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B.TECH.
(SEM VI) THEORY EXAMINATION 2022-23
TRANSPORATION ENGINEERING

Time: 3 Hours ***Total Marks: 100***

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**

(a) Which are alignments controlling factors?
(b) Write the modes of transportation their utilize medium.
(c) Which features affect the geometrics of highway?
(d) Draw neat sketch of shapes of camber
(e) Write the modified definition of 'Traffic Engineering'.
(f) Why traffic surveys are taken to help of geometric design?
(g) Which type stresses developed in concrete pavements?
(h) Why in India give the preference of design of flexible pavement?
(i) What is the difference between Bitumen and road tar?
(j) Where is prime coat provided?

SECTION B

2. Attempt any *three* of the following: **10x3=30**

(a) Explain the essential requirements which are considered as guiding principles for an ideal highway alignment.
(b) For ruling design speed and minimum design speed values of 100 km/hr. and 80 km/hr.respectively. Calculate the values of ruling minimum and absolute maximum radius of a horizontal curve of a NH in plain terrain.
(c) There are two vehicles A and B of weighs 4 tonne and 5 tonne respectively, approaching each other collide at right angles, A from South . After the collision A skids in the direction N 40^0 W and B in the direction N 60^0 E. The skid distances of A and B before collision are 36 m and 22 m, respectively, and after collision 16 m and 35m, respectively. If the average skid resistance of the pavement is 0.52, calculate the original speeds of the vehicle.
(d) Define the specific gravity of bitumen and discuss the two methods of its determination.
(e) What are the methods of construction of cement concrete roads? Which one is the most popular and why?

SECTION C

3. Attempt any *one* part of the following: **10x1=10**

(a) Briefly outline the main features of various road pattern in common use. Explain with neat sketch block pattern.
(b) What are the objects of re-alignment? Write the general principles of re-alignment.

4. Attempt any *one* part of the following: 10x1=10

(a) Give the sketches of the following
  (i) Cross section of road cutting
  (ii) Cross-section of divided highway in urban area

(b) A descending grade of 1 in 30 meets an ascending grade of 1 in 35. Identify the vertical curve and design length of the curve for head light sight distance and comfort requirements. Take the design speed as 80 km/hr. and the allowable rate of change of centrifugal acceleration is 0.65 m/sec^3.

5. Attempt any *one* part of the following: 10x1=10

(a) Calculate the spacing between the lighting units from the following data to produce average lux of 5.5. Street width= 16 m , Mounting height =8 m , Lamp size 5000 lumen, Luminaire type =H, Maintenance factor =80 %, Cu =0.44

(b) What are the factors which are considered to determine the PCU value for a particular class of vehicles?

6. Attempt any *one* part of the following: 10x1=10

(a) A highway concrete pavements 25 cm thick with transverse joints at 12 m interval and longitudinal joints at 3.6m interval. The modulus of subgrade reaction is 2.8 kg/cm^3. Determine the warping stress at interior, edge and corner regions taking the following data: Temperature differential for day conditions =0.5^0 C/cm slab thickness, Radius of loaded area =15 cm, Thermal coefficient of concrete =10 x 10^{-6} /^{o} C, Modulus of elasticity of concrete = 3 x 10^5 kg/cm^2, Poisson's Ratio=0.15.

(b) Briefly describe the three tests which are carried out in Hveen method.How the Hveen method of bituminous mix design is different from the Marshall method?

7. Attempt any *one* part of the following: 10x1=10

(a) Differentiate between joint filler and sealing compound. Name the few sealing compounds and their characteristics.

(b) How will you conduct the arrangement of transverse joint? Explain with neat sketch.