	±5mm	±10mm	+5mm -10mm	+15mm -5mm
4- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Surface Course in accordance with the SPC (ITEM 401) ?	±0mm	±5mm	±10mm	+5mm -10mm	+15mm -5mm

SPC-MPWTC Standard Specifications - November 2014 Edition

Department : Maintenance

Your name : _____

1 Surveying

Questions	Answer: Choose the one of them as the most appropriated answer.				
1-1 If the result of measured coordinates of national bench mark on project is different to the coordination which you were officially informed before the measurement, what will you do ?	To check the coordination of the BM	To order re-survey	To change the measured coordination based on the BM's coordination	To check the survey instrument	To re-training surveyor team
1-2 How do you protect the coordination of control points physically and formally ?	To cover with a little soil	To cover with a much soil	To install peg and instruct the resident to protect	To set up by reference points for restoration	To train the surveyor to remember the correct position
1-3 How do you check the topographic data on the drawing at the site on the project ?	To check the direction of compass	To check the planned center line	To check the existing center line	To check the location of existing houses	To check the location of existing utilities
1-4 When you check road design drawing, which subject you are concerned ?	To check with the standard drawing	Strength of the road bed	Boundary on the road reserve	Direction of compass	Direction of destination of drainage system
1-5 Regarding mobile GPS operation, which subject you shall give the attention when you survey x, y, z coordinates ?	Accuracy	Coordination z (i.e. elevation)	Speed of the surveying	Continuous of the surveying	Battery charger

2 Drainage and Culvert

Questions	Answer: Choose the one of them as the most appropriated answer.				
2-1 When you will conduct a field survey for planning and design of road drainage facilities, which point of view is not appropriate ?	To check a flow direction of surface water	To check a traffic volume and origin and destination of traffic	To check a surrounding condition of outlet point	To check a location and volume of spring water and seepage water from natural ground	Sorry I don't know
2-2 Which data you do not need when you estimate the quantity of water due to rainfall i.e. runoff ?	Catchment area	Rainfall data	Return period	Traffic speed	Sorry I don't know
2-3 Which data you do not need when you estimate the flow capacity passed under the road embankment ?	Dimension of the crossing	Water quality	Velocity of flow	Slope of crossing	Sorry I don't know
2-4 What is the minimum earth covering thickness you will apply for culvert structure ?	15cm	30cm	50cm	100cm	Sorry I don't know
2-5 Which description is not appropriate for hydraulic study on bridge project, comply with the draft Bridge Design Manual in TL ?	In preliminary survey, waterway openings should be able to pass 500-year flood without causing structural failure	In the hydraulic analysis the design discharge is 50-years discharge	Minimum vertical clearance between the highest flood level and the lowest point of the girder should be more than 150mm	Maximum discharge can be estimated by using a Rational method	The velocity obtained in the stream under the flood condition is calculated using Lacey's formula

3 Retaining Wall

Questions	Answer: Choose the one of them as the most appropriated answer.				
3-1 Which factor is not appropriate for damage and collapse of retaining wall ?	Recovery of vegetation and animal	Increase in earth pressure and hydraulic pressure	Settlement of ground	Riverbed erosion	Sorry I don't know
3-2 Which subject is not appropriate for stability analysis of retaining wall ?	Safety for sliding	Safety for overturning	Environmental and social consideration	Bearing capacity of ground	Sorry I don't know
3-3 Which item is not appropriate as primary load for design of retaining wall ?	Self weight of retaining wall	Earth load	Hydraulic pressure	Loaded weight	Sorry I don't know
3-4 Which item is not appropriate for design condition of retaining wall ?	Angle of share resistance (ϕ) of sandy soil, which is assumed according to soil classification, is 35 degree	Unit weight of sandy soil used as backfilling material is 19 kN/m ³	Friction coefficient (μ) between a concrete and gravel ground is 0.6	Allowable bearing capacity (qa) of gravel ground is 600 kN/m ²	Sorry I don't know
3-5 Which description is not appropriate for design of masonry retaining wall ?	Masonry without back fill concrete is used only for a river revetment	It is not necessary to install a drain pipe for retaining wall on land (non-river)	Masonry wall is often used at the site of small earth load	High permeable material such as crushed stone should be used as a back fill material	Sorry I don't know

4 Slope Protection

Questions	Answer: Choose the one of them as the most appropriated answer.				
4-1 Which item is not appropriate reason for set surface	Ensure a stability	Drainage on the surface	Cost saving	Maintenance and operation	Sorry I don't know
4-2 Which subject you will consider in case of the determination for cut slope?	Height of cutting	Drainage system	Type of the soil	Availability of equipment	Sorry I don't know
4-3 What is the minimum slope gradient you will apply for cutting slope on hard rock ground ?	Vertical cut	1 : 0.3	1 : 0.5	1 : 1.0	Sorry I don't know
4-4 What is the standard slope gradient you will apply for embankment slope with normal material ?	1 : 1.0	1 : 1.5	1 : 1.8	1 : 2.0	Sorry I don't know
4-5 Which description is not appropriate for bio-engineering work ?	The first purpose of the work is to protect a slope from rain erosion and prevent from surface failure	The work can not expect the effect which prevents deep slope failure	Selection of the work depend on the vegetable seed, soil type, slope gradient and meteorological condition	The work is also applicable in steep slope	Sorry I don't know

Department : _____

Your name : _____

1 Concrete

Questions	Answer: Choose the one of them as the most appropriated answer.				
1- 1 How much is the Slump for Class A of concrete in accordance with the SPC (ITEM 506) ?	0 - 50mm	50 - 100mm	100 - 200mm	more than 100mm	Sorry I don't know
1- 2 How much is the Minimum Cement Content for Class A of concrete in accordance with the SPC (ITEM 506) ?	360 kg	320 kg	380 kg	440 kg	Sorry I don't know
1- 3 How much is the Maximum Water/Cement Ratio for Class A of concrete in accordance with the SPC (ITEM 506) ?	0.49	0.53	0.55	0.58	Sorry I don't know
1- 4 When do you check the Compressive Strength Test for specimen of concrete in accordance with the SPC (ITEM 506) ?	at 4 days and 28 days after casting of concrete	at 5 days and 28 days after casting of concrete	at 7 days and 28 days after casting of concrete	at 10 days and 28 days after casting of concrete	Sorry I don't know
1- 5 What do you use the Class of Concrete for retaining wall in accordance with SPC (ITEM 506) ?	Class A	Class B	Class C	Class P	Sorry I don't know

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2 Aggregate Subbase Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
2- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 20%	Max. 30%	Max. 35%	Max. 40%	Sorry I don't know
2- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 10	Max. 12	Max. 14	Max. 16	Sorry I don't know
2- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 40%	Max. 45%	Max. 50%	Max. 60%	Sorry I don't know
2- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Subbase Course in accordance with the SPC (ITEM 301) ?	±0mm	±10mm	±20mm	+10mm -20mm	+20mm -30mm
2- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Subbase Course in accordance with the SPC (ITEM 301) ?	±0mm	±5mm	±10mm	±15mm	±20mm

SPC-MPWTC Standard Specifications - November 2014 Edition

3 Aggregate Base Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
3- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	0 - 10%	0 - 15%	0 - 20%	0 - 25%	Sorry I don't know
3- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	Max. 10	Max. 15	Max. 20	Max. 25	Sorry I don't know
3- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	0 - 30%	0 - 35%	0 - 40%	0 - 45%	Sorry I don't know
3- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Base Course in accordance with the SPC (ITEM 303) ?	±0mm	±5mm	±10mm	+5mm -10mm	+10mm -20mm
3- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Base Course in accordance with the SPC (ITEM 303) ?	±0mm	±5mm	±10mm	±15mm	±20mm

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Questions	Answer: Choose the one of them as the most appropriated answer.				
4- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 20%	Max. 25%	Max. 30%	Max. 35%	Sorry I don't know
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SPC-MPWTC Standard Specifications - November 2014 Edition

Department : Maintenance

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Questions	Answer:: Choose the one of them as the most appropriated answer.				
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Questions	Answer:: Choose the one of them as the most appropriated answer.				
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Questions	Answer:: Choose the one of them as the most appropriated answer.				
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4 Slope Protection

Questions	Answer:: Choose the one of them as the most appropriated answer.				
4-1 Which item is not appropriate reason for set up a terrace on slope surface	Ensure a stability	Drainage on the surface	Cost saving	Maintenance and operation	Sorry I don't know
4-2 Which subject you will consider in case of the determination for cut slope?	Height of cutting	Drainage system	Type of the soil	Availability of equipment	Sorry I don't know
4-3 What is the minimum slope gradient you will apply for cutting slope on hard rock ground ?	Vertical cut	1 : 0.3	1 : 0.5	1 : 1.0	Sorry I don't know
4-4 What is the standard slope gradient you will apply for embankment slope with normal material ?	1 : 1.0	1 : 1.5	1 : 1.8	1 : 2.0	Sorry I don't know
4-5 Which description is not appropriate for bio-engineering work ?	The first purpose of the work is to protect a slope from rain erosion and prevent from surface failure	The work can not expect the effect which prevents deep slope failure	Selection of the work depend on the vegetable seed, soil type, slope gradient and meteorological condition	The work is also applicable in steep slope	Sorry I don't know

Department : *Dept. M.*

Your name : _____

1 Concrete

Questions	Answer: Choose the one of them as the most appropriated answer.				
1- 1 How much is the Slump for Class A of concrete in accordance with the SPC (ITEM 506) ?	0 - 50mm	50 - 100mm	100 - 200mm	more than 100mm	Sorry I don't know
1- 2 How much is the Minimum Cement Content for Class A of concrete in accordance with the SPC (ITEM 506) ?	360 kg	320 kg	380 kg	440 kg	Sorry I don't know
1- 3 How much is the Maximum Water/Cement Ratio for Class A of concrete in accordance with the SPC (ITEM 506) ?	0.49	0.53	0.55	0.58	Sorry I don't know
1- 4 When do you check the Compressive Strength Test for specimen of concrete in accordance with the SPC (ITEM 506) ?	at 4 days and 28 days after casting of concrete	at 5 days and 28 days after casting of concrete	at 7 days and 28 days after casting of concrete	at 10 days and 28 days after casting of concrete	Sorry I don't know
1- 5 What do you use the Class of Concrete for retaining wall in accordance with SPC (ITEM 506) ?	Class A	Class B	Class C	Class P	Sorry I don't know

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2 Aggregate Subbase Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
2- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 20%	Max. 30%	Max. 35%	Max. 40%	Sorry I don't know
2- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 10	Max. 12	Max. 14	Max. 16	Sorry I don't know
2- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 40%	Max. 45%	Max. 50%	Max. 60%	Sorry I don't know
2- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Subbase Course in accordance with the SPC (ITEM 301) ?	±0mm	±10mm	±20mm	+10mm -20mm	+20mm -30mm
2- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Subbase Course in accordance with the SPC (ITEM 301) ?	±0mm	±5mm	±10mm	±15mm	±20mm

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3 Aggregate Base Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
3- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	0 - 10%	0 - 15%	0 - 20%	0 - 25%	Sorry I don't know
3- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	Max. 10	Max. 15	Max. 20	Max. 25	Sorry I don't know
3- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	0 - 30%	0 - 35%	0 - 40%	0 - 45%	Sorry I don't know
3- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Base Course in accordance with the SPC (ITEM 303) ?	±0mm	±5mm	±10mm	+5mm -10mm	+10mm -20mm
3- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Base Course in accordance with the SPC (ITEM 303) ?	±0mm	±5mm	±10mm	±15mm	±20mm

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4 Aggregate Surface Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
4- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 20%	Max. 25%	Max. 30%	Max. 35%	Sorry I don't know
4- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 8	Max. 10	Min. 4 Max. 9	Min. 6 Max. 12	Sorry I don't know
4- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 30%	Max. 35%	Max. 45%	Max. 50%	Sorry I don't know
4- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Surface Course in accordance with the SPC (ITEM 401) ?	±0mm	±5mm	±10mm	+5mm -10mm	+15mm -5mm
4- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Surface Course in accordance with the SPC (ITEM 401) ?	±0mm	±5mm	±10mm	+5mm -10mm	+15mm -5mm

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Department : Dept. Manutenção

Your name : _____

1 Surveying

Questions	Answer: Choose the one of them as the most appropriated answer.				
1-1 If the result of measured coordinates of national bench mark on project is different to the coordination which you were officially informed before the measurement, what will you do ?	To check the coordination of the BM	To order re-survey	To change the measured coordination based on the BM's coordination	To check the survey instrument	To re-training surveyor team
1-2 How do you protect the coordination of control points physically and formally ?	To cover with a little soil	To cover with a much soil	To install peg and instruct the resident to protect	To set up by reference points for restoration	To train the surveyor to remember the correct position
1-3 How do you check the topographic data on the drawing at the site on the project ?	To check the direction of compass	To check the planned center line	To check the existing center line	To check the location of existing houses	To check the location of existing utilities
1-4 When you check road design drawing, which subject you are concerned ?	To check with the standard drawing	Strength of the road bed	Boundary on the road reserve	Direction of compass	Direction of destination of drainage system
1-5 Regarding mobile GPS operation, which subject you shall give the attention when you survey x, y, z coordinates ?	Accuracy	Coordination z (i.e. elevation)	Speed of the surveying	Continuous of the surveying	Battery charger

