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BANGALORE - 560 037

PART - B

- 5 a. Discuss briefly the various properties of Bitumen and the tests to be conducted. (06 Marks)
 b. A plate load test was conducted in soaked subgrade during monsoon season using a plate of diameter 30cm. The load values corresponding to the mean settlement dial readings are given below : Find the modulus of subgrade reaction for the standard plate, if one division of the load. (08 Marks)

Mean settlement values in mm	0	0.24	0.52	0.76	1.02	1.23	1.53	1.76
Load values in divisions	0	110	210	280	320	350	380	390

Dial indicates 4.2kg.

- c. Discuss the importance of soil subgrade as highway material. (06 Marks)
- 6 a. Explain the meaning of ESWL. How is it determined for a dual wheel assembly and what are its applications? (06 Marks)
 b. Calculate the warping stresses at interior, edge and corner regions in a 25cm thick concrete pavement with transverse joints at 11m interval and longitudinal joints at 3.6m interval. The modulus of subgrade reaction is 6.9 kg/cm^3 . Assume temperature difference for day conditions to be 0.6°C per cm of slab thickness. Assume radius of loaded area as 15cm. $C_x = 1.03$, $C_y = 0.55$, $E = 3 \times 10^5 \text{ kg/cm}^2$, $\mu = 0.15$. (08 Marks)
 c. What are the factors governing design of pavements? Explain significance of each. (06 Marks)
- 7 a. Write the specifications for materials and step by step procedure for construction of Water bound Macadam Base. (08 Marks)
 b. Briefly explain the steps for design of filter material in subsurface drainage system. (06 Marks)
 c. Briefly explain the functions of embankment and list the design elements of highway embankment. (06 Marks)
- 8 a. The detail of three alternate proposals for strengthening of a highway pavement are given below. Determine which one is more economical, if its rate of interest payable in all the cases is 10% per annum and there is an average of 3000 vehicles per day. (06 Marks)

S.No	Overlay type	Design life yrs	Construction cost (lakhs/km)	Maintenance cost (Rs/km during design life)	VOC (Rs/veh - km during design life)
1	WBM + PMC	5	4.5	15,000	1.52
2	BM + PMC	8	6.8	10,000	1.45
3	BM + AC	12	9.2	6,000	1.35

- b. Write a note on Net present value method. (06 Marks)
 c. What are the factors considered for evaluation of vehicle operation cost? (08 Marks)

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