B.E. Civil Engineering (Model Curriculum) Semester-VII
PCC4-CE704 - Transportation Engineering-II

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Notes : 1.   Assume suitable data wherever necessary.
2.   Illustrate your answers wherever necessary with the help of neat sketches.

1. a) A locomotive with four pair of driving wheels is required to haul a train at a speed of 80.4 kmph. The train is made to run on a straight level track with an axle load by driving wheels of the engine 22.84 tonnes calculate the maximum permissible that can be pulled by the engines. If the train has to ascend a slop of 1 in 200, how much reduction in speed should be made. **8**

b) Calculate maximum permissible train load a locomotive can pull on a horizontal level track with a speed of 80 kmph. The locomotive has 3-pairs of driving wheels carrying 20 tonnes each. If the train has a climb gradient of 1 in 400. Calculate the speed reduction. **8**

OR

2. a) Define gauge of railway track. Innumerate different gauges used in India and explain it. **5**

b) What are the desirable qualities or requirements of good sleepers? **5**

c) A B.G. track has a sleeper density of M +6. If the track is laid with welded rails of 26 m length, find out the number of sleepers on rail length. **6**

3. a) Determine the length of transition curve and draw the offsets at every 15 m. Given that the 12 design speed of the train on curve in 90 kmph on a B.G. track

b) Five degree curve diverges from a main curve of 4 degree in an opposite direction in the layout of a Broad Gauge yard. If the speed on the main curve is restricted to 54.33 kmph, determine the speed restriction on the branch line. Assume permissible cant deficiency as 7.5cms.

OR

4. a) What will be the gradient of broad-gauge track when a great resistance together with curve resistance due to 3° shall be equal to the resistance due to ruling gradient of 1 in 200? **8**

b) Draw a neat sketch of left hand turn out and explain its various parts. **8**

5. a) What is the necessity of railway tunnels? Draw a sketch to illustrate a single track railway tunnel. **8**

b) Describe the various methods of hard rock tunneling and mention the advantages & disadvantages of each of them.

OR

6. a) For 12.8 m rail length of B. G. track, calculate the quantity of materials required per kilometer length of track. Assume sleeper density to be equal to (M+4). Type of rail 90 R i.e. weight = 44.7 kg/m. **10**

b) Describe the various methods of hard rock tunneling and mention advantages & disadvantages of each method? **6**

7. a) Explain with neat sketches the limiting heights of objects in the approach and turning zones of an instrumental runway. **8**

b) Name the different characteristics of aircraft. How do they affect the planning and design of airport. **8**

OR

8. a) Compute the actual runway length for the following data:- **8**
   i) Basic runway length = 1800m.
   ii) Airport elevation 1100 m above MSL.
   iii) Effective gradient = 0.35%.
   iv) Airport reference temperature- 38°C.

b) Discuss the orientation of runway with the help of wind - rose diagram comment on calm period. **8**

9. Write notes on any four. **16**
   i) Hanger.
   ii) Runway markings.
   iii) Approach lighting.
   iv) Calm period.
   v) Exit Taxiway.
   vi) Portals.

OR

10. a) Length of runway required at MSC and standard condition is 2765 m. If airport site is at 623 m elevation, airport reference temperature is 30.5°C and alignment of runway has an effective gradient of 0.36% Determine the length of runway required.

b) Write notes on **8**
   i) Separation clearance.
   ii) Holding aprons.

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