2 Drainage and Culvert

Questions	Answer: Choose the one of them as the most appropriated answer.				
2-1 When you will conduct a field survey for planning and design of road drainage facilities, which point of view is not appropriate ?	To check a flow direction of surface water	To check a traffic volume and origin and destination of traffic	To check a surrounding condition of outlet point	To check a location and volume of spring water and seepage water from natural ground	Sorry I don't know
2-2 Which data you do not need when you estimate the quantity of water due to rainfall i.e. runoff ?	Catchment area	Rainfall data	Return period	Traffic speed	Sorry I don't know
2-3 Which data you do not need when you estimate the flow capacity passed under the road embankment ?	Dimension of the crossing	Water quality	Velocity of flow	Slope of crossing	Sorry I don't know
2-4 What is the minimum earth covering thickness you will apply for culvert structure ?	15cm	30cm	50cm	100cm	Sorry I don't know
2-5 Which description is not appropriate for hydraulic study on bridge project, comply with the draft Bridge Design Manual in TL ?	In preliminary survey, waterway openings should be able to pass 500-year flood without causing structural failure	In the hydraulic analysis the design discharge is 50-years discharge	Minimum vertical clearance between the highest flood level and the lowest point of the girder should be more than 150mm	Maximum discharge can be estimated by using a Rational method	The velocity obtaining in the stream under the flood condition is calculated using Lacey's formula

3 Retaining Wall

Questions	Answer: Choose the one of them as the most appropriated answer.				
3-1 Which factor is not appropriate for damage and collapse of retaining wall ?	Recovery of vegetation and animal	Increase in earth pressure and hydraulic pressure	Settlement of ground	Riverbed erosion	Sorry I don't know
3-2 Which subject is not appropriate for stability analysis of retaining wall ?	Safety for sliding	Safety for overturning	Environmental and social consideration	Bearing capacity of ground	Sorry I don't know
3-3 Which item is not appropriate as primary load for design of retaining wall ?	Self weight of retaining wall	Earth load	Hydraulic pressure	Loaded weight	Sorry I don't know
3-4 Which item is not appropriate for design condition of retaining wall ?	Angle of share resistance (ϕ) of sandy soil, which is assumed according to soil classification, is 35 degree	Unit weight of sandy soil used as backfilling material is 19 kN/m ³	Friction coefficient (μ) between a concrete and gravel ground is 0.6	Allowable bearing capacity (q_n) of gravel ground is 600 kN/m ²	Sorry I don't know
3-5 Which description is not appropriate for design of masonry retaining wall ?	Masonry without back fill concrete is used only for a river revetment	It is not necessary to install a drain pipe for retaining wall on land (non-river)	Masonry wall is often used at the site of small earth load	High permeable material such as crushed stone should be used as a back fill material	Sorry I don't know

4 Slope Protection

Questions	Answer: Choose the one of them as the most appropriated answer.				
4-1 Which item is not appropriate reason for set up a terrace on slope surface	Ensure a stability	Drainage on the surface	Cost saving	Maintenance and operation	Sorry I don't know
4-2 Which subject you will consider in case of the determination for cut slope?	Height of cutting	Drainage system	Type of the soil	Availability of equipment	Sorry I don't know
4-3 What is the minimum slope gradient you will apply for cutting slope on hard rock ground ?	Vertical cut	1 : 0.3	1 : 0.5	1 : 1.0	Sorry I don't know
4-4 What is the standard slope gradient you will apply for embankment slope with normal material ?	1 : 1.0	1 : 1.5	1 : 1.8	1 : 2.0	Sorry I don't know
4-5 Which description is not appropriate for bio-engineering work ?	The first purpose of the work is to protect a slope from rain erosion and prevent from surface failure	The work can not expect the effect which prevents deep slope failure	Selection of the work depend on the vegetable seed, soil type, slope gradient and meteorological condition	The work is also applicable in steep slope	Sorry I don't know

Department : _____

Your name : _____

1 Concrete

Questions	Answer: Choose the one of them as the most appropriated answer.				
1- 1 How much is the Slump for Class A of concrete in accordance with the SPC (ITEM 506) ?	0 - 50mm	50 - 100mm	100 - 200mm	more than 100mm	Sorry I don't know
1- 2 How much is the Minimum Cement Content for Class A of concrete in accordance with the SPC (ITEM 506) ?	360 kg	320 kg	380 kg	440 kg	Sorry I don't know
1- 3 How much is the Maximum Water/Cement Ratio for Class A of concrete in accordance with the SPC (ITEM 506) ?	0.49	0.53	0.55	0.58	Sorry I don't know
1- 4 When do you check the Compressive Strength Test for specimen of concrete in accordance with the SPC (ITEM 506) ?	at 4 days and 28 days after casting of concrete	at 5 days and 28 days after casting of concrete	at 7 days and 28 days after casting of concrete	at 10 days and 28 days after casting of concrete	Sorry I don't know
1- 5 What do you use the Class of Concrete for retaining wall in accordance with SPC (ITEM 506) ?	Class A	Class B	Class C	Class P	Sorry I don't know

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2 Aggregate Subbase Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
2- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 20%	Max. 30%	Max. 35%	Max. 40%	Sorry I don't know
2- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 10	Max. 12	Max. 14	Max. 16	Sorry I don't know
2- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 40%	Max. 45%	Max. 50%	Max. 60%	Sorry I don't know
2- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Subbase Course in accordance with the SPC (ITEM 301) ?	±0mm	±10mm	±20mm	+10mm -20mm	+20mm -30mm
2- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Subbase Course in accordance with the SPC (ITEM 301) ?	±0mm	±5mm	±10mm	±15mm	±20mm

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3 Aggregate Base Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
3- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	0 - 10%	0 - 15%	0 - 20%	0 - 25%	Sorry I don't know
3- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	Max. 10	Max. 15	Max. 20	Max. 25	Sorry I don't know
3- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	0 - 30%	0 - 35%	0 - 40%	0 - 45%	Sorry I don't know
3- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Base Course in accordance with the SPC (ITEM 303) ?	±0mm	±5mm	±10mm	+5mm -10mm	+10mm -20mm
3- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Base Course in accordance with the SPC (ITEM 303) ?	±0mm	±5mm	±10mm	±15mm	±20mm

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4 Aggregate Surface Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
4- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 20%	Max. 25%	Max. 30%	Max. 35%	Sorry I don't know
4- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 8	Max. 10	Min. 4 Max. 9	Min. 6 Max. 12	Sorry I don't know
4- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 30%	Max. 35%	Max. 45%	Max. 50%	Sorry I don't know
4- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Surface Course in accordance with the SPC (ITEM 401) ?	±0mm	±5mm	±10mm	+5mm -10mm	+15mm -5mm
4- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Surface Course in accordance with the SPC (ITEM 401) ?	±0mm	±5mm	±10mm	+5mm -10mm	+15mm -5mm

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Department : MAINTENANCE DEPARTMENT

Your name : _____

1 Surveying

Questions	Answer:: Choose the one of them as the most appropriated answer.				
1-1 If the result of measured coordinates of national bench mark on project is different to the coordination which you were officially informed before the measurement, what will you do ?	To check the coordination of the BM	To order re-survey	To change the measured coordination based on the BM's coordination	To check the survey instrument	To re-training surveyor team
1-2 How do you protect the coordination of control points physically and formally ?	To cover with a little soil	To cover with a much soil	To install peg and instruct the resident to protect	To set up by reference points for restoration	To train the surveyor to remember the correct position
1-3 How do you check the topographic data on the drawing at the site on the project ?	To check the direction of compass	To check the planned center line	To check the existing center line	To check the location of existing houses	To check the location of existing utilities
1-4 When you check road design drawing, which subject you are concerned ?	To check with the standard drawing	Strength of the road bed	Boundary on the road reserve	Direction of compass	Direction of destination of drainage system
1-5 Regarding mobile GPS operation, which subject you shall give the attention when you survey x, y, z coordinates ?	Accuracy	Coordination z (i.e. elevation)	Speed of the surveying	Continuous of the surveying	Battery charger

2 Drainage and Culvert

Questions	Answer:: Choose the one of them as the most appropriated answer.				
2-1 When you will conduct a field survey for planning and design of road drainage facilities, which point of view is not appropriate ?	To check a flow direction of surface water	To check a traffic volume and origin and destination of traffic	To check a surrounding condition of outlet point	To check a location and volume of spring water and seepage water from natural ground	Sorry I don't know
2-2 Which data you do not need when you estimate the quantity of water due to rainfall i.e. runoff ?	Catchment area	Rainfall data	Return period	Traffic speed	Sorry I don't know
2-3 Which data you do not need when you estimate the flow capacity passed under the road capacity passed under the road embankment ?	Dimension of the crossing	Water quality	Velocity of flow	Slope of crossing	Sorry I don't know
2-4 What is the minimum earth covering thickness you will apply for culvert structure ?	15cm	30cm	50cm	100cm	Sorry I don't know
2-5 Which description is not appropriate for hydraulic study on bridge project, comply with the draft Bridge Design Manual in TL ?	In preliminary survey, waterway openings should be able to pass 500-year flood without causing structural failure	In the hydraulic analysis the design discharge is 50-years discharge	Minimum vertical clearance between the highest flood level and the lowest point of the girder should be more than 150mm	Maximum discharge can be estimated by using a Rational method	The velocity obtaining in the stream under the flood condition is calculated using Lacey's formula

3 Retaining Wall

Questions	Answer:: Choose the one of them as the most appropriated answer.				
3-1 Which factor is not appropriate for damage and collapse of retaining wall ?	Recovery of vegetation and animal	Increase in earth pressure and hydraulic pressure	Settlement of ground	Riverbed erosion	Sorry I don't know
3-2 Which subject is not appropriate for stability analysis of retaining wall ?	Safety for sliding	Safety for overturning	Environmental and social consideration	Bearing capacity of ground	Sorry I don't know
3-3 Which item is not appropriate as primary load for design of retaining wall ?	Self weight of retaining wall	Earth load	Hydraulic pressure	Loaded weight	Sorry I don't know
3-4 Which item is not appropriate for design condition of retaining wall ?	Angle of share resistance (ϕ) of sandy soil, which is assumed according to soil classification, is 35 degree	Unit weight of sandy soil used as backfilling material is 19 kN/m ³	Friction coefficient (μ) between a concrete and gravel ground is 0.6	Allowable bearing capacity (qa) of gravel ground is 600 kN/m ²	Sorry I don't know
3-5 Which description is not appropriate for design of masonry retaining wall ?	Masonry without back fill concrete is used only for a river revetment	It is not necessary to install a drain pipe for retaining wall on land (non-river)	Masonry wall is often used at the site of small earth load	High permeable material such as crushed stone should be used as a back fill material	Sorry I don't know

4 Slope Protection

Questions	Answer:: Choose the one of them as the most appropriated answer.				
4-1 Which item is not appropriate reason for set up a terrace on slope surface	Ensure a stability	Drainage on the surface	Cost saving	Maintenance and operation	Sorry I don't know
4-2 Which subject you will consider in case of the determination for cut slope?	Height of cutting	Drainage system	Type of the soil	Availability of equipment	Sorry I don't know
4-3 What is the minimum slope gradient you will apply for cutting slope on hard rock ground ?	Vertical cut	1 : 0.3	1 : 0.5	1 : 1.0	Sorry I don't know
4-4 What is the standard slope gradient you will apply for embankment slope with normal material ?	1 : 1.0	1 : 1.5	1 : 1.8	1 : 2.0	Sorry I don't know
4-5 Which description is not appropriate for bio-engineering work ?	The first purpose of the work is to protect a slope from rain erosion and prevent from surface failure	The work can not expect the effect which prevents deep slope failure	Selection of the work depend on the vegetable seed, soil type, slope gradient and meteorological condition	The work is also applicable in steep slope	Sorry I don't know

Department : Maintenance

Your name : _____

1 Concrete

Questions	Answer: Choose the one of them as the most appropriated answer.				
1- 1 How much is the STemp for Class A of concrete in accordance with the SPC (ITEM 506) ?	0 - 50mm	50 - 100mm	100 - 200mm	more than 100mm	Sorry I don't know
1- 2 How much is the Minimum Cement Content for Class A of concrete in accordance with the SPC (ITEM 506) ?	360 kg	320 kg	380 kg	440 kg	Sorry I don't know
1- 3 How much is the Maximum Water/Cement Ratio for Class A of concrete in accordance with the SPC (ITEM 506) ?	0.49	0.53	0.55	0.58	Sorry I don't know
1- 4 When do you check the Compressive Strength Test for specimen of concrete in accordance with the SPC (ITEM 506) ?	at 4 days and 28 days after casting of concrete	at 5 days and 28 days after casting of concrete	at 7 days and 28 days after casting of concrete	at 10 days and 28 days after casting of concrete	Sorry I don't know
1- 5 What do you use the Class of Concrete for retaining wall in accordance with SPC (ITEM 506) ?	Class A	Class B	Class C	Class P	Sorry I don't know

