

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- Oct 2018

B.Tech Vth Semester

Aakash Gupta

COURSE CODE: 10B11CE511

MAX. MARKS:25

COURSE NAME: Highway Engineering

COURSE CREDITS: 04

MAX. TIME: One Hour Thirty Minutes

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Assume any other missing data accordingly.

Q1. (i) Define Modulus of subgrade reaction. A plate load test was conducted on a soaked subgrade during monsoon season using a plate diameter of 30 cm. Determine the modulus of subgrade reaction for the standard plate. The following data is obtained after test-

Mean settlement, mm	0.0	0.35	0.59	0.83	1.11	1.39	1.68	1.91
Load values, kg	0.0	615	1085	1365	1585	1675	1795	1915

(ii) Determine the Group Index of subgrade soil with following properties- LL=50%, PL=41% & Passing 0.074mm sieve=55%. (3)

Q2. (i) List the different types of cutbacks and emulsions. When are these used?

(ii) What are modified bituminous binders? What are the advantages of these? (4)

Q3. (i) Explain why 'water sensitivity' test is carried out on bituminous mixes and enumerate the method of conducting water sensitivity test on bituminous mixes.

(ii) Explain- (i) Stripping value test (ii) Viscosity test (iii) Solubility test (iv) Soundness test (6)

Q4. (i) Mention the construction steps and quality control tests for the construction of 500 mm thick soil subgrade.

(ii) Mention the specifications of materials, construction steps and quality control tests for laying bituminous concrete surface course. (6)

Q5. (i) Explain ruling, maximum and exceptional gradients. Specify the values recommended by IRC.

(ii) A valley curve of a State Highway is formed by a descending gradient of 1 in 20 meeting an ascending gradient of 1 in 30. Design the length of a valley curve to fulfill both comfort condition and head light sight distance requirement for a design speed of 80 kmph. Assume rate of change of centrifugal acceleration = 0.60 m/sec^3 .

(iii) There is a horizontal highway curve of radius 450 m and length 215 m. The distance between the centre line of the road and the inner lane is 2.1 m. Find set-back distance required from centre line on the inner side of the curve so as to provide SSD = 95m & OSD = 305m. (6)