CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech V Semester Supplementary Examinations December-2024

Course Name: Design and Drawing of RCC Structures

(Civil Engineering)

Date: 16.12.2024 AN   Time: 3 hours   Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A
Answer all TEN questions
Each question carries TWO marks.   10x2=20M

1. Define partial safety factor.   2 M
2. What is the expression recommended by IS 456 for Modulus of Elasticity?   2 M
3. Distinguish between Flexural Bond and Anchorage Bond.   2 M
4. How to overcome torsion on beams.   2 M
5. Why corner reinforcements are provided in two-way slabs?   2 M
6. Draw yield line pattern for one-way slab with simply supported edge conditions.   2 M
7. Write any four support conditions of columns.   2 M
8. On which condition long column is more suitable.   2 M
9. State the governing factors to decide the design of R.C Footings.   2 M
10. When the combined footing is provided?   2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). Determine the moment capacity of a doubly-reinforced rectangular cross-section beam for   10M
the following data: b = 400 mm, d = 800 mm, A_{st} = 1226 mm^2, f_y = 415 N/mm^2, fck = 25
N/mm^2, A_{sc} = 686 mm^2.

OR

11. B). A simply supported beam of an effective span of 12 m is subjected to a uniformly   10M
distributed live load of 45 kN/m. The thickness and width of the flange are restricted to
130mm and 1100 mm respectively. Design a T-beam section with M25 concrete and
HYSD-Fe415 bars by limit state design.

12. A). The critical section of an RC rectangular beam is subjected to a bending moment of   10M
25 kN-m, a torsional moment of 10 kN-m and a shear force of 30 kN. The overall size of
the section is 300 mm x 600 mm. provide effective cover to reinforcement as 40 mm.
concrete grade M25 and steel grade Fe415 are used. Design the necessary reinforcements
for the section.

OR

12. B). The support section of a RC cantilever beam is of 300 mm x 500 mm effective size and   10M
consists of 4 numbers of 16mm dia. Fe415 grade steel bars as tension reinforcement and
4 numbers of 16 mm diameters. Bars as compression reinforcement. This beam carries a
total udl of 20 kN/m on its full length, 3 m. Design vertical stirrups for maximum shear
using 8 mm dia. Fe 415 grade steel bars. The concrete is of M20 grade.

(P.T.O..)

13. A). Design a RC floor for slab a room 4.5 m x 7 m in size to support a super imposed load of 5 kN/m². The edges of the slab are freely supported and its corners are held down. Draw plan and sectional elevations in detail. **10M**

OR

13. B). A hall has clear dimensions 3mx9m with wall thickness 230mm. The live load on the slab is 3kN/m² and a floor finishes of 1 kN/m².Using M20 grade of concrete and Fe 415 Steel. Design the slab and sketch the reinforcement details. **10M**

14. A). Design a short column, with effect length 3.6 m, capable of safety resisting the following factored loads effects (under uniaxial eccentricity): (i) P_u =1665 kN, M_u = 85 kNm. (ii) P_u = 385 kN, M_u = 206 kNm. Assume M25 concrete and Fe 415 steel. Draw the cross section and elevation details. **10M**

OR

14. B). Design a short axially loaded square column, 500mm x 500mm for a service load of 2000kN. Use M20 concrete and Fe 415 steel. **10M**

15. A). An RC column, 300 mm x 400 mm in size, carries an axial load of 600 kN including its self-weight. The safe bearing capacity of the soil is 150 kN/m². Design a rectangular footing with uniform thickness for the column using M20 grade concrete and Fe 415 HYSD grade. **10M**

OR

15. B). Design a single stair to reach a roof slab at a height of 2.70m. Rise & tread are 180mm & 250mm respectively. The stair shall be 1m wide. Use M20 grade of concrete and Fe 415 steel. **10M**

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech V Semester Supplementary Examinations December-2024

Course Name: Business Management & Financial Analysis
(Civil Engineering)

Date: 18.12.2024 AN | Time: 3 hours | Max.Marks: 70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions
Each question carries TWO marks. | 10x2=20M

1.	Define planning.	2 M
2.	What is Leadership?	2 M
3.	List out characteristics of Management.	2 M
4.	Write a note on financial Management.	2 M
5.	What are the phases of business cycle?	2 M
6.	What is the Importance of National Income?	2 M
7.	Define BEP.	2 M
8.	Give brief note on objectives of pricing.	2 M
9.	Write quick ratio formula.	2 M
10.	What is Manufacturing a/c?	2 M