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2 Aggregate Subbase Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
2- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 20%	Max. 30%	Max. 35%	Max. 40%	Sorry I don't know
2- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 10	Max. 12	Max. 14	Max. 16	Sorry I don't know
2- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 40%	Max. 45%	Max. 50%	Max. 60%	Sorry I don't know
2- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Subbase Course in accordance with the SPC (ITEM 301) ?	±0mm	±10mm	±20mm	+10mm -20mm	+20mm -30mm
2- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Subbase Course in accordance with the SPC (ITEM 301) ?	±0mm	±5mm	±10mm	±15mm	±20mm

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3 Aggregate Base Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
3- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	0 - 10%	0 - 15%	0 - 20%	0 - 25%	Sorry I don't know
3- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	Max. 10	Max. 15	Max. 20	Max. 25	Sorry I don't know
3- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	0 - 30%	0 - 35%	0 - 40%	0 - 45%	Sorry I don't know
3- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Base Course in accordance with the SPC (ITEM 303) ?	±0mm	±5mm	±10mm	+5mm -10mm	+10mm -20mm
3- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Base Course in accordance with the SPC (ITEM 303) ?	±0mm	±5mm	±10mm	±15mm	±20mm

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4 Aggregate Surface Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
4- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 20%	Max. 25%	Max. 30%	Max. 35%	Sorry I don't know
4- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 8	Max. 10	Min. 4 Max. 9	Min. 6 Max. 12	Sorry I don't know
4- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 30%	Max. 35%	Max. 45%	Max. 50%	Sorry I don't know
4- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Surface Course in accordance with the SPC (ITEM 401) ?	±0mm	±5mm	±10mm	+5mm -10mm	+15mm -5mm
4- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Surface Course in accordance with the SPC (ITEM 401) ?	±0mm	±5mm	±10mm	+5mm -10mm	+15mm -5mm

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Department : Maintenance

Your name : _____

1 Surveying

Questions	Answer: Choose the one of them as the most appropriated answer.				
1-1 If the result of measured coordinates of national bench mark on project is different to the coordination which you were officially informed before the measurement, what will you do ?	To check the coordination of the BM	To order re-survey	To change the measured coordination based on the BM's coordination	To check the survey instrument	To re-training surveyor team
1-2 How do you protect the coordination of control points physically and formally ?	To cover with a little soil	To cover with a much soil	To install peg and instruct the resident to protect	To set up by reference points for restoration	To train the surveyor to remember the correct position
1-3 How do you check the topographic data on the drawing at the site on the project ?	To check the direction of compass	To check the planned center line	To check the existing center line	To check the location of existing houses	To check the location of existing utilities
1-4 When you check road design drawing, which subject you are concerned ?	To check with the standard drawing	Strength of the road bed	Boundary on the road reserve	Direction of compass	Direction of destination of drainage system
1-5 Regarding mobile GPS operation, which subject you shall give the attention when you survey x, y, z coordinates ?	Accuracy	Coordination z (i.e. elevation)	Speed of the surveying	Continuous of the surveying	Battery charger

2 Drainage and Culvert

Questions	Answer: Choose the one of them as the most appropriated answer.				
2-1 When you will conduct a field survey for planning and design of road drainage facilities, which point of view is not appropriate ?	To check a flow direction of surface water	To check a traffic volume and origin and destination of traffic	To check a surrounding condition of outlet point	To check a location and volume of spring water and seepage water from natural ground	Sorry I don't know
2-2 Which data you do not need when you estimate the quantity of water due to rainfall i.e. runoff ?	Catchment area	Rainfall data	Return period	Traffic speed	Sorry I don't know
2-3 Which data you do not need when you estimate the flow capacity passed under the road embankment ?	Dimension of the crossing	Water quality	Velocity of flow	Slope of crossing	Sorry I don't know
2-4 What is the minimum earth covering thickness you will apply for culvert structure ?	15cm	30cm	50cm	100cm	Sorry I don't know
2-5 Which description is not appropriate for hydraulic study on bridge project, comply with the draft Bridge Design Manual in TL ?	In preliminary survey, waterway openings should be able to pass 500-year flood without causing structural failure	In the hydraulic analysis the design discharge is 50-years discharge	Minimum vertical clearance between the highest flood level and the lowest point of the girder should be more than 150mm	Maximum discharge can be estimated by using a Rational method	The velocity obtaining in the stream under the flood condition is calculated using Lacey's formula

3 Retaining Wall

Questions	Answer: Choose the one of them as the most appropriated answer.				
3-1 Which factor is not appropriate for damage and collapse of retaining wall ?	Recovery of vegetation and animal	Increase in earth pressure and hydraulic pressure	Settlement of ground	Riverbed erosion	Sorry I don't know
3-2 Which subject is not appropriate for stability analysis of retaining wall ?	Safety for sliding	Safety for overturning	Environmental and social consideration	Bearing capacity of ground	Sorry I don't know
3-3 Which item is not appropriate as primary load for design of retaining wall ?	Self weight of retaining wall	Earth load	Hydraulic pressure	Loaded weight	Sorry I don't know
3-4 Which item is not appropriate for design condition of retaining wall ?	Angle of share resistance (ϕ) of sandy soil, which is assumed according to soil classification, is 35 degree	Unit weight of sandy soil used as backfilling material is 19 kN/m ³	Friction coefficient (μ) between a concrete and gravel ground is 0.6	Allowable bearing capacity (qa) of gravel ground is 600 kN/m ²	Sorry I don't know
3-5 Which description is not appropriate for design of masonry retaining wall ?	Masonry without back fill concrete is used only for a river revetment	It is not necessary to install a drain pipe for retaining wall on land (non-river)	Masonry wall is often used at the site of small earth load	High permeable material such as crushed stone should be used as a back fill material	Sorry I don't know

4 Slope Protection

Questions	Answer: Choose the one of them as the most appropriated answer.				
4-1 Which item is not appropriate reason for set up a terrace on slope surface	Ensure a stability	Drainage on the surface	Cost saving	Maintenance and operation	Sorry I don't know
4-2 Which subject you will consider in case of the determination for cut slope?	Height of cutting	Drainage system	Type of the soil	Availability of equipment	Sorry I don't know
4-3 What is the minimum slope gradient you will apply for cutting slope on hard rock ground ?	Vertical cut	1 : 0.3	1 : 0.5	1 : 1.0	Sorry I don't know
4-4 What is the standard slope gradient you will apply for embankment slope with normal material ?	1 : 1.0	1 : 1.5	1 : 1.8	1 : 2.0	Sorry I don't know
4-5 Which description is not appropriate for bio-engineering work ?	The first purpose of the work is to protect a slope from rain erosion and prevent from surface failure	The work can not expect the effect which prevents deep slope failure	Selection of the work depend on the vegetable seed, soil type, slope gradient and meteorological condition	The work is also applicable in steep slope	Sorry I don't know

Department : Maintenance Department

Your name : _____

1 Concrete

Questions	Answer: Choose the one of them as the most appropriated answer.				
1- 1 How much is the Slump for Class A of concrete in accordance with the SPC (ITEM 506) ?	0 - 50mm	50 - 100mm	100 - 200mm	more than 100mm	Sorry I don't know
1- 2 How much is the Minimum Cement Content for Class A of concrete in accordance with the SPC (ITEM 506) ?	360 kg	320 kg	380 kg	440 kg	Sorry I don't know
1- 3 How much is the Maximum Water/ Cement Ratio for Class A of concrete in accordance with the SPC (ITEM 506) ?	0.49	0.53	0.55	0.58	Sorry I don't know
1- 4 When do you check the Compressive Strength Test for specimen of concrete in accordance with the SPC (ITEM 506) ?	at 4 days and 28 days after casting of concrete	at 5 days and 28 days after casting of concrete	at 7 days and 28 days after casting of concrete	at 10 days and 28 days after casting of concrete	Sorry I don't know
1- 5 What do you use the Class of Concrete for retaining wall in accordance with SPC (ITEM 508) ?	Class A	Class B	Class C	Class P	Sorry I don't know

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2 Aggregate Subbase Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
2- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 20%	Max. 30%	Max. 35%	Max. 40%	Sorry I don't know
2- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 10	Max. 12	Max. 14	Max. 16	Sorry I don't know
2- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 40%	Max. 45%	Max. 50%	Max. 60%	Sorry I don't know
2- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Subbase Course in accordance with the SPC (ITEM 301) ?	±0mm	±10mm	±20mm	+10mm -20mm	+20mm -30mm
2- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Subbase Course in accordance with the SPC (ITEM 301) ?	±0mm	±5mm	±10mm	±15mm	±20mm

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3 Aggregate Base Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
3- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	0 - 10%	0 - 15%	0 - 20%	0 - 25%	Sorry I don't know
3- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	Max. 10	Max. 15	Max. 20	Max. 25	Sorry I don't know
3- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	0 - 30%	0 - 35%	0 - 40%	0 - 45%	Sorry I don't know
3- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Base Course in accordance with the SPC (ITEM 303) ?	±0mm	±5mm	±10mm	+5mm -10mm	+10mm -20mm
3- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Base Course in accordance with the SPC (ITEM 303) ?	±0mm	±5mm	±10mm	±15mm	±20mm

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4 Aggregate Surface Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
4- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 20%	Max. 25%	Max. 30%	Max. 35%	Sorry I don't know
4- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 8	Max. 10	Min. 4 Max. 9	Min. 6 Max. 12	Sorry I don't know
4- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 30%	Max. 35%	Max. 45%	Max. 50%	Sorry I don't know
4- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Surface Course in accordance with the SPC (ITEM 401) ?	±0mm	±5mm	±10mm	+5mm -10mm	+15mm -5mm
4- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Surface Course in accordance with the SPC (ITEM 401) ?	±0mm	±5mm	±10mm	+5mm -10mm	+15mm -5mm

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Department : Maintenance HQ

Your name : _____

1 Surveying

Questions	Answer: Choose the one of them as the most appropriated answer.				
1-1 If the result of measured coordinates of national bench mark on project is different to the coordination which you were officially informed before the measurement, what will you do ?	To check the coordination of the BM	To order re-survey	To change the measured coordination based on the BM's coordination	To check the survey instrument	To re-training surveyor team
1-2 How do you protect the coordination of control points physically and formally ?	To cover with a little soil	To cover with a much soil	To install peg and instruct the resident to protect	To set up by reference points for restoration	To train the surveyor to remember the correct position
1-3 How do you check the topographic data on the drawing at the site on the project ?	To check the direction of compass	To check the planned center line	To check the existing center line	To check the location of existing houses	To check the location of existing utilities
1-4 When you check road design drawing, which subject you are concerned ?	To check with the standard drawing	Strength of the road bed	Boundary on the road reserve	Direction of compass	Direction of destination of drainage system
1-5 Regarding mobile GPS operation, which subject you shall give the attention when you survey x, y, z coordinates ?	Accuracy	Coordination z (i.e. elevation)	Speed of the surveying	Continuous of the surveying	Battery charger

2 Drainage and Culvert

Questions	Answer: Choose the one of them as the most appropriated answer.				
2-1 When you will conduct a field survey for planning and design of road drainage facilities, which point of view is not appropriate ?	To check a flow direction of surface water	To check a traffic volume and origin and destination of traffic	To check a surrounding condition of outlet point	To check a location and volume of spring water and seepage water from natural ground	Sorry I don't know
2-2 Which data you do not need when you estimate the quantity of water due to rainfall i.e. runoff ?	Catchment area	Rainfall data	Return period	Traffic speed	Sorry I don't know
2-3 Which data you do not need when you estimate the flow capacity passed under the road embankment ?	Dimension of the crossing	Water quality	Velocity of flow	Slope of crossing	Sorry I don't know
2-4 What is the minimum earth covering thickness you will apply for culvert structure ?	15cm	30cm	50cm	100cm	Sorry I don't know
2-5 Which description is not appropriate for hydraulic study on bridge project, comply with the draft Bridge Design Manual in TL ?	In preliminary survey, waterway openings should be able to pass 500-year flood without causing structural failure	In the hydraulic analysis the design discharge is 50-years discharge	Minimum vertical clearance between the highest flood level and the lowest point of the girder should be more than 150mm	Maximum discharge can be estimated by using a Rational method	The velocity obtaining in the stream under the flood condition is calculated using Lacey's formula

3 Retaining Wall

Questions	Answer: Choose the one of them as the most appropriated answer.				
3-1 Which factor is not appropriate for damage and collapse of retaining wall ?	Recovery of vegetation and animal	Increase in earth pressure and hydraulic pressure	Settlement of ground	Riverbed erosion	Sorry I don't know
3-2 Which subject is not appropriate for stability analysis of retaining wall ?	Safety for sliding	Safety for overturning	Environmental and social consideration	Bearing capacity of ground	Sorry I don't know
3-3 Which item is not appropriate as primary load for design of retaining wall ?	Self weight of retaining wall	Earth load	Hydraulic pressure	Loaded weight	Sorry I don't know
3-4 Which item is not appropriate for design condition of retaining wall ?	Angle of share resistance (ϕ) of sandy soil, which is assumed according to soil classification, is 35 degree	Unit weight of sandy soil used as backfilling material is 19 kN/m ³	Friction coefficient (μ) between a concrete and gravel ground is 0.6	Allowable bearing capacity (q_u) of gravel ground is 600 kN/m ²	Sorry I don't know
3-5 Which description is not appropriate for design of masonry retaining wall ?	Masonry without back fill concrete is used only for a river revetment	It is not necessary to install a drain pipe for retaining wall on land (non-river)	Masonry wall is often used at the site of small earth load	High permeable material such as crushed stone should be used as a back fill material	Sorry I don't know

