

## **MANIPAL INSTITUTE OF TECHNOLOGY** MANIPAL tion of Manipal University

## **VI SEMESTER B.TECH. (CIVIL ENGINEERING) END SEMESTER EXAMINATIONS, APRIL/MAY 2017** SUBJECT: RAILWAY ENGINEERING AND AIRPORT PLANNING [CIE 3203] REVISED CREDIT SYSTEM

(27/04/2017)

Time: 3 Hours

MAX. MARKS: 50

## **Instructions to Candidates:**

✤ Answer ALL the questions.

✤ Missing data may be suitable assumed.

Q.No	Question	Marks	СО	
1A.	Draw a neat diagram of simple right hand turnout and show its various component parts.	2	1	
1B.	The diameter of the wheel of a vehicle moving on a BG track is 1.5 m and the depth of the flanges below the top of the rail is 3.17 cm. What is the extra width to be provided on the gauge if the radius of the curve is 170m?			
1C.	What is the relation between Actual cant, Theoretical cant and cant deficiency? Calculate the speed of a BG track for a 1.5° curve if actual cant provided is zero? Assume the cant deficiency of 50% of the maximum.	4	2	
2A.	With a neat diagram of a station yard explain the Reception signals and Departure signals in a Railway system.	5	1	
2B.	What are the requirements of the good ballast? Mention the different types of ballast used in Indian Railways	2	1	
2C.	Calculate the maximum permissible train load that can be pulled by a locomotive having 4 pairs of driving wheels, carrying an axle load of 22tonnes each. The train has to run at a speed of 80kmph on a straight level B.G. track. Also, calculate the reduction in speed if the train climbs the gradient of 1 in 200. If again, a 4° curve is there on the track, what will be total reduction in speed? Take $\mu$ = 0.166.	3	3	
3A.	Calculate all the necessary elements required to set out a 1 in 8.5 turnout taking off from a straight M.G. track with its curve starting from toe of switch. Heel divergence = $11.4$ cm.	2	3	
3B.	Differentiate between space interval system and automatic signaling system with neat sketches	4	2	
3C.	Explain the influence of Aircraft characteristics in the design of different components of an Airport	4	1	

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4A.	The Airport is to be constructed where temperature data shows Tm as $50^{\circ}$ c and T <sub>a</sub> as $40^{\circ}$ c. Find the Airport reference temperature. If the proposed site is at an elevation of 100m from MSL, determine the actual length of the runway. The runway is assumed to be level. Assume the length of the runway as 'L'	4	3
4B.	What is the Sight distance of Runway? Enumerate the Sight distance requirement for Runway of different types of Airport as per the requirement of ICAO.		
4C.	The Runway gradation map indicates that there is a rising gradient of 1.1% meeting a falling gradient of 0.6%. Again, there is an upgrade of 0.7%. Design the runway profile as per FAA specification.	3	3
5A.	A taxiway is to be designed for operating Boeing 707-320 aircraft which has the following characteristics. Determine the turning radius of the taxiway. Given Wheel base as 17.7m, tread of main loading gear is 6.62m, turning speed is 40kmph, coefficient of friction is 0.13 and type of Airport is 'B'.		3
5B.	With a neat sketch explain the Landing direction indicator.		1
5C.	<ul><li>Write a short note on</li><li>a) Various Guidance required for a pilot during landing.</li><li>b) Guide slope antenna</li></ul>	5	1