University of Mumbai

Civil Engineering Examination

Sub: CE-C 505 / Transportation Engineering-I
Year/Sem:- TE/ V Sem **Max. Marks: 80**
Duration: - 2Hrs

Q1. Attempt all the MCQS **(20 X 2 mark= 40 marks)**

Q. 1. The main objective of transportation is?

a) Economical transport of goods

b) Economical transport of passengers

c) To generate revenue

d) Safe economical and efficient transport of goods and passengers

Q. 2. The transportation system that requires a low initial investment among the following is?

a) Roadway

b) Railway

c) Harbour

d) Airport

Q. 3. The current highway development works in India are undertaken by.

a) NHAI

b) Govt. of India

c) State governments

d) NHDP

Q. 4. The second 20-year development plan conference was held in which city?

a) Nagpur

b) Bombay

c) Madras

d) Lucknow

Q. 5. The design of horizontal and vertical alignments, super elevation, gradient is worst affected by _____

a) Length of vehicle

b) Width of vehicle

c) Speed of vehicle

d) Height of vehicle

Q. 6. Transition curve is introduced in _____

a) Horizontal curve

b) Circular curve

c) Between horizontal curve and circular curve

d) Vertical curve

Q. 7. The minimum width of carriage way in urban roads is _____

a) 2.5m

b) 3.0m

c) 3.5m

d) 3.75m

Q. 8. The traffic survey is conducted during _____

a) Harvest season

b) Harvest and lean season

c) Rainy season

d) Summer season

Q. 9. The traffic volume is usually expressed in _____

a) LMV

b) PCU

c) LCV

d) HCV

Q. 10. If space mean speed of a vehicle is 50kmph, then the time mean speed will be _____

a) Less than 50kmph

b) Greater than 50kmph

c) Equal to 50kmph

d) Depends on the vehicle

Q. 11. The geometric design in India are designed for _____

a) 85th percentile speed

b) 15th percentile speed

c) 98th percentile speed

d) 100 percentile speed

Q. 12. If the load value at 2.5mm penetration in CBR is 190kg and the load for 5.0mm penetration is 48kg, then the CBR value at 5 mm penetration is?

a) 4.6

b) 4.4

c) 4.3

d) 4.1

Q. 13. The bitumen is completely soluble in _____

a) Carbon monoxide

b) Carbon dioxide

c) Carbon sulfide

d) Carbon disulfide

Q. 14. The rate of growth in traffic in urban areas is assumed as _____

a) 7.5%

b) 8.0%

c) 8.5%

d) 9.0%

Q. 15. The lane distribution factor on undivided roads with single lane carriage way is _____

a) 0.5

b) 1

c) 1.5

d) 2

Q. 16. No warping stress is developed if the temperature _____

a) Constant

b) Less than normal

c) More than normal

d) Changes frequently

Q. 17. The deflection in Westergaard analysis is _____

a) 0.125

b) 0.250

c) 0.375

d) 0.500

Q. 18. Warping stress coefficient charts were prepared by _____

a) Burnister

b) Telford

c) Bradbury

d) IRC

Q. 19. The Westergaard equation was modified by _____

a) Bradbury

b) Burnister

c) Teller and Sutherland

d) Telford

Q. 20. What is the minimum factor of safety for rigid pavement?

a) 1

b) 1.1

c) 1.5

d) 1.7

Q2. Attempt any FOUR **(04 X 05 marks= 20 marks)**

1. Discuss the role of NHAI, MORTH, CRRI and IRC.
2. Briefly discuss the importance, objectives and methods of various traffic engineering studies.
3. What is ESWL? Briefly discuss the graphical method determination of ESWL.
4. Discuss on various rigid pavement failures
5. What is Overlay? Discuss on its types
6. Benkelman beam

Q3. Attempt any TWO **(02 X 10 marks= 20 marks)**

1. What is braking distance? Calculate the braking distance for a vehicle moving at the design speed of 100 KMPH.

2. Speed observations from a radar speed meter is given below

Speed (kmph)	Vehicles/hour	Speed (kmph)	Vehicles/hour
2-6	01	34-38	78
6-10	04	38-42	50
10-14	00	42-46	36
14-18	07	46-50	26
18-22	20	50-54	09
22-26	44	54-58	10
26-30	80	58-62	03
30-34	82		

- Draw cumulative frequency graph
- Most frequently occurred speed
- Speed used for geometric study
- Speed used for traffic regulation
- Time mean speed

3. Design a pavement for construction of new bypass for single lane having initial traffic of 600 CVPD in both directions. Rate of growth is 7.5%, VDF is 2.5, CBR is 4%, construction period is 2 years and design life is 15 years.

4. Design a rigid pavement making use of Westergaard's wheel load and warping stress equations at edge region of the slab. The design data are given below.

   Wheel load = 7000 kg

   Contact Pressure = 7.5 kg/cm^2

   Spacing between longitudinal joints = 3.75 m

   Spacing between transverse joints = 4.2 m

   Modulus of elasticity of cement concrete = $3x10^5$ kg/cm^2

   Poisson's ratio of concrete = 0.15

   Thermal coefficient of CC per ^0C = $1x10^{-5}$

   Flexural strength of CC = 45 kg/cm^2

   Modulus of subgrade reaction = 30 kg/cm^3

   Maximum temperature differential at the location for pavement thickness are values of 22, 24, 26 and 30 cm are respectively, 14.8, 15.6, 16.2 and 16.8^0C.

   Desired factor of safety with respect to load stress + warping stress at edge region is 1.1 to 1.2

L/l	C	L/l	C	L/l	C
1	0.00	5	0.720	9	1.080
2	0.04	6	0.920	10	1.075
3	0.175	7	1.030	11	1.050
4	0.440	8	1.077	12	1.000