Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

VI SEMESTER B.TECH (CIVIL ENGINEERING)

END SEMESTER EXAMINATIONS, MAY/JUNE 2022

SUBJECT: **RAILWAY & AIRPORT ENGINEERING [CIE 3253]**

REVISED CREDIT SYSTEM

(_ / / 2022)

Time: 3 Hours Max. Marks: **50**

Instructions to Candidates:

- Answer ALL the questions
- Missing data may be suitable assumed.

Q.No		Marks	CO
1A.	Define the types of gradient adopted by Indian railway	02	1
1B.	Explain the effects of gradient, curve and acceleration on tractive resistance of the train.	03	1
1C.	Describe Hauling Capacity of locomotive with relevant formula. Calculate the maximum permissible train load that can be pulled by a locomotive with four pairs of driving wheels with an axle load of 28.42 t teach on a BG track with a ruling gradient of 1 in 200 and a maximum curvature of 3°, travelling at a speed of 48.3 km/h. Take the coefficient of friction to be 0.2.	05	3
2A.	Describe the different types of crossings used in railways.	02	2
2B.	Derive the relationship of Super-elevation (e), Gauge (G), Speed (V) & Radius of the Curve (R).	03	5
2C.	What would be the equilibrium cant on a Metre Gauge curve of 5 degree for an average speed of 60 kmph? Also find the maximum permissible speed after allowing the maximum cant deficiency	05	4
3A.	Discuss the various types of reception signals used in railways.	04	2
3B.	Explain the working principle of interlocking of signals.	03	1
3C.	Explain with a neat sketch the function of a derailing switch.	03	1
4A.	Explain the working principle of a ram jet engine with a neat sketch.	04	4
4B.	The runway length required for landing at MSL in standard atmospheric condition is 3000m. Runway length required to take off at a level site at MSL in standard atmospheric condition is 2500m. Aerodrome reference temperature is 24°c. And that of the standard atmospheric at aerodrome elevation of 150m is 14.025°c. If the effective runway gradient is 0.5%, determine the runway length to be provided.	03	4
4C.	With a neat diagram explain type 2 wind rose diagram.	03	4
5A.	The runway gradation map indicates that there is a rising gradient of 1.0% meeting a falling gradient of 0.7%. There is again an upgrade of 0.7%. Design the runway profile as per FAA specifications.	03	4
5B.	Describe different types of intersecting runways.	03	4
5C.	With a neat diagram describe outer and middle marker.	04	5