Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

VII SEMESTER B.TECH (CIVIL) END SEMESTER EXAMINATIONS DECEMBER 2020

SUBJECT: RAILWAY AND AIRPORT ENGINEERING [CIE 4102]

Date of Exam: Time of Exam: Max. Marks: **50**

Instructions to Candidates:

- Answer ALL the questions & missing data may be suitably assumed

1A.	Explain the steps involved in the final location survey of Railways.	**3**
1B.	Define the following terminologies used in Railways: i) Blowing of Joint ii) Siding iii) Fouling Mark iv) Track Circuit	**2**
1C.	Calculate the maximum permissible load that a Broad-Gauge locomotive with three pairs of driving wheels bearing an axle load of 22 tonnes each can pull on a straight level track at a speed of 80 km/h. Also calculate the reduction in speed if the train must run on a rising gradient of 1 in 200. What would be the further reduction in speed if the train has to negotiate a 4° curve on the rising gradient of 1 in 200? Assume the coefficient of friction to be 0.2.	**5**
2A.	Explain the train resistances and resistances due to track profile which a locomotive must overcome before starting a train & to keep it in motion.	**3**
2B.	Explain with a neat sketch the behavior of coned wheels on level track and on curves	**3**
2C	With a neat sketch explain class – A and class – B block station.	**4**
3A.	Define acute angle crossing, obtuse angle crossing, square crossing, and number of crossing.	**2**
3B.	What is gradient on a railway track? Explain the reasons needing the gradients on railway track.	**3**
3C.	A 4 degree curve diverges from a 2 degree main curve in reverse direction in the layout of a B.G. yard. If the speed on the branch line is restricted to 40 kmph, determine the restricted speed on the main line. Also determine the permissible speed on the main line.	**5**
4A.	Explain the effect of air traffic characteristics, development of existing airport and environmental consequences on selection of site for airport.	**3**
4B.	Explain with a neat diagram the various forces acting on the wings of an aero plane.	**3**
4C.	The monthly mean temperature of the atmosphere at a particular site where airport must be developed are given below. Determine the airport reference temperature. If the site is at MSL determine the actual length of runway. The runway is assumed to be level.	**4**

5A.	In the gradient operation for runway, it is proposed to have a rising gradient of 0.5% meeting a falling gradient of 0.7%. There is again an upgrade of 0.4%. Determine the length of the vertical curve and distance between the grades changes of runway as per FAA. Assume that the runway is required to handle jet aircraft.	
5B	Explain with a neat sketch different types of aircraft parking with advantages and disadvantages.	**3**
5C.	Explain with a neat sketch: a) Wind direction Indicator b) Landing direction indicators	**4**