



UNIVERSITY OF RUHUNA

Faculty of Engineering

End-Semester 1 Examination in Engineering: August 2015

Module Number: CE 1301

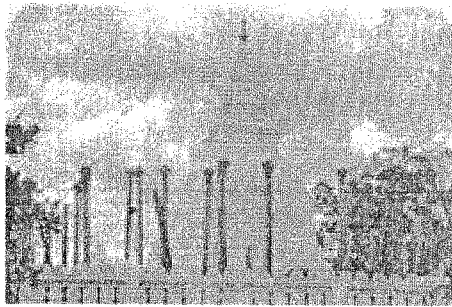
Module Name: Introduction to Civil Engineering

[Repeat Examination for E2012 batch]

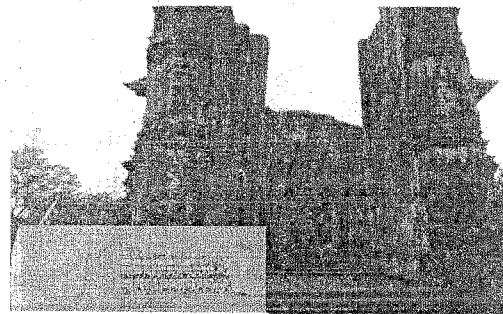
[Three Hours]

[Answer all questions, each question carries SIXTEEN marks]

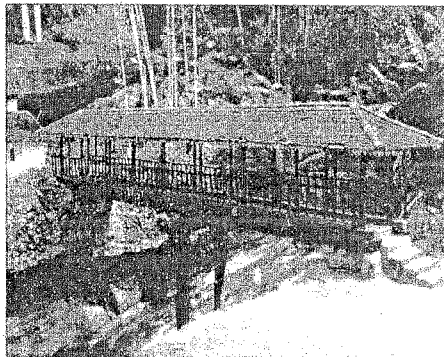
- Q1. a) Briefly describe the term "Engineering" as you understand. [1.0 Mark]
- b) Why does an engineer is called a problem solver? [1.0 Mark]
- c) List four prehistoric civil engineering constructions in the world. [2.0 Marks]
- d) Identify following ancient structures in Sri Lanka with their locations. [2.0 Marks]



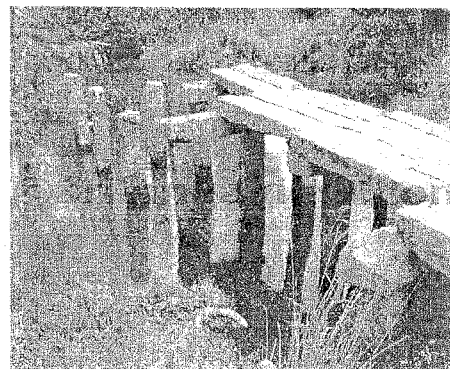
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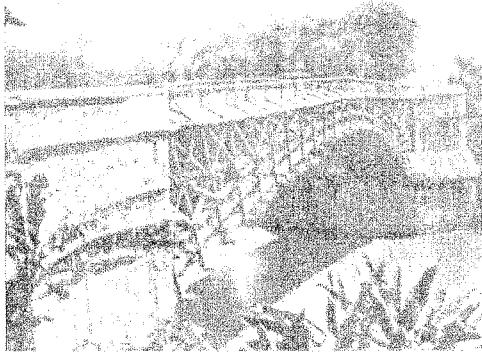
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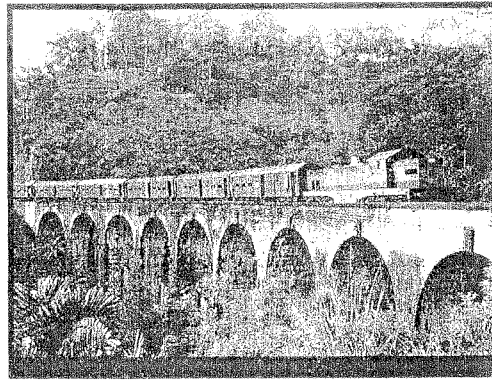
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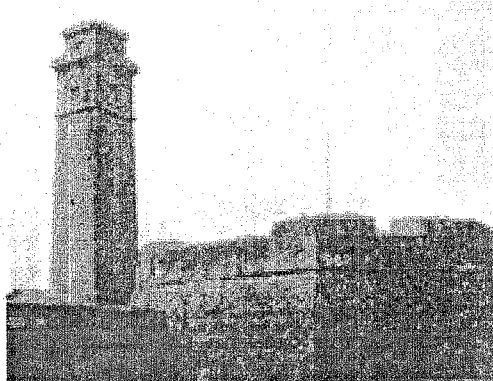
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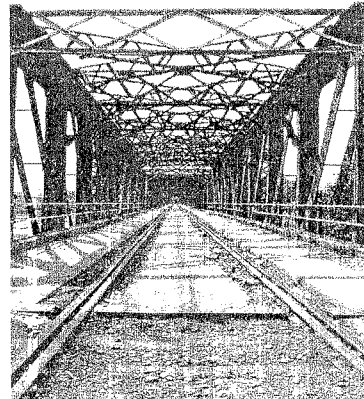
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(vi)



(vii)



(viii)

