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B. Sc. Engg. (CEE)/ 6th Sem. 22 February, 2023 (Group B: Afternoon)

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)

ORGANISATION OF ISLAMIC COOPERATION (OIC)

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

Mid-Semester Examination **Summer Semester: 2021-2022**

Course No.: CEE 4653 **Full Marks: 75**

Course Title: Pavement Design & Railway Engineering **Time: 1.5 Hours**

There are 4 (Four) questions. Answer any 3 (Three) questions. Programmable calculators are not allowed. Do not write on question paper. Figures in the right margin indicate full marks. Symbols have their usual meanings. Assume reasonable values for any missing data.

1(a)	Discuss qualities of railway ballast and outline its function. Explain issues caused by change of Gauge.	(5+5) (CO1-PO1)
1(b)	Draw a neat sketch of a left-hand turnout and show various parts on it with description.	(15) (CO2-PO2)
2(a)	Describe general usage of tandem steel roller, bitumen distributor, grader, pneumatic tire roller and milling machine.	(10) (CO1-PO1)
2(b)	What are the conditions to be satisfied in case of interlocking for a single line station with a loop and a siding? Explain with figure. Why are marshalling yards necessary? Describe the layout of a typical marshalling yard.	(6+3+6) (CO2-PO2)
3(a)	Calculate the maximum permissible load that a BG locomotive with three pairs of driving wheels bearing an axle load of 18t each can pull on a straight level track at a speed of 95 km/h. Also calculate the reduction in speed if the train has to run on a rising gradient of 1 in 250. What would be the further reduction in speed if the train has to negotiate a 3° curve on the rising gradient? Assume the coefficient of friction to be 0.2.	(10) (CO1-PO1)
3(b)	Differentiate with figure between (i) Island platform and dock platform (ii) Junction and terminal (iii) Heel divergence and Switch angle	(15) (CO2-PO2)
4(a)	Why coning of wheel is provided? Explain with sketch. Find required ballast depth if the sleeper density is M+7 on broad gauge track.	(6+4) (CO1-PO1)
4(b)	A 9-degree curve branches off from a 6 degreed main curve in an opposite direction in the layout of a B.G. yard. If the speed restriction on main line is 50 km p. h., what would be the speed restriction on branch line? Assume permissible cant deficiency as 75 mm. Draw a sketch showing positions of various signals for a junction of two main lines and two branch lines with a siding.	(7+8) (CO2-PO2)