G.R. No.	

PAPER CODE U482-221B(ESE)

May 2022 - ENDSEM EXAM
FINAL. YEAR B. TECH. (CIVIL) (SEMESTER - II)
COURSE NAME: ADVANCED TRANSPORTATION ENGINEERING
COURSE CODE: CVUA40181B
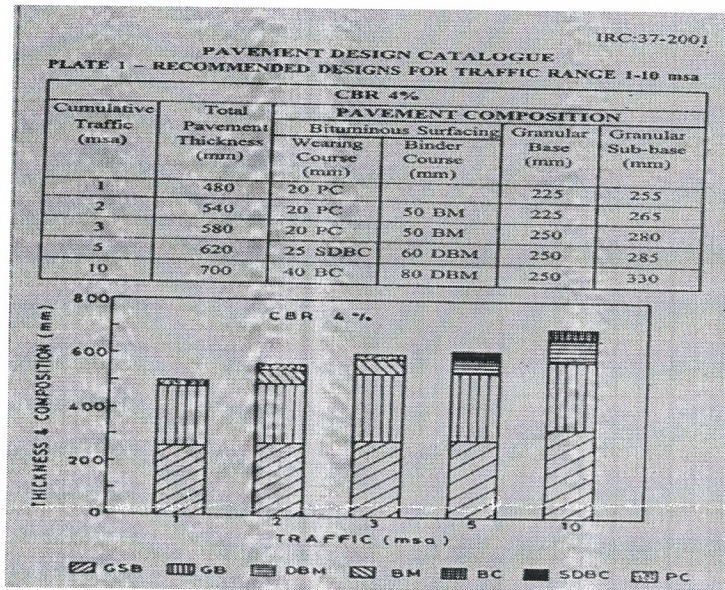## (PATTERN 2018)

Time: [1 Hour]   [Max. Marks: 30]

(*) Instructions to candidates:
1) **Answer Q.1 OR Q.2, Q.3 OR Q.4, Q.5 OR Q.6.**
2) **Figures to the right indicate full marks.**
3) **Use of scientific calculator is allowed**
4) **Use suitable data where ever required**

Question No.	Question Description	Marks
Q.1 a	List out the various factors to be considered while designing a bicycle network?	4
Q.1 b	Identify the types of grade-separated intersections and their necessity.	6

OR

Q2 a	Justify the significance of Level of Service 'A' and 'F' of a road with the help of a neat sketch.	4
Q2 b	During a traffic survey the following data was recorded on a road network: a. Two wheelers - 2000 b. Cars - 800 c. Buses - 500 d. Auto – 350 and Cycle -100 Determine PCU using IRC 106-1990.	6
Q.3 a	Identify the necessity of Pavement Management System for the maintenance of roads?	4
Q.3 b	Distinguish the Typical layers of a flexible pavement with a neat labelled sketch.	6

OR

Q.4 a	Compare Flexible Pavement and Rigid Pavement	4
Q.4 b	Determine the design parameters of the pavement of a new bypass with following data: a. Two Lane Carriage way b. Initial Traffic in the year of completion of construction = 150 CVPD (Sum of both directions) c. Traffic Growth rate = 5% d. Vehicle Damage Factor based on Axle load survey = 2.5 standard axle per commercial vehicle Design CBR of subgrade soil = 4%	6

IRC:37-2001

PAVEMENT DESIGN CATALOGUE
PLATE 1 – RECOMMENDED DESIGNS FOR TRAFFIC RANGE 1-10 msa

Cumulative Traffic (msa)	Total Pavement Thickness (mm)	PAVEMENT COMPOSITION			
		Bituminous Surfacing		Granular Base (mm)	Granular Sub-base (mm)
		Wearing Course (mm)	Binder Course (mm)		
1	480	20 PC		225	255
2	540	20 PC	50 BM	225	265
3	580	20 PC	50 BM	250	280
5	620	25 SDBC	60 DBM	250	285
10	700	40 BC	80 DBM	250	330

OR

Q.5 a   Identify failure criteria of Rigid pavement.   4

Q.5 b   Determine the stresses at interior, edge and corner regions of a cement concrete pavement using Westergaards stress equations. Use the following data: 6
    a.   Wheel load, P = 5100 Kg
    b.   Modulus of elasticity of cement concrete, E = 3.0 x 105 kg/cm2
    c.   Pavement thickness, h = 18 cm
    d.   Poisson's ratio of concrete, μ = 0.15
    e.   Modulus of subgrade reaction, K = 6.0 kg/cm3
    f.   Radius of contact area, a = 15cm

OR

Q.6 a   Distinguish wheel load stresses and temperature stresses in rigid pavement.   4

Q.6 b   A cement concrete pavement of thickness 18 cm, has two lanes of 7.2 m with a joint. Design the tie bars. Data: Thickness - h=18 cm,   6
    a.   Allowable Tensile Stress - Ss -1700kg/cm2
    b.   Unit weight of Concrete - W – 2400 kg/cm2
    c.   Allowable Bond Stress - Sb -24.6 kg/cm2
    d.   Coefficient of Friction - f = 1.5
    e.   Width of Panel - b = 7.2 /2 = 3.6 m.