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15CV552

Fifth Semester B.E. Degree Examination, June/July 2019 Railways, Harbours, Tunneling and Airports

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Draw typical cross-section of permanent way. Discuss in brief the basic functions of various components of railway track. (08 Marks)
- b. Calculate maximum permissible speed on curve of high speed B.G. track having following particulars:
- (i) Degree of curve = 1°
 - (ii) Amount of superelevation = 8.0 cm
 - (iii) Length of transition curve = 130 m
 - (iv) Max. speed of section likely to be sanctioned is 150 kmph. (08 Marks)

OR

- 2 a. Explain : (i) Coning of wheel (ii) Creep in rails (08 Marks)
- b. Calculate all necessary elements required to set out a 1 in $8\frac{1}{2}$ turnout, taking off from straight B.G. track with its curve starting from toe of the switch i.e., tangential to the gauge face of outer main rail and passes through theoretical nose of crossing i.e, TNC. Given heel divergence $d = 11.4$ cm. (08 Marks)

Module-2

- 3 a. List the modern surveying techniques that can be utilized for preliminary survey of railway line for difficult terrain. Explain any two techniques. (06 Marks)
- b. Explain tier system of track maintenance. (10 Marks)

OR

- 4 a. What are the advantages and limitations of underground railways? (08 Marks)
- b. For a rail of 11.89m length, calculate the quantity of materials required per km. Length of track. Assume sleeper density to be equal to $(1.0936n + 4)$. (08 Marks)

Module-3

- 5 a. Explain various shapes of tunnels with neat sketches. (04 Marks)
- b. Explain with neat sketches the natural classification of harbours. (06 Marks)
- c. Mention objects of tunnel lining. List materials used for lining. (06 Marks)

OR

- 6 a. List methods of tunneling in hard rock. Explain any one method. (06 Marks)
- b. Explain the natural phenomena considered in the design of harbour. (06 Marks)
- c. What is importance of tunnel ventilation? Explain methods adopted for ventilation. (04 Marks)

Module-4

- 7 a. Write a brief note on "Airport classifications". (08 Marks)
- b. Explain factors which influence the airport site selection. (08 Marks)



15CV552

OR

- 8 a. What is "Regional planning"? What information will regional plan provide? List various data to be collected for scientific and sound regional plan. (08 Marks)
- b. Write short note on :
- (i) Holding apron
 - (ii) Imaginary surfaces. (08 Marks)

Module-5

- 9 a. What is wind rose diagram? Explain briefly with a neat sketch any one method of orientation of runway. (06 Marks)
- b. Calculate actual length of runway from following data:
- (i) Airport elevation = R.L. 105m
 - (ii) Airport reference temperature = 30°C
 - (iii) Runway basic length = 4200 m
 - (iv) Highest point along length = R.L. 107m
 - (v) Lowest point along length = R.L. 101m. (10 Marks)

OR

- 10 a. Explain the following :
- (i) Airport marking
 - (ii) Airport lighting (08 Marks)
- b. Explain principles adopted in design of an exit taxiway connecting runway and a parallel taxiway. On a neat typical layout, indicate various design elements. (08 Marks)
