

Code No: RT32015

**R13****SET - 1**

**III B. Tech II Semester Regular Examinations April- 2016**  
**TRANSPORTATION ENGINEERING – II**  
(Civil Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)  
2. Answering the question in **Part-A** is compulsory  
3. Answer any **THREE** Questions from **Part-B**

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**PART -A**

- 1 a) What is CSI and Adzing? [3M]
- b) What are check rails on curves? [4M]
- c) Differentiate between – Repeating and Co-acting signals. [4M]
- d) What are visual aids? Explain their uses. [3M]
- e) What are the different types of Sub surface drainages? [4M]
- f) Define the term Break waters. Enlist the different types. [4M]

**PART -B**

- 2 a) What is Ballast? What are the different types and enumerate the requirements of Good ballast. [8M]
- b) Determine the number of sleepers required for the construction of 2000 m of BG track, with a sleeper density of  $N + 7$ . [8M]
- 3 a) What is a Transition curve, what are the different types and what are the requirements for an ideal transition curve. [8M]
- b) Write a note about (i) Momentum gradient and [8M]  
(ii) Compensated gradient for curvature.
- 4 a) Draw a neat sketch of Right hand turn out, clearly showing the various elements. [8M]
- b) A cross over is to be laid connecting two BG parallel tracks spaced 4.5 m apart. Assuming that 1 in 8.5 crossings are to be used, work out the various details required for setting the cross over. [8M]
- 5 a) The length of runway at sea level, standard atmospheric conditions and zero gradient is 1500 m. The airport site has an elevation of 900 m, and the reference temperature as  $20^{\circ}$  C. If the proposed runway grading permits an effective gradient of 0.20 percent, determine the actual runway length required at the site. [8M]
- b) Explain with neat sketches, the various markings on Runways. [8M]
- 6 a) Explain in brief the difference between functional and structural evaluation of airfield pavements. [8M]
- b) Explain in detail the various maintenance works that are performed on Flexible airfield pavements. [8M]
- 7 a) Define (i) Semi diurnal tides, (ii) Mixed diurnal tides, (iii) Neap tides and (iv) Age of tide. [8M]
- b) What are Navigational aids? Briefly describe the different types of Floating signals [8M]

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**PART –A**

- 1 a) Name at least five causes of Rail failures? [4M]
- b) What is degree of curve? [3M]
- c) What are the objectives of Interlocking? [4M]
- d) What do you understand by the term taxiway design? [3M]
- e) Differentiate between Airport and Highway pavements. [4M]
- f) Define (i) Anchorage area, (ii) Free port and (iii) Beam. [4M]

**PART –B**

- 2 a) With the help of a neat sketch, show the various components of a typical Railway track. [8M]
- b) Explain the following terms (i) Track modulus, (ii) Coning of Wheels. Draw neat sketches, wherever necessary. [8M]
- 3 a) Write a note about - (i) Ruling gradient and (ii) Pusher gradient. [8M]
- b) Calculate the super elevation, maximum permissible speed and transition length for a 4 degree curve on a high speed BG section with a maximum allowable speed of 100 kmph. Assume the equilibrium speed to be 70 kmph and the booked speed of the goods train to be 45 kmph. [8M]
- 4 a) A turn out is to be laid off a straight BG track with a 1 in 11 crossing. Determine the lead and radius for the turn out, given the following data. Heel divergence  $d = 113$  mm, the straight length between the TNC and the tangent point of the crossing curve,  $h = 1.325$  m, crossing angle  $\alpha = 3^\circ 25' 40''$  and switch angle  $\beta = 1^\circ 8' 20''$ . [8M]
- b) Describe the three aspects in Upper quadrant signalling. Briefly describe one method of interlocking used by Indian Railways. [8M]
- 5 a) The length of runway under standard conditions is 1730 m. The airport site has an elevation of 290 m. Its reference temperature is  $31.60^\circ\text{C}$ . If the runway is to be constructed with an effective gradient of 0.15 percent, determine the corrected runway length. [8M]
- b) What is a Wind rose diagram? What are its types? Explain one. [8M]
- 6 a) Explain in detail the causes for Airfield Rigid pavement failures. [8M]
- b) Discuss the Flexible overlay designs for strengthening airfield pavements. [8M]
- 7 a) Differentiate between a Jetty and a Wharf. State the conditions under which you will prefer their construction. [8M]
- b) Write short notes about (i) Transition sheds and (ii) Work houses. [8M]