4 Slope Protection

Questions	Answer: Choose the one of them as the most appropriated answer.				
4-1 Which item is not appropriate reason for set up a terrace on slope surface	Ensure a stability	Drainage on the surface	Cost saving	Maintenance and operation	Sorry I don't know
4-2 Which subject you will consider in case of the determination for cut slope?	Height of cutting	Drainage system	Type of the soil	Availability of equipment	Sorry I don't know
4-3 What is the minimum slope gradient you will apply for cutting slope on hard rock ground ?	Vertical cut	1 : 0.3	1 : 0.5	1 : 1.0	Sorry I don't know
4-4 What is the standard slope gradient you will apply for embankment slope with normal material ?	1 : 1.0	1 : 1.5	1 : 1.8	1 : 2.0	Sorry I don't know
4-5 Which description is not appropriate for bio-engineering work ?	The first purpose of the work is to protect a slope from rain erosion and prevent from surface failure	The work can not expect the effect which prevents deep slope failure	Selection of the work depend on the vegetable seed, soil type, slope gradient and meteorological condition	The work is also applicable in steep slope	Sorry I don't know

Department : _____

Your name : _____

1 Concrete

Questions	Answer: Choose the one of them as the most appropriated answer.				
1- 1 How much is the Slump for Class A of concrete in accordance with the SPC (ITEM 506) ?	0 - 50mm	50 - 100mm	100 - 200mm	more than 100mm	Sorry I don't know
1- 2 How much is the Minimum Cement Content for Class A of concrete in accordance with the SPC (ITEM 506) ?	360 kg	320 kg	380 kg	440 kg	Sorry I don't know
1- 3 How much is the Maximum Water/Cement Ratio for Class A of concrete in accordance with the SPC (ITEM 506) ?	0.49	0.53	0.55	0.58	Sorry I don't know
1- 4 When do you check the Compressive Strength Test for specimen of concrete in accordance with the SPC (ITEM 506) ?	at 4 days and 28 days after casting of concrete	at 5 days and 28 days after casting of concrete	at 7 days and 28 days after casting of concrete	at 10 days and 28 days after casting of concrete	Sorry I don't know
1- 5 What do you use the Class of Concrete for retaining wall in accordance with SPC (ITEM 506) ?	Class A	Class B	Class C	Class P	Sorry I don't know

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2 Aggregate Subbase Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
2- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 20%	Max. 30%	Max. 35%	Max. 40%	Sorry I don't know
2- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 10	Max. 12	Max. 14	Max. 16	Sorry I don't know
2- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 40%	Max. 45%	Max. 50%	Max. 60%	Sorry I don't know
2- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Subbase Course in accordance with the SPC (ITEM 301) ?	±0mm	±10mm	±20mm	+10mm -20mm	+20mm -30mm
2- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Subbase Course in accordance with the SPC (ITEM 301) ?	±0mm	±5mm	±10mm	±15mm	±20mm

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3 Aggregate Base Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
3- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	0 - 10%	0 - 15%	0 - 20%	0 - 25%	Sorry I don't know
3- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	Max. 10	Max. 15	Max. 20	Max. 25	Sorry I don't know
3- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	0 - 30%	0 - 35%	0 - 40%	0 - 45%	Sorry I don't know
3- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Base Course in accordance with the SPC (ITEM 303) ?	±0mm	±5mm	±10mm	+5mm -10mm	+10mm -20mm
3- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Base Course in accordance with the SPC (ITEM 303) ?	±0mm	±5mm	±10mm	±15mm	±20mm

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4 Aggregate Surface Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
4- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 20%	Max. 25%	Max. 30%	Max. 35%	Sorry I don't know
4- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 8	Max. 10	Min. 4 Max. 9	Min. 6 Max. 12	Sorry I don't know
4- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 30%	Max. 35%	Max. 45%	Max. 50%	Sorry I don't know
4- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Surface Course in accordance with the SPC (ITEM 401) ?	±0mm	±5mm	±10mm	+5mm -10mm	+15mm -5mm
4- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Surface Course in accordance with the SPC (ITEM 401) ?	±0mm	±5mm	±10mm	+5mm -10mm	+15mm -5mm

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Department : DEPARTMENT OF CONSTRUCTION

Your name : _____

1 Surveying

Questions	Answer:: Choose the one of them as the most appropriated answer.				
1-1 If the result of measured coordinates of national bench mark on project is different to the coordination which you were officially informed before the measurement, what will you do ?	To check the coordination of the BM	To order re-survey	To change the measured coordination based on the BM's coordination	To check the survey instrument	To re-training surveyor team
1-2 How do you protect the coordination of control points physically and formally ?	To cover with a little soil	To cover with a much soil	To install peg and instruct the resident to protect	To set up by reference points for restoration	To train the surveyor to remember the correct position
1-3 How do you check the topographic data on the drawing at the site on the projection ?	To check the direction of compass	To check the planned center line	To check the existing center line	To check the location of existing houses	To check the location of existing utilities
1-4 When you check road design drawing, which subject you are concerned ?	To check with the standard drawing	Strength of the road bed	Boundary on the road reserve	Direction of compass	Direction of destination of drainage system
1-5 Regarding mobile GPS operation, which subject you shall give the attention when you survey x, y, z coordinates ?	Accuracy	Coordination z (i.e. elevation)	Speed of the surveying	Continuous of the surveying	Battery charger

2 Drainage and Culvert

Questions	Answer:: Choose the one of them as the most appropriated answer.				
2-1 When you will conduct a field survey for planning and design of road drainage facilities, which point of view is not appropriate ?	To check a flow direction of surface water	To check a traffic volume and origin and destination of traffic	To check a surrounding condition of outlet point	To check a location and volume of spring water and seepage water from natural ground	Sorry I don't know
2-2 Which data you do not need when you estimate the quantity of water due to rainfall i.e. runoff ?	Catchment area	Rainfall data	Return period	Traffic speed	Sorry I don't know
2-3 Which data you do not need when you estimate the flow capacity passed under the road embankment ?	Dimension of the crossing	Water quality	Velocity of flow	Slope of crossing	Sorry I don't know
2-4 What is the minimum earth covering thickness you will apply for culvert structure ?	15cm	30cm	50cm	100cm	Sorry I don't know
2-5 Which description is not appropriate for hydraulic study on bridge project, comply with the draft Bridge Design Manual in TL ?	In preliminary survey, waterway openings should be able to pass 500-year flood without causing structural failure	In the hydraulic analysis the design discharge is 50-years discharge	Minimum vertical clearance between the highest flood level and the lowest point of the girder should be more than 150mm	Maximum discharge can be estimated by using a Rational method	The velocity obtaining in the stream under the flood condition is calculated using Lacey's formula

3 Retaining Wall

Questions	Answer:: Choose the one of them as the most appropriated answer.				
3-1 Which factor is not appropriate for damage and collapse of retaining wall ?	Recovery of vegetation and animal	Increase in earth pressure and hydraulic pressure	Settlement of ground	Riverbed erosion	Sorry I don't know
3-2 Which subject is not appropriate for stability analysis of retaining wall ?	Safety for sliding	Safety for overturning	Environmental and social consideration	Bearing capacity of ground	Sorry I don't know
3-3 Which item is not appropriate as primary load for design of retaining wall ?	Self weight of retaining wall	Earth load	Hydraulic pressure	Loaded weight	Sorry I don't know
3-4 Which item is not appropriate for design condition of retaining wall ?	Angle of share resistance (ϕ) of sandy soil, which is assumed according to soil classification, is 35 degree	Unit weight of sandy soil used as backfilling material is 19 kN/m ³	Friction coefficient (μ) between a concrete and gravel ground is 0.6	Allowable bearing capacity (qa) of gravel ground is 600 kN/m ²	Sorry I don't know
3-5 Which description is not appropriate for design of masonry retaining wall ?	Masonry without back fill concrete is used only for a river revetment	It is not necessary to install a drain pipe for retaining wall on land (non-river)	Masonry wall is often used at the site of small earth load	High permeable material such as crashed stone should be used as a back fill material	Sorry I don't know

4 Slope Protection

Questions	Answer:: Choose the one of them as the most appropriated answer.				
4-1 Which item is not appropriate reason for set up a terrace on slope surface	Ensure a stability	Drainage on the surface	Cost saving	Maintenance and operation	Sorry I don't know
4-2 Which subject you will consider in case of the determination for cut slope?	Height of cutting	Drainage system	Type of the soil	Availability of equipment	Sorry I don't know
4-3 What is the minimum slope gradient you will apply for cutting slope on hard rock ground ?	Vertical cut	1 : 0.3	1 : 0.5	1 : 1.0	Sorry I don't know
4-4 What is the standard slope gradient you will apply for embankment slope with normal material ?	1 : 1.0	1 : 1.5	1 : 1.8	1 : 2.0	Sorry I don't know
4-5 Which description is not appropriate for bio-engineering work ?	The first purpose of the work is to protect a slope from rain erosion and prevent from surface failure	The work can not expect the effect which prevents deep slope failure	Selection of the work depend on the vegetable seed, soil type, slope gradient and meteorological condition	The work is also applicable in steep slope	Sorry I don't know

Department : MAINTENANCE

Your name : _____

1 Concrete

Questions	Answer: Choose the one of them as the most appropriated answer.				
1- 1 How much is the Slump for Class A of concrete in accordance with the SPC (ITEM 506) ?	0 - 50mm	50 - 100mm	100 - 200mm	more than 100mm	Sorry I don't know
1- 2 How much is the Minimum Cement Content for Class A of concrete in accordance with the SPC (ITEM 506) ?	360 kg	320 kg	380 kg	440 kg	Sorry I don't know
1- 3 How much is the Maximum Water/Cement Ratio for Class A of concrete in accordance with the SPC (ITEM 506) ?	0.49	0.53	0.55	0.58	Sorry I don't know
1- 4 When do you check the Compressive Strength Test for specimen of concrete in accordance with the SPC (ITEM 506) ?	at 4 days and 28 days after casting of concrete	at 5 days and 28 days after casting of concrete	at 7 days and 28 days after casting of concrete	at 10 days and 28 days after casting of concrete	Sorry I don't know
1- 5 What do you use the Class of Concrete for retaining wall in accordance with SPC (ITEM 506) ?	Class A	Class B	Class C	Class P	Sorry I don't know

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2 Aggregate Subbase Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
2- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 20%	Max. 30%	Max. 35%	Max. 40%	Sorry I don't know
2- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 10	Max. 12	Max. 14	Max. 16	Sorry I don't know
2- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 40%	Max. 45%	Max. 50%	Max. 60%	Sorry I don't know
2- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Subbase Course in accordance with the SPC (ITEM 301) ?	±0mm	±10mm	±20mm	+10mm -20mm	+20mm -30mm
2- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Subbase Course in accordance with the SPC (ITEM 301) ?	±0mm	±5mm	±10mm	±15mm	±20mm

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3 Aggregate Base Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
3- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	0 - 10%	0 - 15%	0 - 20%	0 - 25%	Sorry I don't know
3- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	Max. 10	Max. 15	Max. 20	Max. 25	Sorry I don't know
3- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	0 - 30%	0 - 35%	0 - 40%	0 - 45%	Sorry I don't know
3- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Base Course in accordance with the SPC (ITEM 303) ?	±0mm	±5mm	±10mm	+5mm -10mm	+10mm -20mm
3- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Base Course in accordance with the SPC (ITEM 303) ?	±0mm	±5mm	±10mm	±15mm	±20mm

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4 Aggregate Surface Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
4- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 20%	Max. 25%	Max. 30%	Max. 35%	Sorry I don't know
4- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 8	Max. 10	Min. 4 Max. 9	Min. 6 Max. 12	Sorry I don't know
4- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 30%	Max. 35%	Max. 45%	Max. 50%	Sorry I don't know
4- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Surface Course in accordance with the SPC (ITEM 401) ?	±0mm	±5mm	±10mm	+5mm -10mm	+15mm -5mm
4- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Surface Course in accordance with the SPC (ITEM 401) ?	±0mm	±5mm	±10mm	+5mm -10mm	+15mm -5mm

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Department : MAINTENANCE

Your name : _____

1 Surveying

Questions	Answer:: Choose the one of them as the most appropriated answer.				
1-1 If the result of measured coordinates of national bench mark on project is different to the coordination which you were officially informed before the measurement, what will you do ?	To check the coordination of the BM	To order re-survey	To change the measured coordination based on the BM's coordination	To check the survey instrument	To re-training surveyor team
1-2 How do you protect the coordination of control points physically and formally ?	To cover with a little soil	To cover with a much soil	To install peg and instruct the resident to protect	To set up by reference points for restoration	To train the surveyor to remember the correct position
1-3 How do you check the topographic data on the drawing at the site on the project ?	To check the direction of compass	To check the planned center line	To check the existing center line	To check the location of existing houses	To check the location of existing utilities
1-4 When you check road design drawing, which subject you are concerned ?	To check with the standard drawing	Strength of the road bed	Boundary on the road reserve	Direction of compass	Direction of destination of drainage system
1-5 Regarding mobile GPS operation, which subject you shall give the attention when you survey x, y, z coordinates ?	Accuracy	Coordination z (i.e. elevation)	Speed of the surveying	Continuous of the surveying	Battery charger

