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G.R. No.

U218-113(ESE)

**DECEMBER 2018-ENDSEM**

**S. Y. B. TECH. (Civil Engineering) (SEMESTER-I)**

**COURSE NAME:** Infrastructure Engineering

**COURSE CODE:** CVUA21173

**(2017 PATTERN)**

Time: [2 Hours]

[Max. Marks: 50]

**Instructions to candidates:**

- 1) Answer Q.1, Q.2, Q.3, Q.4, Q.5 OR Q.6, Q.7 OR Q.8
- 2) Figures to the right indicate full marks.
- 3) Use of scientific calculator is allowed
- 4) Assume suitable data wherever required and state them clearly

Q.1) a) What is meant by 'P3' and 'BRTS' with respect to infrastructure development? Explain these concepts with examples. [6 marks]

**OR**

b) Explain the necessity of 'smart city' in 21<sup>st</sup> Century in India. State two advantages and two drawbacks of smart city. [6 marks]

Q.2) a) Why do you need to test the ballast sample in laboratory? State various tests, purpose of those tests and expected limits/ results of the tests. [6 marks]

**OR**

b) State two points of comparison between wooden, C.I. and concrete sleepers. [6 marks]

Q.3) a) Determine equilibrium cant for a BG track on 3<sup>rd</sup> curve if 10 trains, 6 trains, and 2 trains run on it with speeds 45 km/h, 63 km/h and 72 km/h respectively. [6 marks]

**OR**

b) Draw neat labelled plan showing: (i) Fan shaped layout of sleepers at a Right Hand turnout, (ii) Supported rail joint, and (iii) Suspended rail joint. [6 marks]

Q.4) a) Show in a neat labelled sketch: superstructure and substructure of a bridge with their essential subcomponents. [4 marks]

**OR**

b) State whether True or False, giving justification. (Marks will not be allotted if justification is not given): (i) Lining of tunnel ensures movement of vehicles in straight line, (ii) Drilling holes in rock is not necessary before blasting. [4 marks]

Q.5) a) Explain in detail different types (Categories) of ports. Draw sketches wherever possible. [6 marks]

b) State whether True or False; giving justification (Marks will not be given if justification is not given): (i) Platform built along or parallel to shore is called jetty, (ii) Slipway consists of gently sloping rail track for launching ships. [4 marks]

c) Define 'breakwater'. Briefly explain three types of forces acting on a breakwater. [4 marks]

OR

Q.6) a) What is meant by breakwater? Explain with sketch: Mound type breakwater supplemented by tetrapods. [6 marks]

b) Discuss four important (Necessary) facilities which must be provided at a major port. [4 marks]

c) Describe 'capital dredging' and 'maintenance dredging'. [4 marks]

Q.7) a) Determine actual length of runway to be provided for an airport if basic runway length is 1.26 km. The airport is 400 m above MSL where effective gradient is 0.5%; and mean of maximum and mean of daily average temperature for the hottest month are  $44.8^{\circ}$  and  $26.2^{\circ}$  respectively. [6 marks]

b) Write a note on various runway configurations at an airport. [4 marks]

c) Briefly explain with sketch following imaginary surfaces: Outer Horizontal Surface and Conical Surface. [4 marks]

OR

Q.8) a) List six factors (elements) to be considered for designing airport runways. [6 marks]

b) Clearly explain three corrections to be applied to the basic runway length for obtaining actual runway length. [4 marks]

c) Define: Runway Visual Range (RVR), Touchdown Zone, Primary Runway, Airport Reference Point (ARP). [4 marks]

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