

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATIONS - 2016

B.Tech VI Semester

COURSE CODE: 10B11CE614

MAX. MARKS: 35

COURSE NAME: Transportation Engineering

COURSE CREDITS: 4

MAX. TIME: 2 HRS

Note: All questions are compulsory. Carrying mobile phone during examinations will be treated as case of unfair means. Illustrate your answers with neat sketches wherever necessary.

Preferably write your answer in sequential order. Use graph papers wherever it is required.

1. The following is the average wind data for 10 years. An airport is to be designed for a single runway. Determine the maximum wind coverage and the best direction of runway. [8]

Direction	Percent time with wind velocity in kmph		
	6-25	25-50	50-75
N	7.4	2.7	0.2
NNE	5.7	2.1	0.3
NE	2.4	0.9	0.6
ENE	1.2	0.4	0.2
E	0.8	0.2	0.0
ESE	0.3	0.1	0.0
SE	4.3	2.8	0.0
SSE	5.5	3.2	0.0
S	9.7	4.6	0.0
SSW	6.3	3.2	0.5
SW	3.6	1.8	0.3
WSW	1.0	0.5	0.1
W	0.4	0.1	0.0
WNW	0.2	0.1	0.0
NW	5.3	1.9	0.0
WNW	4.0	1.3	0.3

2. Explain how the basic runway length is determined. [3]
3. The length of a runway under standard conditions is 2100 m. The airport is located at an elevation of 410 m above the mean sea level. The airport reference temperature is 32°C. The construction plan includes the following data. [5]

End to end of runway (m)	Longitudinal Grade (%)
0 to 320	+1.0
320 to 900	-0.5
900 to 1500	+0.5
1500 to 1800	+1.0

1800 to 2100	-0.5
2100 to 2700	-0.4
2700 to 3000	-0.10

Determine the actual length of the runway to be provided.

Also determine the lengths of the vertical curves and the distance between them.

4. A taxiway is to be designed for operating a supersonic aircraft, which has the following characteristics. Determine the turning radius of the taxiway. [3]

Wheel base	17.70 m
Tread of main loading gear	6.62m
Turning speed	40 kmph
Coefficient of friction between tire and pavement surface	0.10

5. Enumerate the various factors which you would keep in view while selecting a suitable site for an airport. [2]

6. A plate load test was carried out on a silty clay subgrade and 15 cm of base course using a 75 cm diameter plate. The pressures on the plate at 0.5 cm deflection was 0.5 kg/cm^2 and 2.1 kg/cm^2 for the subgrade and base respectively. Determine the thickness of the pavement required for a 33,750 kg dual wheel with 10.5 kg/cm^2 tire pressure. [6]

Given: Centre to centre distance between the adjacent tires is 30 cm and distance between adjacent wall of tire is 12 cm.

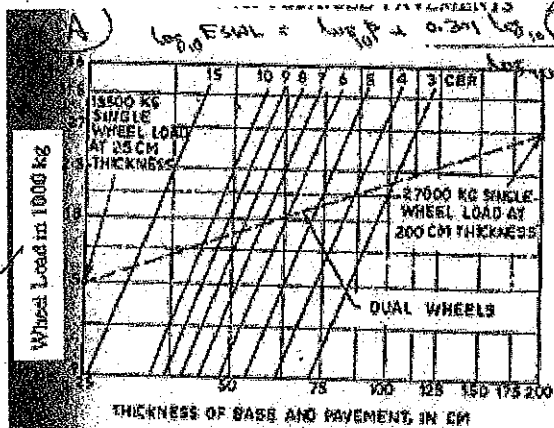
7. A curve of 600 m radius on a BG track has a limited transition of 40 m length. Calculate the maximum permissible speed and super-elevation for the same. The maximum sectional speed is 100 kmph. [3]

8. A. If the pressure carried by a specimen at 2.5 mm penetration is 3.5 N/mm^2 , then what will be the CBR value of the specimen? [1]

- B. If the modulus of sub-grade reaction of a standard plate of 30 cm diameter is 16 kg/cm^3 , then what will be the value of the same for a standard plate of 75 cm diameter? [1]

- C. Calculate the maximum permissible train load that can be pulled by a locomotive with a four pairs of driving wheels with an axle load of 28.4 t each on a BG track with a ruling gradient of 1 in 200 and a maximum curvature of 3° , travelling at a speed of 48 kmph. Assume the coefficient of friction to be 0.2. [3]

Annex



9.3 Computation of Equivalent Single Wheel Load