2 Drainage and Culvert

Questions	Answer:: Choose the one of them as the most appropriated answer.				
2-1 When you will conduct a field survey for planning and design of road drainage facilities, which point of view is not appropriate ?	To check a flow direction of surface water	To check a traffic volume and origin and destination of traffic	To check a surrounding condition of outlet point	To check a location and volume of spring water and seepage water from natural ground	Sorry I don't know
2-2 Which data you do not need when you estimate the quantity of water due to rainfall i.e. runoff ?	Catchment area	Rainfall data	Return period	Traffic speed	Sorry I don't know
2-3 Which data you do not need when you estimate the flow capacity passed under the road embankment ?	Dimension of the crossing	Water quality	Velocity of flow	Slope of crossing	Sorry I don't know
2-4 What is the minimum earth covering thickness you will apply for culvert structure ?	15cm	30cm	50cm	100cm	Sorry I don't know
2-5 Which description is not appropriate for hydraulic study on bridge project, comply with the draft Bridge Design Manual in TL ?	In preliminary survey, waterway openings should be able to pass 500-year flood without causing structural failure	In the hydraulic analysis the design discharge is 50-years discharge	Minimum vertical clearance between the highest flood level and the lowest point of the girder should be more than 150mm	Maximum discharge can be estimated by using a Rational method	The velocity obtaining in the stream under the flood condition is calculated using Lacey's formula

3 Retaining Wall

Questions	Answer:: Choose the one of them as the most appropriated answer.				
3-1 Which factor is not appropriate for damage and collapse of retaining wall ?	Recovery of vegetation and animal	Increase in earth pressure and hydraulic pressure	Settlement of ground	Riverbed erosion	Sorry I don't know
3-2 Which subject is not appropriate for stability analysis of retaining wall ?	Safety for sliding	Safety for overturning	Environmental and social consideration	Bearing capacity of ground	Sorry I don't know
3-3 Which item is not appropriate as primary load for design of retaining wall ?	Self weight of retaining wall	Earth load	Hydraulic pressure	Loaded weight	Sorry I don't know
3-4 Which item is not appropriate for design condition of retaining wall ?	Angle of shear resistance (ϕ) of sandy soil, which is assumed according to soil classification, is 35 degree	Unit weight of sandy soil used as backfilling material is 19 kN/m ³	Friction coefficient (μ) between a concrete and gravel ground is 0.6	Allowable bearing capacity (qa) of gravel ground is 600 kN/m ²	Sorry I don't know
3-5 Which description is not appropriate for design of masonry retaining wall ?	Masonry without back fill concrete is used only for a river revetment	It is not necessary to install a drain pipe for retaining wall on land (non-river)	Masonry wall is often used at the site of small earth load	High permeable material such as crushed stone should be used as a back fill material	Sorry I don't know

4 Slope Protection

Questions	Answer:: Choose the one of them as the most appropriated answer.				
4-1 Which item is not appropriate reason for set up a terrace on slope surface	Ensure a stability	Drainage on the surface	Cost saving	Maintenance and operation	Sorry I don't know
4-2 Which subject you will consider in case of the determination for cut slope?	Height of cutting	Drainage system	Type of the soil	Availability of equipment	Sorry I don't know
4-3 What is the minimum slope gradient you will apply for cutting slope on hard rock ground ?	Vertical cut	1 : 0.3	1 : 0.5	1 : 1.0	Sorry I don't know
4-4 What is the standard slope gradient you will apply for embankment slope with normal material ?	1 : 1.0	1 : 1.5	1 : 1.8	1 : 2.0	Sorry I don't know
4-5 Which description is not appropriate for bio-engineering work ?	The first purpose of the work is to protect a slope from rain erosion and prevent from surface failure	The work can not expect the effect which prevents deep slope failure	Selection of the work depend on the vegetable seed, soil type, slope gradient and meteorological condition	The work is also applicable in steep slope	Sorry I don't know

Department : CONSTRUCTION

Your name :

1 Concrete

Questions	Answer: Choose the one of them as the most appropriated answer.				
1- 1 How much is the Slump for Class A of concrete in accordance with the SPC (ITEM 506) ?	0 - 50mm	50 - 100mm	100 - 200mm	more than 100mm	Sorry I don't know
1- 2 How much is the Minimum Cement Content for Class A of concrete in accordance with the SPC (ITEM 506) ?	360 kg	320 kg	380 kg	440 kg	Sorry I don't know
1- 3 How much is the Maximum Water/Cement Ratio for Class A of concrete in accordance with the SPC (ITEM 506) ?	0.49	0.53	0.55	0.58	Sorry I don't know
1- 4 When do you check the Compressive Strength Test for specimen of concrete in accordance with the SPC (ITEM 506) ?	at 4 days and 28 days after casting of concrete	at 5 days and 28 days after casting of concrete	at 7 days and 28 days after casting of concrete	at 10 days and 28 days after casting of concrete	Sorry I don't know
1- 5 What do you use the Class of Concrete for retaining wall in accordance with SPC (ITEM 506) ?	Class A	Class B	Class C	Class P	Sorry I don't know

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2 Aggregate Subbase Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
2- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 20%	Max. 30%	Max. 35%	Max. 40%	Sorry I don't know
2- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 10	Max. 12	Max. 14	Max. 16	Sorry I don't know
2- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 40%	Max. 45%	Max. 50%	Max. 60%	Sorry I don't know
2- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Subbase Course in accordance with the SPC (ITEM 301) ?	±0mm	±10mm	±20mm	+10mm -20mm	+20mm -30mm
2- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Subbase Course in accordance with the SPC (ITEM 301) ?	±0mm	±5mm	±10mm	±15mm	±20mm

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3 Aggregate Base Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
3- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	0 - 10%	0 - 15%	0 - 20%	0 - 25%	Sorry I don't know
3- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	Max. 10	Max. 15	Max. 20	Max. 25	Sorry I don't know
3- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	0 - 30%	0 - 35%	0 - 40%	0 - 45%	Sorry I don't know
3- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Base Course in accordance with the SPC (ITEM 303) ?	±0mm	±5mm	±10mm	+5mm -10mm	+10mm -20mm
3- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Base Course in accordance with the SPC (ITEM 303) ?	±0mm	±5mm	±10mm	±15mm	±20mm

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4 Aggregate Surface Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
4- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 20%	Max. 25%	Max. 30%	Max. 35%	Sorry I don't know
4- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 8	Max. 10	Min. 4 Max. 9	Min. 6 Max. 12	Sorry I don't know
4- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 30%	Max. 35%	Max. 45%	Max. 50%	Sorry I don't know
4- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Surface Course in accordance with the SPC (ITEM 401) ?	±0mm	±5mm	±10mm	+5mm -10mm	+15mm -5mm
4- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Surface Course in accordance with the SPC (ITEM 401) ?	±0mm	±5mm	±10mm	+5mm -10mm	+15mm -5mm

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Department : CONSTRUCTION

Your name : _____

1 Surveying

Questions	Answer: Choose the one of them as the most appropriated answer.				
1-1 If the result of measured coordinates of national bench mark on project is different to the coordination which you were officially informed before the measurement, what will you do ?	To check the coordination of the BM	To order re-survey	To change the measured coordination based on the BM's coordination	To check the survey instrument	To re-training surveyor team
1-2 How do you protect the coordination of control points physically and formally ?	To cover with a little soil	To cover with a much soil	To install peg and instruct the resident to protect	To set up by reference points for restoration	To train the surveyor to remember the correct position
1-3 How do you check the topographic data on the drawing at the site on the project ?	To check the direction of compass	To check the planned center line	To check the existing center line	To check the location of existing houses	To check the location of existing utilities
1-4 When you check road design drawing, which subject you are concerned ?	To check with the standard drawing	Strength of the road bed	Boundary on the road reserve	Direction of compass	Direction of destination of drainage system
1-5 Regarding mobile GPS operation, which subject you shall give the attention when you survey x, y, z coordinates ?	Accuracy	Coordination z (i.e. elevation)	Speed of the surveying	Continuous of the surveying	Battery charger

2 Drainage and Culvert

Questions	Answer: Choose the one of them as the most appropriated answer.				
2-1 When you will conduct a field survey for planning and design of road drainage facilities, which point of view is not appropriate ?	To check a flow direction of surface water	To check a traffic volume and origin and destination of traffic	To check a surrounding condition of outlet point	To check a location and volume of spring water and seepage water from natural ground	Sorry I don't know
2-2 Which data you do not need when you estimate the quantity of water due to rainfall i.e. runoff ?	Catchment area	Rainfall data	Return period	Traffic speed	Sorry I don't know
2-3 Which data you do not need when you estimate the flow capacity passed under the road embankment ?	Dimension of the crossing	Water quality	Velocity of flow	Slope of crossing	Sorry I don't know
2-4 What is the minimum earth covering thickness you will apply for culvert structure ?	15cm	30cm	50cm	100cm	Sorry I don't know
2-5 Which description is not appropriate for hydraulic study on bridge project, comply with the draft Bridge Design Manual in TL ?	In preliminary survey, waterway openings should be able to pass 500-year flood without causing structural failure	In the hydraulic analysis the design discharge is 50-years discharge	Minimum vertical clearance between the highest flood level and the lowest point of the girder should be more than 150mm	Maximum discharge can be estimated by using a Rational method	The velocity obtaining in the stream under the flood condition is calculated using Lacey's formula

3 Retaining Wall

Questions	Answer: Choose the one of them as the most appropriated answer.				
3-1 Which factor is not appropriate for damage and collapse of retaining wall ?	Recovery of vegetation and animal	Increase in earth pressure and hydraulic pressure	Settlement of ground	Riverbed erosion	Sorry I don't know
3-2 Which subject is not appropriate for stability analysis of retaining wall ?	Safety for sliding	Safety for overturning	Environmental and social consideration	Bearing capacity of ground	Sorry I don't know
3-3 Which item is not appropriate as primary load for design of retaining wall ?	Self weight of retaining wall	Earth load	Hydraulic pressure	Loaded weight	Sorry I don't know
3-4 Which item is not appropriate for design condition of retaining wall ?	Angle of share resistance (ϕ) of sandy soil, which is assumed according to soil classification, is 35 degree	Unit weight of sandy soil used as backfilling material is 19 kN/m ³	Friction coefficient (μ) between a concrete and gravel ground is 0.6	Allowable bearing capacity (qa) of gravel ground is 600 kN/m ²	Sorry I don't know
3-5 Which description is not appropriate for design of masonry retaining wall ?	Masonry without back fill concrete is used only for a river revetment	It is not necessary to install a drain pipe for retaining wall on land (non-river)	Masonry wall is often used at the site of small earth load	High permeable material such as crushed stone should be used as a back fill material	Sorry I don't know

4 Slope Protection

Questions	Answer: Choose the one of them as the most appropriated answer.				
4-1 Which item is not appropriate reason for set up a terrace on slope surface	Ensure a stability	Drainage on the surface	Cost saving	Maintenance and operation	Sorry I don't know
4-2 Which subject you will consider in case of the determination for cut slope?	Height of cutting	Drainage system	Type of the soil	Availability of equipment	Sorry I don't know
4-3 What is the minimum slope gradient you will apply for cutting slope on hard rock ground ?	Vertical cut	1 : 0.3	1 : 0.5	1 : 1.0	Sorry I don't know
4-4 What is the standard slope gradient you will apply for embankment slope with normal material ?	1 : 1.0	1 : 1.5	1 : 1.8	1 : 2.0	Sorry I don't know
4-5 Which description is not appropriate for bio-engineering work ?	The first purpose of the work is to protect a slope from rain erosion and prevent from surface failure	The work can not expect the effect which prevents deep slope failure	Selection of the work depend on the vegetable seed, soil type, slope gradient and meteorological condition	The work is also applicable in steep slope	Sorry I don't know

Department : _____

Your name : _____

1 Concrete

Questions	Answer: Choose the one of them as the most appropriated answer.				
1- 1 How much is the Slump for Class A of concrete in accordance with the SPC (ITEM 506) ?	0 - 50mm	50 - 100mm	100 - 200mm	more than 100mm	Sorry I don't know
1- 2 How much is the Minimum Cement Content for Class A of concrete in accordance with the SPC (ITEM 506) ?	360 kg	320 kg	380 kg	440 kg	Sorry I don't know
1- 3 How much is the Maximum Water/Cement Ratio for Class A of concrete in accordance with the SPC (ITEM 506) ?	0.49	0.53	0.55	0.58	Sorry I don't know
1- 4 When do you check the Compressive Strength Test for specimen of concrete in accordance with the SPC (ITEM 506) ?	at 4 days and 28 days after casting of concrete	at 5 days and 28 days after casting of concrete	at 7 days and 28 days after casting of concrete	at 10 days and 28 days after casting of concrete	Sorry I don't know
1- 5 What do you use the Classe of Concrete for retaining wall in accordance with SPC (ITEM 506) ?	Class A	Class B	Class C	Class P	Sorry I don't know

