

Code No: R32016

**R10****Set No: 1**

III B.Tech. II Semester Regular Examinations, April/May -2013

**TRANSPORTATION ENGINEERING-II**

(Civil Engineering)

**Time: 3 Hours****Max Marks: 75**

Answer any FIVE Questions  
All Questions carry equal marks  
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1. (a) Name the different modes of transportation. Enumerate the advantages and disadvantages of (i) Road and (ii) Rail transportation.  
(b) Explain the following terms (i) Track modulus, (ii) Coning of Wheels and (iii) Tilting of Rails. Draw neat sketches, wherever necessary.
2. (a) Explain, with neat sketches, the various considerations for providing extra clearances on Horizontal curves.  
(b) The wheel base of a vehicle moving on a BG track is 6 m. The diameter of the wheels is 1524 mm and the flanges project 32 mm below the top of the rail. Determine the extra width of the gauge required if the radius of the curve is 168 m.
3. (a) Define the terms (i) Turn out, (ii) Right hand turn out, (iii) Left hand turn out, (iv) Tongue rail, (v) Stock rail and (vi) Crossing.  
(b) 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  $\beta = 1^\circ 8' 20''$ .
4. (a) Differentiate between Mechanical and Electrical signalling systems.  
(b) What essential purposes are served by Signalling and Interlocking? What do you understand by route relay interlocking?
5. (a) Compare the recommendations of FAA and ICAO with reference to airport master planning.  
(b) Enumerate the various factors which are to be considered while selecting a suitable site for an Airport.
6. (a) What data is collected for the design of sub surface drainage system for an airport?  
(b) Explain in brief the difference between functional and structural evaluation of airfield pavements.
7. (a) What is Water transportation? What are the different types and enlist the advantages and disadvantages of water transportation.  
(b) Write a note on (i) River transportation, (ii) Canal transportation and (iii) EIS.
8. (a) Define (i) Semi diurnal tides, (ii) Mixed diurnal tides, (iii) Neap tides, (iv) Age of tide, (v) Spring range, (vi) Sieches and (vii) Equinoctial tides.  
(b) What are Wharves? Write a note about Open type wharves and Solid type wharves. Draw neat sketches.

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(Civil Engineering)

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1. (a) With the help of a neat sketch, show the various components of a typical Railway track. Name at least five causes of Rail failures.  
(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.
2. (a) What is a Transition curve, what are the different types and what are the requirements for an ideal transition curve.  
(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.
3. (a) Draw a neat sketch of Diamond and Scissors crossing. Clearly show the various rail pieces and gaps.  
(b) Two BG tracks cross each other at an angle of 1 in 10. Calculate the important dimensions of the diamond crossing.
4. (a) Differentiate between – (i) Repeating and Co-acting signals and (ii) Track circuit and Rail circuit.  
(b) Describe the three aspects in Upper quadrant signalling. Briefly describe one method of interlocking used by Indian Railways.
5. (a) Explain the various Surveys to be conducted and the data to be collected for Airport site selection.  
(b) 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.
6. (a) Discuss in brief the Flexible and Rigid overlay designs for strengthening airfield pavements.  
(b) What are the different types of Sub surface drainages? Explain the necessity of each type.
7. (a) Define – (i) Harbour, (ii) Port, (iii) Off shore Moorings and (iv) Turning basin. What are the requirements of a good Port?  
(b) What are the requirements of a good Harbour? Write a detailed note about harbour classification based on utility.
8. (a) What is Dredging? Classify the different types of dredging works.  
(b) What are the various services that are required for the maintenance of shipping terminals?

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1. (a) What are Sleepers? What are the advantages and disadvantages of Concrete sleepers?  
 (b) What is CSI and Adzing. Determine the number of sleepers required for the construction of 1800 m of BG track, with a sleeper density of  $N + 5$ .
2. (a) Define the terms (i) Ruling gradient, (ii) Pusher gradient, (iii) Momentum gradient and (iv) Compensated gradient for curvature.  
 (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.
3. (a) Differentiate between (i) Stock rail and Tongue rail and (ii) Stud switch and Split switch.  
 (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.
4. (a) What are the objectives of Interlocking? Explain the Tappet and lock system of interlocking.  
 (b) Briefly describe the locations and purposes of the following signals (i) Warner, (ii) Outer, (iii) Home Starter and (iv) Advance starter.
5. (a) What is a Wind rose diagram? What are its types? Explain each type.  
 (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.
6. (a) Explain in detail the causes for Airfield Rigid pavement failures.  
 (b) Explain in detail the various maintenance works that are performed on Flexible airfield pavements.
7. (a) Write short notes about (i) Transition sheds and (ii) Work houses.  
 (b) Briefly describe the design principles of a Wet dock. How does a Wet dock differ from a Tidal basin?
8. (a) Define (i) Buoyancy, (ii) Buoyancy Factor, (iii) Net Buoyancy, (iv) Float, (v) Luminous flux, (vi) Luminance and (vii) Pilotage.  
 (b) What are Navigational aids? Briefly describe the different types of Floating signals.

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1. (a) What is Ballast? What are the different types and enumerate the requirements of Good ballast.  
 (b) What is Creep? Enlist the causes, effects and the steps involved in the Adjustment of creep.
2. (a) What are the basic requirements of an Ideal railway alignment?  
 (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.
3. (a) Draw a neat sketch of Right hand turn out, clearly showing the various elements.  
 (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.
4. (a) Describe the Semaphore and Coloured light signals. Draw neat sketches.  
 (b) What are the necessary requirements for tracks to be able to operate High speed trains?
5. (a) Explain with neat sketches, the various markings on Runways.  
 (b) 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° C. If the proposed runway grading permits an effective gradient of 0.20 percent, determine the actual runway length required at the site.
6. (a) Differentiate between Airport and Highway pavements. Discuss in brief the various factors to be considered in the design of Airfield pavements.  
 (b) Explain in detail the causes for airfield flexible pavement failures.
7. (a) Define (i) Anchorage area, (ii) Free port, (iii) Beam, (iv) Draft (v) Ballast, (vi) Channel line and (vii) Guard houses.  
 (b) Differentiate between Natural and Artificial harbours. Write a note about Harbour classification based on Location.
8. (a) Define the term Break waters. Write a note about the different types.  
 (b) Differentiate between a Jetty and a Wharf. State the conditions under which you will prefer their construction.

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