Registration No : | | | | | | | | | | |

Total Number of Pages : 03 **B.Tech.**
PCI6J001

6th Semester Regular Examination 2017-18
ADVANCED TRANSPORTATION ENGINEERING
BRANCH : CIVIL
Time : 3 Hours
Max Marks : 100
Q.CODE : C336

Answer Part-A which is compulsory and any four from Part-B.
The figures in the right hand margin indicate marks.

Part – A (Answer all the questions)

Q1 **Answer the following questions :** **(2 x 10)**

a) The standard length of rail for Broad Gauge and Metre Gauge are respectively
(a) 12 m and 12 (b) 12 m and 13 m (c) 13 m and 12 m (d) 13 m and 13 m

b) The steepest gradient permissible on a 2.5° curve for Broad Gauge line having ruling gradient of I in 200 is
(a) 1 in 250 (b) 1 in 222 (c) 1 in 235 (d) 1in275

c) For a Broad Gauge route with M+7 sleeper density, number of sleepers per rail length is
(a) 18 (b) 19 (c) 20 (d) 21

d) Due to battering action of wheels over the end of rails , the rails get bent down and are deflected at ends. These rails are called
(a) Roaring rails (b) Hogged rails (c) Corrugated rails (d) Buckled rails

e) The width of foot for 90 R rail section is
(a) 100 mm (b) 122.2 mm (c) 136.5 mm (d) 146.0 mm

f) The maximum degree of curv Metre Gauge is limited to
(a) 10° (b) 16° (c) 30° (d) 40°

g) Which of the following is used for servicing and repairs of the aircraft ?
(a) Apron (b) Hanger (c) Terminal building
(d) Holding apron

h) Runway threshold is indicated by a series of parallel lines starting from a distance of
(a) 3 m from runway end (b) 6 m from runway end
(c) 10 m from runway end (d) 15 m from runway end

i) Calm period is the percentage of time during which wind intensity is less than
(a) 4.8 kmph (b) 6.4 kmph (c) 8.0 kmph (d) 9.6 kmph

j) A ship is berthed in a chamber and lifted by principles of buoyancy. Such a chamber is called.
(a) Dry dock (b) Wet dock (c) Floating dock (d) Refuge dock

Q2 **Answer the following questions :** **(2 x 10)**

a) What are the factors which affecting the selection of gauge?

b) Differentiate between T.N.C and A.N.C.

c) Write any two effects of creep of rail.

d) What are the function of check rail and wing rail?

e) Mention various type of Rail section used in Indian Railways for M. G. track.

f) Define sleeper density. What is the minimum spacing between the sleepers for packing of ballast?

g) Define cross wind component. What are the permissible limits as per FAA and ICAO?

h) Differentiate between runway and taxiway.

i) What is code Beacon? Why it is provided in Airport?

j) Define Breakwater.

Part – B (Answer any four questions)

Q3 **a)** Draw a typical cross-section of a B.G. track in cutting. Briefly explain the requirements of an ideal permanent way. **(9)**

b) A 5º curve diverges from a 3º main curve in reverse direction in the layout of B.G. yard. If the speed on branch line is restricted to 55 kmph, determine the restricted speed on the main line. **(6)**

Q4 **a)** Calculate the maximum permissible speed on a curve of high speed B.G. track having the following data; **(9)**

- Degree of curve= 1º 40'
- Amount of superelevation=7.0cm
- Length of transition curve=160m
- Maximum speed provided by additional commissioner of Railway=165kmph

b) Briefly explain the various theories of creep and also Explain the various measures that can be adopted to reduce creep. **(6)**

Q5 **a)** The train is hauled by a 2-8-4 locomotive with 18.5 tonnes load on each driving axle. Calculate maximum permissible train load that can be pulled by a locomotive if the train has to run at a speed of 95 kmph on a straight MG track. Also calculate the reduction in speed if the train has to climb a gradient of 1 in 175 with a 3º radius of curve. Assume the coefficient of friction to be 0.2. **(8)**

b) What are the requirements of good Ballast used in Railway track? **(7)**

Q6 **a)** Calculate the elements of 1 in 12 turnout on a straight BG track by IRS method, when it is given, angle of switch is 1º 30'45", heel divergence is 12.5 cm and the straight length of arm at crossing is 0.85 m. **(6)**

b) Draw the schematic diagram of Right hand Turn out and explain its various component parts. **(9)**

Q7 **a)** The length of the runway for landing and take-off under standard conditions is 3000 m and 3600m respectively. The airport is to be provided at elevation of 320 m above the mean sea level. The airport reference temperature is 34ºc. determine the corrected runway length as per ICAO and FAA with fallowing data: **(10)**

End to end runway(m)	Grade (%)
0-300	+1.00
300-900	-0.5
900-1500	+0.3
1500-1800	+0.9
1800-2100	-0.4
2100-2700	-0.4
2700-3000	+0.3

b) Briefly explain the geometric standard of taxiway. **(5)**

Q8 **a)** What are the objects of signaling? Explain the working principle of semaphore signal. **(7)**

b) What do you understand by the term visual aid in connection with airport? Name the different visual aids. What is the necessity of visual aids? **(8)**

Q9 **a)** Briefly explain the different components of duck. **(8)**

b) What are the requirements of a good Harbor? **(7)**