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2 Aggregate Subbase Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
2- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 20%	Max. 30%	Max. 35%	Max. 40%	Sorry I don't know
2- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 10	Max. 12	Max. 14	Max. 16	Sorry I don't know
2- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 40%	Max. 45%	Max. 50%	Max. 60%	Sorry I don't know
2- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Subbase Course in accordance with the SPC (ITEM 301) ?	±0mm	±10mm	±20mm	+10mm -20mm	+20mm -30mm
2- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Subbase Course in accordance with the SPC (ITEM 301) ?	±0mm	±5mm	±10mm	±15mm	±20mm

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3 Aggregate Base Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
3- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	0 - 10%	0 - 15%	0 - 20%	0 - 25%	Sorry I don't know
3- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	Max. 10	Max. 15	Max. 20	Max. 25	Sorry I don't know
3- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	0 - 30%	0 - 35%	0 - 40%	0 - 45%	Sorry I don't know
3- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Base Course in accordance with the SPC (ITEM 303) ?	±0mm	±5mm	±10mm	+5mm -10mm	+10mm -20mm
3- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Base Course in accordance with the SPC (ITEM 303) ?	±0mm	±5mm	±10mm	±15mm	±20mm

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4 Aggregate Surface Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
4- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 20%	Max. 25%	Max. 30%	Max. 35%	Sorry I don't know
4- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 8	Max. 10	Min. 4 Max. 9	Min. 6 Max. 12	Sorry I don't know
4- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 30%	Max. 35%	Max. 45%	Max. 50%	Sorry I don't know
4- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Surface Course in accordance with the SPC (ITEM 401) ?	±0mm	±5mm	±10mm	+5mm -10mm	+15mm -5mm
4- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Surface Course in accordance with the SPC (ITEM 401) ?	±0mm	±5mm	±10mm	+5mm -10mm	+15mm -5mm

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Department : Maintenance e servico

Your name : _____

1 Surveying

Questions	Answer: Choose the one of them as the most appropriated answer.				
1-1 If the result of measured coordinates of national bench mark on project is different to the coordination which you were officially informed before the measurement, what will you do ?	To check the coordination of the BM	To order re-survey	To change the measured coordination based on the BM's coordination	To check the survey instrument	To re-training surveyor team
1-2 How do you protect the coordination of control points physically and formally ?	To cover with a little soil	To cover with a much soil	To install peg and instruct the resident to protect	To set up by reference points for restoration	To train the surveyor to remember the correct position
1-3 How do you check the topographic data on the drawing at the site on the project ?	To check the direction of compass	To check the planned center line	To check the existing center line	To check the location of existing houses	To check the location of existing utilities
1-4 When you check road design drawing, which subject you are concerned ?	To check with the standard drawing	Strength of the road bed	Boundary on the road reserve	Direction of compass	Direction of destination of drainage system
1-5 Regarding mobile GPS operation, which subject you shall give the attention when you survey x, y, z coordinates ?	Accuracy	Coordination z (i.e. elevation)	Speed of the surveying	Continuous of the surveying	Battery charger

2 Drainage and Culvert

Questions	Answer: Choose the one of them as the most appropriated answer.				
2-1 When you will conduct a field survey for planning and design of road drainage facilities, which point of view is not appropriate ?	To check a flow direction of surface water	To check a traffic volume and origin and destination of traffic	To check a surrounding condition of outlet point	To check a location and volume of spring water and seepage water from natural ground	Sorry I don't know
2-2 Which data you do not need when you estimate the quantity of water due to rainfall i.e. runoff ?	Catchment area	Rainfall data	Return period	Traffic speed	Sorry I don't know
2-3 Which data you do not need when you estimate the flow capacity passed under the road embankment ?	Dimension of the crossing	Water quality	Velocity of flow	Slope of crossing	Sorry I don't know
2-4 What is the minimum earth covering thickness you will apply for culvert structure ?	15cm	30cm	50cm	100cm	Sorry I don't know
2-5 Which description is not appropriate for hydraulic study on bridge project, comply with the draft Bridge Design Manual in TL ?	In preliminary survey, waterway openings should be able to pass 500-year flood without causing structural failure	In the hydraulic analysis the design discharge is 50-years discharge	Minimum vertical clearance between the highest flood level and the lowest point of the girder should be more than 150mm	Maximum discharge can be estimated by using a Rational method	The velocity obtaining in the stream under the flood condition is calculated using Lacey's formula

3 Retaining Wall

Questions	Answer: Choose the one of them as the most appropriated answer.				
3-1 Which factor is not appropriate for damage and collapse of retaining wall ?	Recovery of vegetation and animal	Increase in earth pressure and hydraulic pressure	Settlement of ground	Riverbed erosion	Sorry I don't know
3-2 Which subject is not appropriate for stability analysis of retaining wall ?	Safety for sliding	Safety for overturning	Environmental and social consideration	Bearing capacity of ground	Sorry I don't know
3-3 Which item is not appropriate as primary load for design of retaining wall ?	Self weight of retaining wall	Earth load	Hydraulic pressure	Loaded weight	Sorry I don't know
3-4 Which item is not appropriate for design condition of retaining wall ?	Angle of share resistance (ϕ) of sandy soil, which is assumed according to soil classification, is 35 degree	Unit weight of sandy soil used as backfilling material is 19 kN/m ³	Friction coefficient (μ) between a concrete and gravel ground is 0.6	Allowable bearing capacity (qa) of gravel ground is 600 kN/m ²	Sorry I don't know
3-5 Which description is not appropriate for design of masonry retaining wall ?	Masonry without back fill concrete is used only for a river revetment	It is not necessary to install a drain pipe for retaining wall on land (non-river)	Masonry wall is often used at the site of small earth load	High permeable material such as crushed stone should be used as a back fill material	Sorry I don't know

4 Slope Protection

Questions	Answer: Choose the one of them as the most appropriated answer.				
4-1 Which item is not appropriate reason for set up a terrace on slope surface	Ensure a stability	Drainage on the surface	Cost saving	Maintenance and operation	Sorry I don't know
4-2 Which subject you will consider in case of the determination for cut slope?	Height of cutting	Drainage system	Type of the soil	Availability of equipment	Sorry I don't know
4-3 What is the minimum slope gradient you will apply for cutting slope on hard rock ground ?	Vertical cut	1 : 0.3	1 : 0.5	1 : 1.0	Sorry I don't know
4-4 What is the standard slope gradient you will apply for embankment slope with normal material ?	1 : 1.0	1 : 1.5	1 : 1.8	1 : 2.0	Sorry I don't know
4-5 Which description is not appropriate for bio-engineering work ?	The first purpose of the work is to protect a slope from rain erosion and prevent from surface failure	The work can not expect the effect which prevents deep slope failure	Selection of the work depend on the vegetable seed, soil type, slope gradient and meteorological condition	The work is also applicable in steep slope	Sorry I don't know

Department : _____

Your name : _____

1 Concrete

Questions	Answer: Choose the one of them as the most appropriated answer.				
1- 1 How much is the Slump for Class A of concrete in accordance with the SPC (ITEM 506) ?	0 - 50mm	50 - 100mm	100 - 200mm	more than 100mm	Sorry I don't know
1- 2 How much is the Minimum Cement Content for Class A of concrete in accordance with the SPC (ITEM 506) ?	360 kg	320 kg	380 kg	440 kg	Sorry I don't know
1- 3 How much is the Maximum Water/Cement Ratio for Class A of concrete in accordance with the SPC (ITEM 508) ?	0.49	0.53	0.55	0.58	Sorry I don't know
1- 4 When do you check the Compressive Strength Test for specimen of concrete in accordance with the SPC (ITEM 506) ?	at 4 days and 28 days after casting of concrete	at 5 days and 28 days after casting of concrete	at 7 days and 28 days after casting of concrete	at 10 days and 28 days after casting of concrete	Sorry I don't know
1- 5 What do you use the Class of Concrete for retaining wall in accordance with SPC (ITEM 506) ?	Class A	Class B	Class C	Class P	Sorry I don't know

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2 Aggregate Subbase Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
2- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 20%	Max. 30%	Max. 35%	Max. 40%	Sorry I don't know
2- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 10	Max. 12	Max. 14	Max. 16	Sorry I don't know
2- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 40%	Max. 45%	Max. 50%	Max. 60%	Sorry I don't know
2- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Subbase Course in accordance with the SPC (ITEM 301) ?	±0mm	±10mm	±20mm	+10mm -20mm	+20mm -30mm
2- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Subbase Course in accordance with the SPC (ITEM 301) ?	±0mm	±5mm	±10mm	±15mm	±20mm

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3 Aggregate Base Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
3- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	0 - 10%	0 - 15%	0 - 20%	0 - 25%	Sorry I don't know
3- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	Max. 10	Max. 15	Max. 20	Max. 25	Sorry I don't know
3- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	0 - 30%	0 - 35%	0 - 40%	0 - 45%	Sorry I don't know
3- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Base Course in accordance with the SPC (ITEM 303) ?	±0mm	±5mm	±10mm	+5mm -10mm	+10mm -20mm
3- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Base Course in accordance with the SPC (ITEM 303) ?	±0mm	±5mm	±10mm	±15mm	±20mm

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4 Aggregate Surface Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
4- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 20%	Max. 25%	Max. 30%	Max. 35%	Sorry I don't know
4- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 8	Max. 10	Min. 4 Max. 9	Min. 6 Max. 12	Sorry I don't know
4- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 30%	Max. 35%	Max. 45%	Max. 50%	Sorry I don't know
4- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Surface Course in accordance with the SPC (ITEM 401) ?	±0mm	±5mm	±10mm	+5mm -10mm	+15mm -5mm
4- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Surface Course in accordance with the SPC (ITEM 401) ?	±0mm	±5mm	±10mm	+5mm -10mm	+15mm -5mm

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Department : Dep. of Project

Your name : _____

1 Surveying

Questions	Answer: Choose the one of them as the most appropriated answer.				
1-1 If the result of measured coordinates of national bench mark on project is different to the coordination which you were officially informed before the measurement, what will you do ?	To check the coordination of the BM	To order re-survey	To change the measured coordination based on the BM's coordination	To check the survey instrument	To re-training surveyor team
1-2 How do you protect the coordination of control points physically and formally ?	To cover with a little soil	To cover with a much soil	To install peg and instruct the resident to protect	To set up by reference points for restoration	To train the surveyor to remember the correct position
1-3 How do you check the topographic data on the drawing at the site on the project ?	To check the direction of compass	To check the planned center line	To check the existing center line	To check the location of existing houses	To check the location of existing utilities
1-4 When you check road design drawing, which subject you are concerned ?	To check with the standard drawing	Strength of the road bed	Boundary on the road reserve	Direction of compass	Direction of destination of drainage system
1-5 Regarding mobile GPS operation, which subject you shall give the attention when you survey x, y, z coordinates ?	Accuracy	Coordination z (i.e. elevation)	Speed of the surveying	Continuous of the surveying	Battery charger

2 Drainage and Culvert

Questions	Answer: Choose the one of them as the most appropriated answer.				
2-1 When you will conduct a field survey for planning and design of road drainage facilities, which point of view is not appropriate ?	To check a flow direction of surface water	To check a traffic volume and origin and destination of traffic	To check a surrounding condition of outlet point	To check a location and volume of spring water and seepage water from natural ground	Sorry I don't know
2-2 Which data you do not need when you estimate the quantity of water due to rainfall i.e. runoff ?	Catchment area	Rainfall data	Return period	Traffic speed	Sorry I don't know
2-3 Which data you do not need when you estimate the flow capacity passed under the road embankment ?	Dimension of the crossing	Water quality	Velocity of flow	Slope of crossing	Sorry I don't know
2-4 What is the minimum earth covering thickness you will apply for culvert structure ?	15cm	30cm	50cm	100cm	Sorry I don't know
2-5 Which description is not appropriate for hydraulic study on bridge project, comply with the draft Bridge Design Manual in TL ?	In preliminary survey, waterway openings should be able to pass 500-year flood without causing structural failure	In the hydraulic analysis the design discharge is 50-years discharge	Minimum vertical clearance between the highest flood level and the lowest point of the girder should be more than 150mm	Maximum discharge can be estimated by using a Rational method	The velocity obtaining in the stream under the flood condition is calculated using Lacey's formula

