

## APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

### Scheme for Valuation/Answer Key

*Scheme of evaluation (marks in brackets) and answers of problems/key*

**SEVENTH SEMESTER B.TECH DEGREE EXAMINATION (S), MAY 2019**

**Course Code: CE467**

**Course Name: HIGHWAY PAVEMENT DESIGN**

Max. Marks: 100

Duration: 3 Hours

### PART A

*Answer any two full questions, each carries 15 marks.*

		Marks
1	a) Drawing cross section- Function of layers	3 4
	b) Graph Explain the steps of Rothfutch method of proportioning of soil	3 5
2	a) Six properties Testing (CBR)	3 4
	b) Burmister's assumptions (4points) and explain (4*1+4= 8)	8
3	a) Concept of ESWL explanation with figure	4 4
	b) Pressure $p= 7 \text{ kg/cm}^2$ , radius=16cm, pavement thickness, $z=50\text{cm}$ , $E_s =1000 \text{ kg/cm}^2$ Using deflection equation, $\Delta = \frac{3pa^2}{2E(a^2+z^2)^{0.5}} = 0.0512 \text{ cm}$	7

### PART B

*Answer any two full questions, each carries 15 marks.*

4	a) Concept Advantages Disadvantages	2 1 1
	b) $T = \{ (3Pmn/2\Pi e * \text{deflection})^2 - a^2 \}^{0.5} (E/E_p)^{1/3} = 32.3 \text{ cm}$ ( 2 marks) Assume thickness of wearing course = 5 cm Calculate remaining thickness = 27.3 cm Convert this thickness to equivalent thickness $t_b$ $t_b = 27.3 * (E_p/E_b)^{1/3} = 37 \text{ cm}$ ( 3 marks) Assume thickness of base as 15 cm $t_{sb} = (t_b - \text{assumed thickness of base}) (E_b/E_{sb})^{1/3} = 28 \text{ cm}$ ( 2 marks)	2 1 1 2 1 2

5 a)	Concept, theory and procedure	7
b)	Factors	4
	Assumptions	4
6 a)	Definitions 3 terms	6
b)	Critical combination of stresses	
	List	1
	explanation	2
c)	Radius of relative stiffness, $l = 73.79 \text{ cm}$	
	$\frac{I_x}{I} = 13.55 \rightarrow C_x = 1$	
	$\frac{I_y}{I} = 5.08 \rightarrow C_y = 0.72$	2
	Warping Stress at interior = $20.4 \text{ kg/cm}^2$	
	Warping Stress at edge = $18 \text{ kg/cm}^2$	2
	Warping Stress at corner = $6.36 \text{ kg/cm}^2$	2

**PART C**

*Answer any two full questions, each carries 20 marks.*

7 a)	(a) Dummy Joint	5
	(b) Contraction joint with dowel bar	5
	(c) Contraction joint without dowel bar	5
b)	Functions	5
8 a)	Detailed step by step procedure	8
b)	$S_c = 0.8 \text{ kg/c}$	7
	$W = 2400 \text{ kg/m}^3$	
	$f = 1.2$	
	$L_c = (2 * 0.8 * 10^4) / (2400 * 1.2) = 5.55 \text{ m}$	
c)	Sketch	2
	Explanation	3
9 a)	Structural evaluation concept	2
	Plate load test	5
	BBD test	5
b)	Structural requirements	4
	Functional requirements	4

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