PART-B
Answer the following. Each question carries TEN Marks. | 5x10=50M

11.A).	Elucidate the functions of management with suitable examples.	10M
	OR	
11. B).	Explain in detail the theories of motivation.	10M
12. A).	Describe objectives and functions of financial management.	10M
	OR	
12. B).	Define marketing management and write on recent trends in marketing.	10M
13. A).	Illustrate the nature and scope of managerial economics.	10M
	OR	
13. B).	Explain methods of demand forecasting with examples.	10M
14. A).	What is market and elucidate different types of competitions?	10M
	OR	
14. B).	Determine the cost-output relationship.	10M
15. A).	Explain types and objectives of business enterprise.	10M
	OR	
15. B).	What are the techniques used to analyze the financial statements?	10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech V Semester Supplementary Examinations December-2024
Course Name: Geotechnical Engineering
(Civil Engineering)

Date: 20.12.2024 AN   Time: 3 hours   Max.Marks:70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions
Each question carries TWO marks. 10x2=20M

1. Define (i) void ratio (ii) porosity.   2 M

2. If the bulk unit weight of a wet soil mass is 19.80 kN/m³, find dry density, void ratio and degree of saturation of soil mass.   2 M

3. "Coefficient of permeability will be more in horizontal direction than vertical" answer yes or no and justify.   2 M

4. A stratified soil deposit consists of three layers of equal thickness and different composition. The permeability of layers are 2×10^{-3}, 1×10^{-3}, 5×10^{-4} cm/sec. Calculate the average permeability of deposit in horizontal and vertical directions.   2 M

5. Define dry side and wet side of optimum.   2 M

6. Name the method by which you can determine the stress intensity at any point below an irregular shaped area.   2 M

7. Differentiate between consolidation and compaction.   2 M

8. A clay stratum 5m thick has the initial void ratio of 1.50 and the effective overburden pressure of 120 kN/m². When the sample is subjected to an increase of pressure of 120 kN/m², the void ratio reduces to 1.44. Determine the coefficient of volume compressibility and the final settlement of the stratum.   2 M

9. In a drained triaxial compression test, a saturated specimen of a cohesionless sand fails under a deviatoric stress of 3 kgf/cm² when the cell pressure is 1 kgf/cm². Find the effective angle of shearing resistance.   2 M

10. What are the limitations of direct shear test?   2 M

PART-B
Answer the following.Each question carries TEN Marks.   5x10=50M

11.A). i) A soil sample has a bulk unit weight of 18.5 kN/m³ and a void ratio of 0.84. The specific gravity of the soil is 2.65. Determine the moisture content, dry unit weight and degree of saturation of the soil sample.   4M

ii) Explain in detail about Grain-size analysis of soil.   6M

OR

11. B). i) In a shrinkage limit test, the following observations were taken. Compute the shrinkage limit and the specific gravity of solids.   6M
    a) Volume of saturated soil = 9.75ml
    b) Mass of saturated soil = 16.5 gm
    c) Volume of dry soil after shrinkage = 5.40 ml
    d) Mass of dry soil after = 10.9 gm

(P.T.O..)

ii) A soil sample consists of particles ranging in size from 0.6 mm to 0.02 mm. The average specific gravity of the particles is 2.66. Determine the time of settlement of the coarsest and finest of these particles through a depth of 1 metre. Assume the viscosity of water as 0.001 N-sec/m^2 and the unit weight as 9.8 kN/m^3.   4M

12. A). i) A falling head permeameter accommodates a soil sample 10 cm high and 50 cm^2 in cross-sectional area. The permeability of the sample is expected to be 1×10^{-5} cm/sec. If the desired head in the standpipe should fall from 10 cm to 30 cm in 30 mins, determine the size of the standpipe which should be used. If on the same soil sample, a constant head of 150 cm is maintained for 2 hours, then how much quantity of water will flow?   5M

ii) A saturated sand layer over a clay stratum is 5 m in depth. The water is 1.5 m below ground level. If the bulk density of saturated sand is 17.66 kN/m^3, calculate the effective and neutral pressure on the top of the clay layer. Assume that the sand above the water table is dry.   5M

