Total number of printed pages: **Civil Engineering (UG)/VI/UCE602**

2025

TRANSPORTATION ENGINEERING II

Full Marks: 100

Time: Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1.		Draw the diagram of the following and mention their components. (i) Aeroplane (ii) Harbor (iii) Railway track (iv) Airport	20
2.	a)	Give the comparison between rail and road transport.	5
	b)	Explain different types of rail joints.	5
	c)	Explain three cases used to arrive at basic runway length with neat sketches.	10
3.	a)	Write the assumptions made in deciding basic runway length.	5
	b)	Explain the factors governing taxiway layout with the help of sketches.	5
	c)	What are the advantages and disadvantages of tunnel construction.	10
4.	a)	Draw the different cross sections of tunnels adopted with neat sketches.	5
	b)	If the wheel base of a vehicle moving on a B.G. track is 6m, the diameter of wheel is 1.5 m and the depth of flanges below the top of rail is 3.17 m. Determine the extra width required to be provided on gauge, if the radius of the curve is 160 m.	5
	c)	The wind data for average of 8 yeas period is given in the table below. Based on the data, determine the direction of orientation of runway. What is the percentage of time in a year during which the runway can safely be used for landing and take-off.	10

Wind direction	Duration of wind (%)		
	6.4 – 25 kmph	25 – 40 kmph	40 – 60 kmph
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
			NNW	4.0	1.3	0.3
5.	a)	The proposed longitudinal section along the centre line of a runway is as follows: Station to station — Gradient (%) 0 to 8 — + 1.25 8 to 15 — - 1.0 15 to 30 — + 0.5 30 to 45 — + 0.2 45 to 60 — - 0.4 If stations are located at a regular interval of 30 m, determine the effective gradient of runway.				5
	b)	Explain the surveys conducted for airport site selection.				5
	c)	The length of runway under standard conditions is 1620 m. The airport site has an elevation of 270 m. Its reference temperature is 32.9ºC. If the runway is to be constructed with an effective gradient of 0.2 percent, determine the corrected runway length.				10
6.		Calculate the maximum permissible train load that can be pulled by a locomotive having four pairs of driving wheels carrying an axle load of 20 tonnes each. The train has to run at a speed of 75 kmph on a straight level track (B.G.). Also calculate the reduction in speed, if train has to climb a gradient of 1 in 200. If train climbs the above gradient with a 3º curve, then what would be reduction in speed?				10 +5 +5