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## Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020 Railways, Harbours, Tunneling and Airport

Time: 3 hrs.

Max. Marks: 80

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

### Module-1

- 1 a. Explain Permanent way with a neat sketch. Mention the requirements of an ideal permanent way. (08 Marks)  
b. Define creep. What are the causes, effects and prevention of creep? (08 Marks)

OR

- 2 a. What are the requirements of good ballast? Mention the different types of Ballast used in permanent way. (08 Marks)  
b. A 5° curve diverges from 3° main curve in the Reverse direction in the layout of a B.G. Yard. If the speed on the branch line is restricted to 33 kmph. Determine the restricted speed on the main line. (08 Marks)

### Module-2

- 3 a. Estimate the quantities of materials required to construct one km long BG railway track taking the sleeper density as  $(n + 6)$ . (08 Marks)  
b. With a neat sketch, explain "Marshalling Yard". List the component. (08 Marks)

OR

- 4 a. Draw a neat sketch of right Hand Turnout and list the various parts. (08 Marks)  
b. Discuss the present scenario of Metro Rail System. (08 Marks)

### Module-3

- 5 a. Draw a neat sketch of Artificial Harbour and list the various components. (08 Marks)  
b. Explain the advantages of tunnels. Mention the different shapes of tunnels adopted for roads and railways with a neat sketch. (08 Marks)

OR

- 6 a. Discuss the following:  
(i) Jetties  
(ii) Mooring Buoy  
(iii) Transit shed  
(iv) Break water (08 Marks)  
b. Explain with a neat sketch the operations involved in needle beam method. (08 Marks)

### Module-4

- 7 a. Draw a neat sketch of an Airport Layout and list the various elements in an Airport. (08 Marks)  
b. List the characteristics of an Aircraft which affect the Design of an Airport. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.



OR

- 8 a. What is Basic Runway Length? Explain the various corrections applied to it. (08 Marks)
- b. Determine the orientation of Runway by Plotting Wind Rose diagram, by using the data given in Table Q8(b). Find the percentage of wind coverage. (08 Marks)

Wind Direction	Direction of Wind in % of time
N	10.3
NNE	8.1
NE	3.9
ENE	1.8
E	1.0
ESE	0.4
SE	7.1
SSE	8.7
S	14.3
SSW	10.0
SW	5.7
WSW	1.6
W	0.5
WNW	0.3
NW	7.2
NNW	5.6

Table Q8(b)

**Module-5**

- 9 a. The length of runway under standard conditions is 1650 mts. The airport site has an elevation of 275 mts. Its reference temperature is 32.94°C. If the runway is to be constructed with an effective gradient of 0.20%. Determine the corrected runway length. (08 Marks)
- b. Explain the various factors to be considered in selection of suitable site for airport. (08 Marks)

OR

- 10 a. Design an exit taxiway joining the runway and a parallel main taxiway. The total angle of turn is 40° and turn-off speed is 65 kmph. Assume radius of entrance curve as 517 mt. Draw a neat sketch and show all elements of an exit taxiway. (08 Marks)
- b. Write brief notes on:
- (i) Airport Marking (04 Marks)
  - (ii) Airport Lighting (04 Marks)

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