Fig. Q1

- e) State four main types of transportation systems giving examples for each. [2.0 Marks]
- f) State three main reasons for urban traffic congestion. [2.5 Marks]
- g) Recently there have been moves to introduce cleaner and environmental-friendly means of transport. In that context explain the term *Environmentally Sustainable Transport* giving examples. [2.5 Marks]
- h) What are the public institutions in Sri Lanka that are responsible for the operation and maintenance of infrastructure facilities built to provide following services?
- Drinking water supply
 - Road transport
 - Electricity supply

[3.0 Marks]

- Q2. a) Name and explain briefly the different types of (i) solids and (ii) organic matter, found in water and wastewater. [4.0 Marks]
- b) Explain the following statements:
- i) The discharge of industrial wastewater into surface water bodies causes water pollution. [2.5 Marks]
- ii) Keeping a balance between the environment and economic activities will help achieve the 'sustainability'. [1.5 Marks]
- iii) The 'urbanization and industrialization' lead to an 'enhanced greenhouse effect' and 'stratospheric ozone layer depletion'. [2.0 Marks]
- c) Explain briefly two engineering and two management approaches to reduce the air and noise pollution during the construction of a multi-storey building. [2.0 Marks]
- d) 'Evaluation of the impacts' is the most difficult and controversial step in an Environmental Impact Assessment (EIA) process. Give reasons. [2.0 Marks]
- e) Explain briefly the nature of the decision-making process of selecting an appropriate action among several alternative actions suggested by an EIA report. [2.0 Marks]
- Q3. a) During the construction phase of an industrial estate, name a primary environmental impact that is likely to occur. Explain how it may induce a secondary, tertiary or higher order impact/s. [2.0 Marks]
- b) "Sustainable development is important to improve the livelihoods of the people in a country." Discuss the above statement highlighting the meaning of the term 'sustainable development'. [2.0 Marks]
- c) Discuss different strategies which should be included in a strategic plan aimed to achieve a sustainable development in a developing country. [4.0 Marks]
- d) State the factors that have to be considered in selecting a land to construct a residential building. [3.0 Marks]
- e) i) Briefly explain why traps should be included with the sanitary appliances.
 ii) With the aid of sketches, describe the different types of 'traps' with respect to their shapes. [2.5 Marks]

- f) To ensure efficient operation, what are the important factors that should be considered when laying drains below ground?

[2.5 Marks]

Q4. a) Identify and explain the differences of the following terms

- i) Plane Surveying and Geodetic Surveying.
ii) Geological Surveying and Geographical Surveying.

[2.0 Marks]

- b) i) What is the purpose of taking tie measurements for stations in tape and offset surveying?

- ii) Briefly explain the taking of tie measurements with the aid of sketches.

[2.0 Marks]

- c) What are the factors to be considered in selecting stations (or control points) for tape and offset surveying?

[3.0 Marks]

- d) State the differences between the dumpy level and the tilting level.

[3.0 Marks]

- e) Describe the checks to be carried out in levelling procedure to ensure following:

- i) Accuracy of field work.
ii) Accuracy of field book calculations.

[2.0 Marks]

- f) The extract shown in Table Q4 is from a level book and shows staff readings taken between two Temporary Bench Marks (TBMs) 'A' and 'B'. Calculate reduced levels of all the points by rise and fall method.

[4.0 Marks]

Table Q4

Backsight	Intermediate sight	Foresight	Remarks
3.150			TBM 'A' 100.00 m
1.770		3.850	Change point (CP) 1
	2.200		P
2.430		1.850	CP 2
	2.440		Q
2.800		1.340	CP 3
1.185		2.010	CP 4
	2.735		R
0.720		1.685	CP 5
		1.525	TBM 'B' 99.795 m

- Q5. a) State the factors which need to be considered in choosing materials for different types of structures.

[2.0 Marks]

- b) State the advantages of steel structures compared to concrete structures.

[2.5 Marks]

- c) Clay is one of the suitable materials for making bricks. Explain preliminary test that can be used in determining the suitability of clay sample to make bricks.

[2.5 Marks]

d) Describe following terms related to concreting.

i) Compaction.

ii) Curing.

[3.0 Marks]

e) Beam AB supported at Points P and Q is subjected to series of point and uniformly distributed loads as shown in Fig. Q5. Point loads at the end of two over hangs, Point A and B, are 10 kN each. Point load at the middle of the beam is 20 kN. Uniformly distributed load between the supports P and Q is 2kN/m. Draw Shear Force Diagram (SFD) and Bending Moment Diagram (BMD) of the beam AB.

[6.0 Marks]

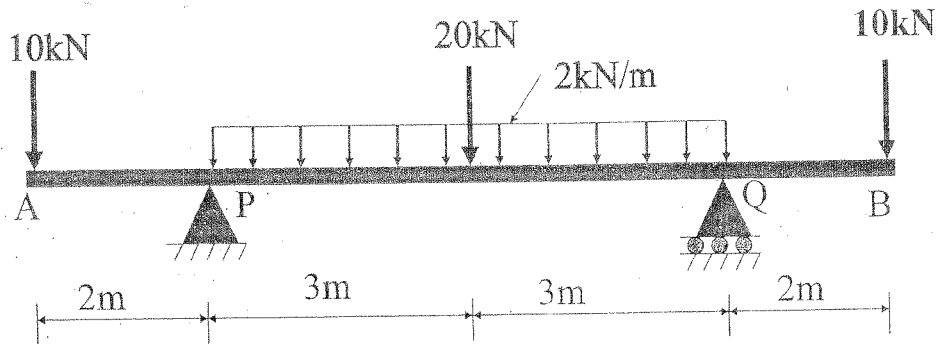


Fig. Q5