OR

12. B). i) A sample in a variable head permeameter is 8 cm in diameter and 10 cm high. The permeability of the sample is estimated to be 10×10^{-4} cm/s. If it is desired that the head in the stand pipe should fall from 24 cm to 12 cm in 3 min., determine the size of the standpipe which should be used.   5M

ii) The flownet of an earthen dam with 30m water depth consists of 25 potential drops and 5 flow channels. The coefficient of permeability of the dam material is 0.03 mm/sec. Find the discharge per meter length of the dam is   5M

13. A). The following results are obtained from a standard compaction test on a sample of soil.   10M

Water Content (%)	0.12	0.14	0.16	0.18	0.20	0.22
Mass of Wet Soil (kg)	1.68	1.85	1.91	1.87	1.87	1.85

Volume of mould used was 950 cc. Plot the compaction curve and obtain MDD and OMC. Calculate void ratio, degree of saturation and the theoretical maximum dry density. (G = 2.70).

OR

13. B). Explain about Boussinesq's and Westergard theory of soil and state the differences between them.   10M

14. A). i) A clayey soil sample, tested in a consolidometer, showed a decrease in void ratio from 1.20 to 1.10 when the pressure was increased from 0.25 to 0.50 kgf/cm^2. Calculate a_v and m_v. If c_v = 10 m^2/year, calculate the coefficient of permeability. If the sample tested at the site was taken from a clay layer 3 m in thickness, determine consolidation settlement for the given stress increment.   6M

ii) State the assumptions of Terzaghi's one-dimensional consolidation theory.   4M

OR

14. B). i) A 20 m thick clay layer is sandwiched between a silty sand layer and a gravelly sand layer. The layer experiences 50mm total settlement in 6.5 years. If the coefficient of consolidation of the layer is 0.003 cm^2/sec, estimate the time (in years) in which the deposit will experience a settlement of 30mm.   6M

ii) Define normally consolidated and over-consolidated soil.   4M

15. A).   i) Two identical specimen of soil were tested in a triaxial apparatus. First specimen failed   6M
at a total stress 470 kN/m^2 when the cell pressure was 100 kN/m^2 while the second
specimen failed at a total stress of 770 kN/m^2 under a cell pressure of 200 kN/m^2.
Determine c and φ of the soil.

          ii) An in-situ vane shear test was conducted in a clay soil at the bottom of a borehole. A   4M
torque of 153 Nm was required to shear the soil. What was the undrained strength of clay?
The vane was 100mm in diameter and 150mm long.

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OR

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15. B).   i) Explain in detail about triaxial compression test and direct shear test along with its   6M
merits and demerits.

          ii) discuss the factors affecting the shear strength of cohesive soils.   4M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech V Semester Supplementary Examinations December-2024
Course Name: Environmental Impact Assessment
(Civil Engineering)

Date: 23.12.2024 AN   Time: 3 hours   Max.Marks:70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions
Each question carries TWO marks. 10x2=20M

1.	Write the factors affecting EIA.	2 M
2.	What is EMP?	2 M
3.	What is Delineation?	2 M
4.	Write the need of GIS For EIA.	2 M
5.	How air pollutants can affect human beings directly?	2 M
6.	Identify and list the major primary and secondary air pollutants.	2 M
7.	Write about development Activities on Vegetation.	2 M
8.	Write about Environmental Risk Assessment.	2 M
9.	What is ISO?	2 M
10.	Briefly write about Audit data.	2 M

PART-B
Answer the following.Each question carries TEN Marks.   5x10=50M

11.A). Examine the significance, methodology, advantages, and drawbacks of both the Network method and the Media Quality Index method in the context of Environmental Impact Assessment (EIA).   10M

OR

11. B). Discuss classification of environmental parameters in EIA and what are the basic criteria to select an appropriate methodology for a specific project.   10M

12. A). Explain the impact assessments of activities on vegetation and wildlife in the angle of environment.   10M

OR

12. B). Explain EIA is an integral part of the planning and decision-making process.   10M

13. A). Explain in detail the environmental management plan for air, water and land environment for a thermal power plant project.   10M

OR

13. B). Explain the role of public participation in EIA and discuss on overlay and matrix method of impact assessment.   10M

14. A). Explain briefly the stage wise preparation of environmental audit and onsite activities for a hydroelectric power project.   10M

