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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

MID TERM (SUMMER SEMESTER EXAMINATION)- June-2018

B.Tech V Semester

COURSE CODE: 10B11CE511 MAX. MARKS:50

COURSE NAME: Highway Engineering

COURSE CREDITS: 04 MAX. TIME: 2 Hrs

Note: *All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.*

Q1 (a) What are the policies and goals of the Third Road Development Plan for 1981-2001?

(b) Write short note on- (i) Central Road Fund (ii) Indian Roads Congress (6)

Q2. (a) Discuss the special care to be taken while aligning hill roads.

(b) Discuss the objects of reconnaissance in engineering surveys. (6)

Q3. (a) Liquid limit of subgrade soil = 75%, Plastic limit = 55%, Passing 0.074 mm sieve = 70%. Determine the Group Index of soil.

(b) Explain the desirable properties of aggregates to be used in different types of pavement construction. (6)

Q4. (a) Explain the principle of conducting aggregate impact test. Mention the recommended aggregate impact values for pavement construction.

(b) Explain the plate bearing test procedure and how the modulus of subgrade reaction, K is determined. (8)

Q5. (a) Explain "PIEV" theory and its importance.

(b) Explain sight distance and factors causing restrictions to sight distance. Explain the significance of stopping, intermediate and overtaking sight distances. (8)

Q6. (a) A NH passing through a flat terrain has a horizontal curve of radius equal to the ruling minimum radius. If design speed is 100 kmph, calculate absolute minimum sight distance, superelevation, extra widening and length of transition curve. Assume necessary data suitably.

(b) The ruling gradient of a hill road is 1 in 20. What should be the compensation in gradient and compensated gradient on a horizontal curve of radius 80 m after allowing for curve resistance? (8)

Q7. (a) The load-penetration values of CBR tests conducted on two soil specimens (S) of a particular soil are given below. Determine the average CBR value of the soil if 10 divisions of the load dial represents 20 kg load in the calibration chart of the proving ring.

Penetration, mm	0.0	0.5	1.0	1.5	2.0	2.5	3.0	4.0	5.0	7.5	10.0	12.5
Load divi., S-1	0	10	18	23	34	40	50	62	70	87	95	109
Load divi., S-2	0	0.5	3.5	9.0	18	30	40	54	64	80	88	102

(b) 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. (8)