3 Retaining Wall

Questions	Answer: Choose the one of them as the most appropriated answer.				
3-1 Which factor is not appropriate for damage and collapse of retaining wall ?	Recovery of vegetation and animal	Increase in earth pressure and hydraulic pressure	Settlement of ground	Riverbed erosion	Sorry I don't know
3-2 Which subject is not appropriate for stability analysis of retaining wall ?	Safety for sliding	Safety for overturning	Environmental and social consideration	Bearing capacity of ground	Sorry I don't know
3-3 Which item is not appropriate as primary load for design of retaining wall ?	Self weight of retaining wall	Earth load	Hydraulic pressure	Loaded weight	Sorry I don't know
3-4 Which item is not appropriate for design condition of retaining wall ?	Angle of she resistance (ϕ) of sandy soil, which is assumed according to soil classification, is 35 degree	Unit weight of sandy soil used as backfilling material is 19 kN/m ³	Friction coefficient (μ) between a concrete and gravel ground is 0.6	Allowable bearing capacity (qa) of gravel ground is 600 kN/m ²	Sorry I don't know
3-5 Which description is not appropriate for design of masonry retaining wall ?	Masonry without back fill concrete is used only for a river revetment	It is not necessary to install a drain pipe for retaining wall on land (non-river)	Masonry wall is often used at the site of small earth load	High permeable material such as crushed stone should be used as a back fill material	Sorry I don't know

4 Slope Protection

Questions	Answer: Choose the one of them as the most appropriated answer.				
4-1 Which item is not appropriate reason for set up a terrace on slope surface	Ensure a stability	Drainage on the surface	Cost saving	Maintenance and operation	Sorry I don't know
4-2 Which subject you will consider in case of the determination for cut slope?	Height of cutting	Drainage system	Type of the soil	Availability of equipment	Sorry I don't know
4-3 What is the minimum slope gradient you will apply for cutting slope on hard rock ground ?	Vertical cut	1 : 0.3	1 : 0.5	1 : 1.0	Sorry I don't know
4-4 What is the standard slope gradient you will apply for embankment slope with normal material ?	1 : 1.0	1 : 1.5	1 : 1.8	1 : 2.0	Sorry I don't know
4-5 Which description is not appropriate for bio-engineering work ?	The first purpose of the work is to protect a slope from rain erosion and prevent from surface failure	The work can not expect the effect which prevents deep slope failure	Selection of the work depend on the vegetable seed, soil type, slope gradient and meteorological condition	The work is also applicable in steep slope	Sorry I don't know

Department : _____

Your name : _____

1 Concrete

Questions	Answer: Choose the one of them as the most appropriated answer.				
1- 1 How much is the Slump for Class A of concrete in accordance with the SPC (ITEM 506) ?	0 - 50mm	50 - 100mm	100 - 200mm	more than 100mm	Sorry I don't know
1- 2 How much is the Minimum Cement Content for Class A of concrete in accordance with the SPC (ITEM 506) ?	360 kg	320 kg	380 kg	440 kg	Sorry I don't know
1- 3 How much is the Maximum Water/Cement Ratio for Class A of concrete in accordance with the SPC (ITEM 506) ?	0.49	0.53	0.55	0.58	Sorry I don't know
1- 4 When do you check the Compressive Strength Test for specimen of concrete in accordance with the SPC (ITEM 506) ?	at 4 days and 28 days after casting of concrete	at 5 days and 28 days after casting of concrete	at 7 days and 28 days after casting of concrete	at 10 days and 28 days after casting of concrete	Sorry I don't know
1- 5 What do you use the Class of Concrete for retaining wall in accordance with SPC (ITEM 506) ?	Class A	Class B	Class C	Class P	Sorry I don't know

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2 Aggregate Subbase Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
2- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 20%	Max. 30%	Max. 35%	Max. 40%	Sorry I don't know
2- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 10	Max. 12	Max. 14	Max. 16	Sorry I don't know
2- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 40%	Max. 45%	Max. 50%	Max. 60%	Sorry I don't know
2- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Subbase Course in accordance with the SPC (ITEM 301) ?	±0mm	±10mm	±20mm	+10mm -20mm	+20mm -30mm
2- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Subbase Course in accordance with the SPC (ITEM 301) ?	±0mm	±5mm	±10mm	±15mm	±20mm

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3 Aggregate Base Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
3- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	0 - 10%	0 - 15%	0 - 20%	0 - 25%	Sorry I don't know
3- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	Max. 10	Max. 15	Max. 20	Max. 25	Sorry I don't know
3- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	0 - 30%	0 - 35%	0 - 40%	0 - 45%	Sorry I don't know
3- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Base Course in accordance with the SPC (ITEM 303) ?	±0mm	±5mm	±10mm	+5mm -10mm	+10mm -20mm
3- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Base Course in accordance with the SPC (ITEM 303) ?	±0mm	±5mm	±10mm	±15mm	±20mm

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4 Aggregate Surface Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
4- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 20%	Max. 25%	Max. 30%	Max. 35%	Sorry I don't know
4- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 8	Max. 10	Min. 4 Max. 9	Min. 6 Max. 12	Sorry I don't know
4- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 30%	Max. 35%	Max. 45%	Max. 50%	Sorry I don't know
4- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Surface Course in accordance with the SPC (ITEM 401) ?	±0mm	±5mm	±10mm	+5mm -10mm	+15mm -5mm
4- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Surface Course in accordance with the SPC (ITEM 401) ?	±0mm	±5mm	±10mm	+5mm -10mm	+15mm -5mm

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Department : Inf. Depart.

Your name : _____

1 Surveying

Questions	Answer: Choose the one of them as the most appropriated answer.				
1-1 If the result of measured coordinates of national bench mark on project is different to the coordination which you were officially informed before the measurement, what will you do?	To check the coordination of the BM	To order re-survey	To change the measured coordination based on the BM's coordination	To check the survey instrument	To re-training surveyor team
1-2 How do you protect the coordination of control points physically and formally?	To cover with a little soil	To cover with a much soil	To install peg and instruct the resident to protect	To set up by reference points for restoration	To train the surveyor to remember the correct position
1-3 How do you check the topographic data on the drawing at the site on the project?	To check the direction of compass	To check the planned center line	To check the existing center line	To check the location of existing houses	To check the location of existing utilities
1-4 When you check road design drawing, which subject you are concerned?	To check with the standard drawing	Strength of the road bed	Boundary on the road reserve	Direction of compass	Direction of destination of drainage system
1-5 Regarding mobile GPS operation, which subject you shall give the attention when you survey x, y, z coordinates?	Accuracy	Coordination z (i.e. elevation)	Speed of the surveying	Continuous of the surveying	Battery charger

2 Drainage and Culvert

Questions	Answer: Choose the one of them as the most appropriated answer.				
2-1 When you will conduct a field survey for planning and design of road drainage facilities, which point of view is not appropriate?	To check a flow direction of surface water	To check a traffic volume and origin and destination of traffic	To check a surrounding condition of outlet point	To check a location and volume of spring water and seepage water from natural ground	Sorry I don't know
2-2 Which data you do not need when you estimate the quantity of water due to rainfall i.e. runoff?	Catchment area	Rainfall data	Return period	Traffic speed	Sorry I don't know
2-3 Which data you do not need when you estimate the flow capacity passed under the road embankment?	Dimension of the crossing	Water quality	Velocity of flow	Slope of crossing	Sorry I don't know
2-4 What is the minimum earth covering thickness you will apply for culvert structure?	15cm	30cm	50cm	100cm	Sorry I don't know
2-5 Which description is not appropriate for hydraulic study on bridge project, comply with the draft Bridge Design Manual in TL?	In preliminary survey, waterway openings should be able to pass 500-year flood without causing structural failure	In the hydraulic analysis the design discharge is 50-years discharge	Minimum vertical clearance between the highest flood level and the lowest point of the girder should be more than 150mm	Maximum discharge can be estimated by using a Rational method	The velocity obtaining in the stream under the flood condition is calculated using Lacey's formula

3 Retaining Wall

Questions	Answer: Choose the one of them as the most appropriated answer.				
3-1 Which factor is not appropriate for damage and collapse of retaining wall?	Recovery of vegetation and animal	Increase in earth pressure and hydraulic pressure	Settlement of ground	Riverbed erosion	Sorry I don't know
3-2 Which subject is not appropriate for stability analysis of retaining wall?	Safety for sliding	Safety for overturning	Environmental and social consideration	Bearing capacity of ground	Sorry I don't know
3-3 Which item is not appropriate as primary load for design of retaining wall?	Self weight of retaining wall	Earth load	Hydraulic pressure	Loaded weight	Sorry I don't know
3-4 Which item is not appropriate for design condition of retaining wall?	Angle of share resistance (ϕ) of sandy soil, which is assumed according to soil classification, is 35 degree	Unit weight of sandy soil used as backfilling material is 19 kN/m ³	Friction coefficient (μ) between concrete and gravel ground is 0.6	Allowable bearing capacity (qa) of gravel ground is 600 kN/m ²	Sorry I don't know
3-5 Which description is not appropriate for design of masonry retaining wall?	Masonry without back fill concrete is used only for a river revetment	It is not necessary to install a drain pipe for retaining wall on land (non-river)	Masonry wall is often used at the site of small earth load	High permeable material such as crushed stone should be used as a back fill material	Sorry I don't know

4 Slope Protection

Questions	Answer: Choose the one of them as the most appropriated answer.				
4-1 Which item is not appropriate reason for set up a terrace on slope surface?	Ensure a stability	Drainage on the surface	Cost saving	Maintenance and operation	Sorry I don't know
4-2 Which subject you will consider in case of the determination for cut slope?	Height of cutting	Drainage system	Type of the soil	Availability of equipment	Sorry I don't know
4-3 What is the minimum slope gradient you will apply for cutting slope on hard rock ground?	Vertical cut	1 : 0.3	1 : 0.5	1 : 1.0	Sorry I don't know
4-4 What is the standard slope gradient you will apply for embankment slope with normal material?	1 : 1.0	1 : 1.5	1 : 1.8	1 : 2.0	Sorry I don't know
4-5 Which description is not appropriate for bio-engineering work?	The first purpose of the work is to protect a slope from rain erosion and prevent from surface failure	The work can not expect the effect which prevents deep slope failure	Selection of the work depend on the vegetable seed, soil type, slope gradient and meteorological condition	The work is also applicable in steep slope	Sorry I don't know

Department : _____

Your name : _____

1 Concrete

Questions	Answer: Choose the one of them as the most appropriated answer.				
1- 1 How much is the Slump for Class A of concrete in accordance with the SPC (ITEM 506) ?	0 - 50mm	50 - 100mm	100 - 200mm	more than 100mm	Sorry I don't know
1- 2 How much is the Minimum Cement Content for Class A of concrete in accordance with the SPC (ITEM 506) ?	300 kg	320 kg	380 kg	440 kg	Sorry I don't know
1- 3 How much is the Maximum Water/Cement Ratio for Class A of concrete in accordance with the SPC (ITEM 506) ?	0.49	0.53	0.55	0.58	Sorry I don't know
1- 4 When do you check the Compressive Strength Test for specimen of concrete in accordance with the SPC (ITEM 506) ?	at 4 days and 28 days after casting of concrete	at 5 days and 28 days after casting of concrete	at 7 days and 28 days after casting of concrete	at 10 days and 28 days after casting of concrete	Sorry I don't know
1- 5 What do you use the Class of Concrete for retaining wall in accordance with SPC (ITEM 506) ?	Class A	Class B	Class C	Class P	Sorry I don't know

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2 Aggregate Subbase Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
2- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 20%	Max. 30%	Max. 35%	Max. 40%	Sorry I don't know
2- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 10	Max. 12	Max. 14	Max. 16	Sorry I don't know
2- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 40%	Max. 45%	Max. 50%	Max. 60%	Sorry I don't know
2- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Subbase Course in accordance with the SPC (ITEM 301) ?	±0mm	±10mm	±20mm	+10mm -20mm	+20mm -30mm
2- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Subbase Course in accordance with the SPC (ITEM 301) ?	±0mm	±5mm	±10mm	±15mm	±20mm

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3 Aggregate Base Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
3- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	0 - 10%	0 - 15%	0 - 20%	0 - 25%	Sorry I don't know
3- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	Max. 10	Max. 15	Max. 20	Max. 25	Sorry I don't know
3- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	0 - 30%	0 - 35%	0 - 40%	0 - 45%	Sorry I don't know
3- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Base Course in accordance with the SPC (ITEM 303) ?	±0mm	±5mm	±10mm	+5mm -10mm	+10mm -20mm
3- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Base Course in accordance with the SPC (ITEM 303) ?	±0mm	±5mm	±10mm	±15mm	±20mm

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4 Aggregate Surface Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
4- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 20%	Max. 25%	Max. 30%	Max. 35%	Sorry I don't know
4- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 8	Max. 10	Min. 4 Max. 9	Min. 6 Max. 12	Sorry I don't know
4- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 30%	Max. 35%	Max. 45%	Max. 50%	Sorry I don't know
4- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Surface Course in accordance with the SPC (ITEM 401) ?	±0mm	±5mm	±10mm	+5mm -10mm	+15mm -5mm
4- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Surface Course in accordance with the SPC (ITEM 401) ?	±0mm	±5mm	±10mm	+5mm -10mm	+15mm -5mm