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**R13****SET - 3**

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2. Answering the question in **Part-A** is compulsory

3. Answer any **THREE** Questions from **Part-B**

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**PART –A**

- 1 a) What is Tilting of Rails? [3M]
- b) What is cant deficiency? Draw a neat sketch of the same. [4M]
- c) Differentiate between - Stud switch and Split switch [4M]
- d) What are the different types of airports? [3M]
- e) Write a note about Surface drainages? [4M]
- f) Differentiate between Natural and Artificial harbours. [4M]

**PART -B**

- 2 a) What are Sleepers? What are the advantages and disadvantages of Concrete sleepers? [8M]
- b) Determine the number of sleepers required for the construction of 1800 m of BG track, with a sleeper density of  $N + 5$ . [8M]
- 3 a) What are the basic requirements of an Ideal railway alignment? [8M]
- b) A rising gradient of 1 in 120 meets a falling gradient of 1 in 230 on a group A route. The point of intersection has a chainage of 1000 m and its R.L. is 135 m. Calculate the length of the vertical curve, the R.L. and the chainage of the various points in order to set a curve at this location. [8M]
- 4 a) What essential purposes are served by Signalling and Interlocking? What do you understand by route relay interlocking? [8M]
- b) Two BG tracks cross each other at an angle of 1 in 10. Calculate the important dimensions of the diamond crossing. [8M]
- 5 a) Explain the various Surveys to be conducted and the data to be collected for Airport site selection [8M]
- b) The runway length required for landing at sea level in standard atmospheric conditions is 3000 m. Runway length required for takeoff at sea level in standard atmospheric conditions is 2500 m. Aerodrome reference temperature is  $25^{\circ}\text{C}$  and that of the standard atmosphere at aerodrome elevation of 150 m is  $14.025^{\circ}\text{C}$ . If the effective runway gradient is 0.5 percent, determine the runway length to be provided. [8M]
- 6 a) Explain in detail the causes for airfield flexible pavement failures. [8M]
- b) What data is collected for the design of sub surface drainage system for an airport? [8M]
- 7 a) What are the various services that are required for the maintenance of shipping terminals? [8M]
- b) What is Dredging? Classify the different types of dredging works. [8M]

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**PART -A**

- 1 a) What is Creep? What are its causes? [3M]
- b) Write about the engineering surveys to be performed for railway line construction. [4M]
- c) Differentiate between - Stock rail and Tongue rail. [4M]
- d) What are the various characteristics of a good aircraft? [3M]
- e) Enlist the uses of different types of Airport Pavements. [4M]
- f) Enumerate the requirements of good port. [4M]

**PART -B**

- 2 a) Name the different modes of transportation. Enumerate the advantages and disadvantages of (i) Road and (ii) Rail transportation. [8M]
- b) What is meant by wear of Rails? Enumerate the various types of Rail wear and enlist the methods by which it can be measured. [8M]
- 3 a) Explain, with neat sketches, the various considerations for providing extra clearances on Horizontal curves. [8M]
- b) A curve of 500 m radius on a BG section has a limited transition of 50 m. Calculate the maximum permissible speed and super elevation for the same. The maximum sectional speed is 90 kmph. [8M]
- 4 a) Differentiate between Mechanical and Electrical signalling systems. [8M]
- b) Design a turn out for a BG track if the number of the crossing is 12 and the heel divergence is 124 mm. Assume a simple circular curve from the toe of the switch to the TNC. [8M]
- 5 a) The length of runway under standard conditions is 1620 m. The airport site has an elevation of 270 m. Its reference temperature is 32.90° C. If the runway is to be constructed with an effective gradient of 0.20 percent, determine the corrected runway length. [8M]
- b) Compare the recommendations of FAA and ICAO with reference to airport master planning. [8M]
- 6 a) Discuss the Rigid overlay designs for strengthening airfield pavements. [8M]
- b) Discuss in brief the various factors to be considered in the design of Airfield pavements. [8M]
- 7 a) Define (i) Harbour, (ii) EIS, (iii) Off shore Moorings and (iv) Turning basin. [8M]
- b) What are Wharves? Write a note about Open type wharves and Solid type wharves. Draw neat sketches. [8M]

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