

Total No. of Questions: 6

Total No. of Printed Pages:3

Enrollment No.....



Faculty of Engineering
End Sem (Even) Examination May-2022
CE3CO09 Transportation Engineering

Programme: B.Tech.

Branch/Specialisation: CE

Duration: 3 Hrs.

Maximum Marks: 60

- Q.1 i. Based on location and function, Nagpur Road plan has classified the road in India- 1
(a) 2 categories (b) 3 categories
(c) 4 categories (d) 5 categories
- ii. What is the crown height with respect to the edges to be provided in case of state highway of bituminous concrete pavement of width of 7.0 m and very high rainfall? 1
(a) 0.07 (b) 0.035 (c) 0.11 (d) 0.04
- iii. Marshall stability test is carried out at temperature- 1
(a) 40⁰ C (b) 60⁰ C (c) 50⁰ C (d) 27⁰ C
- iv. The method of design of flexible pavement as per IRC is- 1
(a) G.I. method (b) CBR method
(c) Westergaard method (d) Bradbury method
- v. Westergaard method is used for design of- 1
(a) Flexible pavement (b) Rigid pavement
(c) Both (a) and (b) (d) None of these
- vi. In Rigid pavement, the contraction joints spacing is normally provided as- 1
(a) 1.5 m (b) 2.5 m (c) 4.5 m (d) 5.5 m
- vii. Road roughness is measured using- 1
(a) Benkelman beam method (b) Bump integrator
(c) Dynamic cone test (d) Plate bearing test
- viii. Which one is not the failure of flexible pavement? 1
(a) Alligator cracking (b) Reflection cracking
(c) Mud pumping (d) Frost heaving

P.T.O.

[2]

- ix. The grade bitumen used for airport runway is- **1**
 (a) 30/40 (b) 60/70 (c) 80/100 (d) 100/120
- x. According to ICAO, all marking on the runway are- **1**
 (a) Yellow (b) White (c) Black (d) Red
- Q.2 i. Explain PIEV theory. **2**
 ii. What is sight distance? Define OSD, SSD. **3**
 iii. Write down the steps of design of OSD with formula. **5**
- OR iv. Design the super elevation and extra widening for two lane highway **5**
 in which Design speed of vehicles 80 kmph. Assume suitable data as per IRC.
- Q.3 i. Difference between prime coat and seal coat. **2**
 ii. Explain the Marshall stability test with neat graph. **8**
- OR iii. Result of C.B.R. test are as follow: **8**
 2.5 mm -60 kg
 5 mm-80 kg
 Following material are required to be used over this soil sub grade
 (a) Compacted soil CBR =6%
 (b) Poorly graded gravel CBR 12%
 (c) Well graded gravel 60%
 (d) Bituminous surface of 4 cm, Design pavement using C.B.R. method if wheel load 4100kg and tyre pressure is 7 kg/cm².
- Q.4 i. Calculate the radius of relative stiffness, if tyre pressure 7 kg/cm², **3**
 thickness of pavement 15 cm, poisons ratio 0.15, Elasticity of pavement 2.5*10⁵ kg/cm², Deflection 1 cm.
 ii. A pavement slab having width 4.5 m and thickness 25 cm, Design **7**
 contraction joint if-
 RCC is used
 PCC is used
 f =1.5, design strength of steel 1400 kg/cm², stress in concrete 0.8 kg/cm² for RCC 12 mm diameter of bar is used at 300 mm spacing.

[3]

- OR iii. Write a short note on any two: **7**
 (a) Tie bar and dowel bar
 (b) Load stresses by westergaard formula
 (c) Temperature stresses
- Q.5 i. Explain the any four Flexible pavement failure with diagram. **4**
 ii. What is overlay of pavement? Write design steps of Benkelman beam **6**
 method of correction deflection.
- OR iii. Explain the surface and sub surface drainage in detail. How to **6**
 overcome drainage problem in urban area?
- Q.6 Attempt any two:
 i. What are the measures of selecting airport site? (min. 10 points) **5**
 ii. What is wind rose diagram? Draw a neat sketch. **5**
 iii. Write design steps of runway and any two corrections. **5**

Marking Scheme
CE3CO09 Transportation Engineering

Q.1	i.	Based on location and function, Nagpur Road plan has classified the road in India- (d) 5 categories		1
	ii.	What is the crown height with respect to the edges to be provided in case of state highway of bituminous concrete pavement of width of 7.0 m and very high rainfall? (a) 0.07		1
	iii.	Marshall stability test is carried out at temperature- (b) 60 ⁰ C		1
	iv.	The method of design of flexible pavement as per IRC is- (b) CBR method		1
	v.	Westergaard method is used for design of- (b) Rigid pavement		1
	vi.	In Rigid pavement, the contraction joints spacing is normally provided as- (c) 4.5 m		1
	vii.	Road roughness is measured using- (b) Bump integrator		1
	viii.	Which one is not the failure of flexible pavement? (c) Mud pumping		1
	ix.	The grade bitumen used for airport runway is- (a) 30/40		1
	x.	According to ICAO, all marking on the runway are- (b) White		1
Q.2	i.	Short note	1 Mark	2
		Diagram	1 Mark	
	ii.	Each explanation carry 1 Mark	(1 Mark*3)	3
	iii.	Each step carry equal marks (5 steps)		5
		1 Mark for each step	(1 Mark*5)	
OR	iv.	Super elevation	2.5 Marks	5
		Extra widening	2.5 Marks	

Q.3	i.	Two difference carry	2 Marks	2
	ii.	Explanation	4 Marks	8
		Neat graph.	4 Marks	
OR	iii.	Correct C.B.R. value	2 Marks	8
		Remaining marks in each thickness calculation	(2 Marks*3)	
Q.4	i.	Value of K	1 Mark	3
		Formula of relative stiffness radius	1 Mark	
		Answer	1 Mark	
	ii.	PCC designed	3.5 Marks	7
		RCC designed	3.5 Marks	
OR	iii.	Note on any two:		7
		Each short note carry equal 3.5 Marks	(3.5 Marks*2)	
Q.5	i.	Any four Flexible pavement failure carry 1 Mark each	(1 Mark*4)	4
	ii.	Explanation of overlay	2 Marks	6
		Benkelman beam method	4 Marks	
OR	iii.	Surface drainage	2 Marks	6
		Sub surface drainage	2 Marks	
		Urban area drainage	2 Marks	
Q.6		Attempt any two:		
	i.	2 points carry 1 Mark each	5 Marks	5
	ii.	Explanation of wind rose diagram	2.5 Marks	5
		Neat sketch.	2.5 Marks	
	iii.	Steps of runway	3 Marks	5
		Each correction	2 Marks	