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Department : Project

Your name : _____

1 Surveying

Questions	Answer:: Choose the one of them as the most appropriated answer.				
1-1 If the result of measured coordinates of national bench mark on project is different to the coordination which you were officially informed before the measurement, what will you do ?	To check the coordination of the BM	To order re-survey	To change the measured coordination based on the BM's coordination	To check the survey instrument	To re-training surveyor team
1-2 How do you protect the coordination of control points physically and formally ?	To cover with a little soil	To cover with a much soil	To install peg and instruct the resident to protect	To set up by reference points for restoration	To train the surveyor to remember the correct position
1-3 How do you check the topographic data on the drawing at the site on the project ?	To check the direction of compass	To check the planned center line	To check the existing center line	To check the location of existing houses	To check the location of existing utilities
1-4 When you check road design drawing, which subject you are concerned ?	To check with the standard drawing	Strength of the road bed	Boundary on the road reserve	Direction of compass	Direction of destination of drainage system
1-5 Regarding mobile GPS operation, which subject you shall give the attention when you survey x, y, z coordinates ?	Accuracy	Coordination z (i.e. elevation)	Speed of the surveying	Continuous of the surveying	Battery charger

2 Drainage and Culvert

Questions	Answer:: Choose the one of them as the most appropriated answer.				
2-1 When you will conduct a field survey for planning and design of road drainage facilities, which point of view is not appropriate ?	To check a flow direction of surface water	To check a traffic volume and origin and destination of traffic	To check a surrounding condition of outlet point	To check a location and volume of spring water and seepage water from natural ground	Sorry I don't know
2-2 Which data you do not need when you estimate the quantity of water due to rainfall i.e. runoff ?	Catchment area	Rainfall data	Return period	Traffic speed	Sorry I don't know
2-3 Which data you do not need when you estimate the flow capacity passed under the road embankment ?	Dimension of the crossing	Water quality	Velocity of flow	Slope of crossing	Sorry I don't know
2-4 What is the minimum earth covering thickness you will apply for culvert structure ?	15cm	30cm	50cm	100cm	Sorry I don't know
2-5 Which description is not appropriate for hydraulic study on bridge project, comply with the draft Bridge Design Manual in TL ?	In preliminary survey, waterway openings should be able to pass 500-year flood without causing structural failure	In the hydraulic analysis the design discharge is 50-years discharge	Minimum vertical clearance between the highest flood level and the lowest point of the girder should be more than 150mm	Maximum discharge can be estimated by using a Rational method	The velocity obtaining in the stream under the flood condition is calculated using Lacey's formula

3 Retaining Wall

Questions	Answer:: Choose the one of them as the most appropriated answer.				
3-1 Which factor is not appropriate for damage and collapse of retaining wall ?	Recovery of vegetation and animal	Increase in earth pressure and hydraulic pressure	Settlement of ground	Riverbed erosion	Sorry I don't know
3-2 Which subject is not appropriate for stability analysis of retaining wall ?	Safety for sliding	Safety for overturning	Environmental and social consideration	Bearing capacity of ground	Sorry I don't know
3-3 Which item is not appropriate as primary load for design of retaining wall ?	Self weight of retaining wall	Earth load	Hydraulic pressure	Loaded weight	Sorry I don't know
3-4 Which item is not appropriate for design condition of retaining wall ?	Angle of share resistance (ϕ) of sandy soil, which is assumed according to soil classification, is 35 degree	Unit weight of sandy soil used as backfilling material is 19 kN/m ³	Friction coefficient (μ) between a concrete and gravel ground is 0.6	Allowable bearing capacity (qa) of gravel ground is 600 kN/m ²	Sorry I don't know
3-5 Which description is not appropriate for design of masonry retaining wall ?	Masonry without back fill concrete is used only for a river revetment	It is not necessary to install a drain pipe for retaining wall on land (non-river)	Masonry wall is often used at the site of small earth load	High permeable material such as crushed stone should be used as a back fill material	Sorry I don't know

4 Slope Protection

Questions	Answer:: Choose the one of them as the most appropriated answer.				
4-1 Which item is not appropriate reason for set up a terrace on slope surface	Ensure a stability	Drainage on the surface	Cost saving	Maintenance and operation	Sorry I don't know
4-2 Which subject you will consider in case of the determination for cut slope?	Height of cutting	Drainage system	Type of the soil	Availability of equipment	Sorry I don't know
4-3 What is the minimum slope gradient you will apply for cutting slope on hard rock ground ?	Vertical cut	1 : 0.3	1 : 0.5	1 : 1.0	Sorry I don't know
4-4 What is the standard slope gradient you will apply for embankment slope with normal material ?	1 : 1.0	1 : 1.5	1 : 1.8	1 : 2.0	Sorry I don't know
4-5 Which description is not appropriate for bio-engineering work ?	The first purpose of the work is to protect a slope from rain erosion and prevent from surface failure	The work can not expect the effect which prevents deep slope failure	Selection of the work depend on the vegetable seed, soil type, slope gradient and meteorological condition	The work is also applicable in steep slope	Sorry I don't know

Department : Project Dep.

Your name : _____

1 Concrete

Questions	Answer: Choose the one of them as the most appropriated answer.				
1- 1 How much is the Slump for Class A of concrete in accordance with the SPC (ITEM 506) ?	0 - 50mm	50 - 100mm	100 - 200mm	more than 100mm	Sorry I don't know
1- 2 How much is the Minimum Cement Content for Class A of concrete in accordance with the SPC (ITEM 506) ?	360 kg	320 kg	380 kg	440 kg	Sorry I don't know
1- 3 How much is the Maximum Water/Cement Ratio for Class A of concrete in accordance with the SPC (ITEM 506) ?	0.49	0.53	0.55	0.58	Sorry I don't know
1- 4 When do you check the Compressive Strength Test for specimen of concrete in accordance with the SPC (ITEM 506) ?	at 4 days and 28 days after casting of concrete	at 5 days and 28 days after casting of concrete	at 7 days and 28 days after casting of concrete	at 10 days and 28 days after casting of concrete	Sorry I don't know
1- 5 What do you use the Class of Concrete for retaining wall in accordance with SPC (ITEM 506) ?	Class A	Class B	Class C	Class P	Sorry I don't know

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2 Aggregate Subbase Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
2- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 20%	Max. 30%	Max. 35%	Max. 40%	Sorry I don't know
2- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 10	Max. 12	Max. 14	Max. 16	Sorry I don't know
2- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Subbase Course in accordance with the SPC (ITEM 301) ?	Max. 40%	Max. 45%	Max. 50%	Max. 60%	Sorry I don't know
2- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Subbase Course in accordance with the SPC (ITEM 301) ?	±0mm	±10mm	±20mm	+10mm -20mm	+20mm -30mm
2- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Subbase Course in accordance with the SPC (ITEM 301) ?	±0mm	±5mm	±10mm	±15mm	±20mm

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3 Aggregate Base Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
3- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	0 - 10%	0 - 15%	0 - 20%	0 - 25%	Sorry I don't know
3- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	Max. 10	Max. 15	Max. 20	Max. 25	Sorry I don't know
3- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Base Course Class A in accordance with the SPC (ITEM 303) ?	0 - 30%	0 - 35%	0 - 40%	0 - 45%	Sorry I don't know
3- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Base Course in accordance with the SPC (ITEM 303) ?	±0mm	±5mm	±10mm	+5mm -10mm	+10mm -20mm
3- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Base Course in accordance with the SPC (ITEM 303) ?	±0mm	±5mm	±10mm	±15mm	±20mm

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4 Aggregate Surface Course

Questions	Answer: Choose the one of them as the most appropriated answer.				
4- 1 Material Test How much is the Liquid Limit (LL) for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 20%	Max. 25%	Max. 30%	Max. 35%	Sorry I don't know
4- 2 Material Test How much is the Plasticity Index (PI) for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 8	Max. 10	Min. 4 Max. 9	Min. 6 Max. 12	Sorry I don't know
4- 3 Material Test How much is the Abrasion of the Coarse Aggregate for Aggregate Surface Course in accordance with the SPC (ITEM 401) ?	Max. 30%	Max. 35%	Max. 45%	Max. 50%	Sorry I don't know
4- 4 Tolerance How much is the Permitted Variation from design Level of Surface for Surface Course in accordance with the SPC (ITEM 401) ?	±0mm	±5mm	±10mm	+5mm -10mm	+15mm -5mm
4- 5 Tolerance How much is the Permitted Variation from design Thickness of Layer for Surface Course in accordance with the SPC (ITEM 401) ?	±0mm	±5mm	±10mm	+5mm -10mm	+15mm -5mm

SPC-MPWTC Standard Specifications - November 2014 Edition

Department : Project Dep.

Your name : _____


1 Surveying

Questions	Answer: Choose the one of them as the most appropriated answer.				
1-1 If the result of measured coordinates of national bench mark on project is different to the coordination which you were officially informed before the measurement, what will you do ?	To check the coordination of the BM	To order re-survey	To change the measured coordination based on the BM's coordination	To check the survey instrument	To re-training surveyor team
1-2 How do you protect the coordination of control points physically and formally ?	To cover with a little soil	To cover with a much soil	To install peg and instruct the resident to protect	To set up by reference points for restoration	To train the surveyor to remember the correct position
1-3 How do you check the topographic data on the drawing at the site on the project ?	To check the direction of compass	To check the planned center line	To check the existing center line	To check the location of existing houses	To check the location of existing utilities
1-4 When you check road design drawing, which subject you are concerned ?	To check with the standard drawing	Strength of the road bed	Boundary on the road reserve	Direction of compass	Direction of destination of drainage system
1-5 Regarding mobile GPS operation, which subject you shall give the attention when you survey x, y, z coordinates ?	Accuracy	Coordination z (i.e. elevation)	Speed of the surveying	Continuous of the surveying	Battery charger

2 Drainage and Culvert

Questions	Answer: Choose the one of them as the most appropriated answer.				
2-1 When you will conduct a field survey for planning and design of road drainage facilities, which point of view is not appropriate ?	To check a flow direction of surface water	To check a traffic volume and origin and destination of traffic	To check a surrounding condition of outlet point	To check a location and volume of spring water and seepage water from natural ground	Sorry I don't know
2-2 Which data you do not need when you estimate the quantity of water due to rainfall i.e. runoff ?	Catchment area	Rainfall data	Return period	Traffic speed	Sorry I don't know
2-3 Which data you do not need when you estimate the flow capacity passed under the road embankment ?	Dimension of the crossing	Water quality	Velocity of flow	Slope of crossing	Sorry I don't know
2-4 What is the minimum earth covering thickness you will apply for culvert structure ?	15cm	30cm	50cm	100cm	Sorry I don't know
2-5 Which description is not appropriate for hydraulic study on bridge project, comply with the draft Bridge Design Manual in TL ?	In preliminary survey, waterway openings should be able to pass 500-year flood without causing structural failure	In the hydraulic analysis the design discharge is 50-years discharge	Minimum vertical clearance between the highest flood level and the lowest point of the girder should be more than 150mm	Maximum discharge can be estimated by using a Rational method	The velocity obtaining in the stream under the flood condition is calculated using Lacey's formula

3 Retaining Wall

Questions	Answer: Choose the one of them as the most appropriated answer.				
3-1 Which factor is not appropriate for damage and collapse of retaining wall ?	Recovery of vegetation and animal	Increase in earth pressure and hydraulic pressure	Settlement of ground	Riverbed erosion	Sorry I don't know
3-2 Which subject is not appropriate for stability analysis of retaining wall ?	Safety for sliding	Safety for overturning	Environmental and social consideration	Bearing capacity of ground	Sorry I don't know
3-3 Which item is not appropriate as primary load for design of retaining wall ?	Self weight of retaining wall	Earth load 	Hydraulic pressure	Loaded weight	Sorry I don't know
3-4 Which item is not appropriate for design condition of retaining wall ?	Angle of share resistance (ϕ) of sandy soil, which is assumed according to soil classification, is 35 degree	Unit weight of sandy soil used as backfilling material is 19 kN/m ³	Friction coefficient (μ) between a concrete and gravel ground is 0.6	Allowable bearing capacity (q_u) of gravel ground is 600 kN/m ²	Sorry I don't know
3-5 Which description is not appropriate for design of masonry retaining wall ?	Masonry without back fill concrete is used only for a river revetment	It is not necessary to install a drain pipe for retaining wall on land (non-river)	Masonry wall is often used at the site of small earth load	High permeable material such as crushed stone should be used as a back fill material	Sorry I don't know

4 Slope Protection

Questions	Answer: Choose the one of them as the most appropriated answer.				
4-1 Which item is not appropriate reason for set up a terrace on slope surface	Ensure a stability	Drainage on the surface	Cost saving	Maintenance and operation	Sorry I don't know
4-2 Which subject you will consider in case of the determination for cut slope?	Height of cutting	Drainage system	Type of the soil	Availability of equipment	Sorry I don't know
4-3 What is the minimum slope gradient you will apply for cutting slopes on hard rock ground ?	Vertical cut	1 : 0.3	1 : 0.5	1 : 1.0	Sorry I don't know
4-4 What is the standard slope gradient you will apply for embankment slope with normal material ?	1 : 1.0	1 : 1.5	1 : 1.8	1 : 2.0	Sorry I don't know
4-5 Which description is not appropriate for bio-engineering work ?	The first purpose of the work is to protect a slope from rain erosion and prevent from surface failure	The work can not expect the effect which prevents deep slope failure	Selection of the work depend on the vegetable seed, soil type, slope gradient and meteorological condition	The work is also applicable in steep slope	Sorry I don't know

Department : Department of Construction

Your name : _____