OR

14. B). Explain the socio-economic impacts usually encountered due to development.   10M

15. A). Discuss the role of an environmental engineering in context with EIA.   10M

OR

15. B). Discuss how the cement industry causes the impact on air quality and explain mitigation measures to reduce the impact.   10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech V Semester Supplementary Examinations December-2024

Course Name: Structural Analysis-II

(Civil Engineering)

Date: 26.12.2024 AN   Time: 3 hours   Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A
Answer all TEN questions
### Each question carries TWO marks.   10x2=20M

1. Compare the kinematic indeterminacy of a cantilever and fixed beam.   2 M
2. What is the value of rotational factor at the fixed end?   2 M
3. Principle of analysis of two hinged arches.   2 M
4. List the reasons for side sway in portal frames.   2 M
5. What is cantilever method in structural analysis?   2 M
6. Define substitute frame method.   2 M
7. Which method is better, flexibility or stiffness method, why?   2 M
8. Derive the relationship between the flexibility and stiffness matrix.   2 M
9. In a member AB, if a moment of 10kNm is applied, what is the moment carried over to hinged end B.   2 M
10. Draw the influence line for the support moment for the propped cantilever beam, propped at the free end.   2 M

PART-B
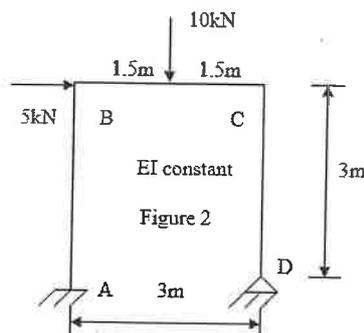### Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). Analyze the frame shown in Figure 1 by Moment distribution method. Draw the bending moment and shear force diagram.   10M
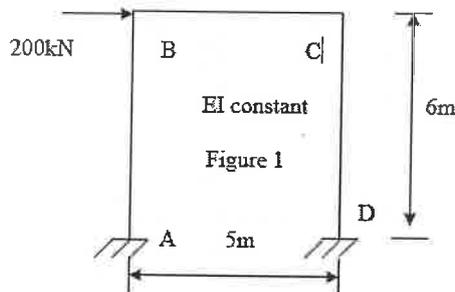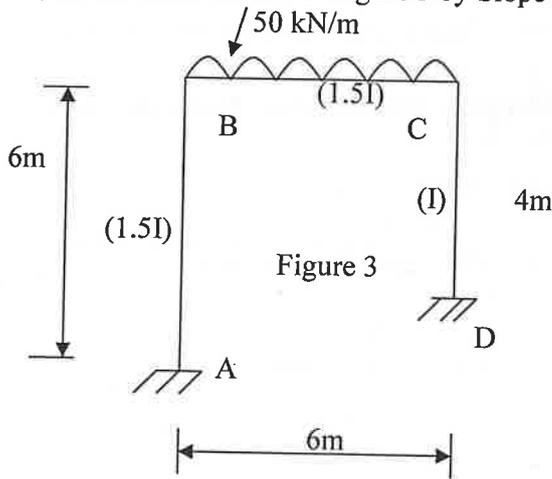

Figure 1

OR

11. B). Analyze the frame shown in Figure 2 by Kani's method. Draw the bending moment diagram.   10M

Figure 2

(P.T.O..)

12. A). Analyze the frame shown in Figure 3 by Slope deflection method. Draw BMD.   10M

/ 50 kN/m

(1.5I)

B   C

6m

(I)   4m

(1.5I)

Figure 3

D

A

6m

OR

12. B). A two hinged parabolic arch of span 20m and central rise 4m carries an uniformly   10M
distributed load of 100 kN/m on the left half of the span. The arch rib has moment of
inertia of its cross section at any point varying as the secant of the slope of the rib axis at
that point. Determine the reactions at the supports. Also determine the stress resultants
Bending moment, radial shear and normal thrust at the left quarter span.

13. A). Using the portal method, analyze the building frame subjected to horizontal force (due to   10M
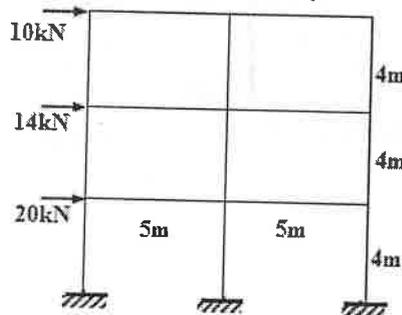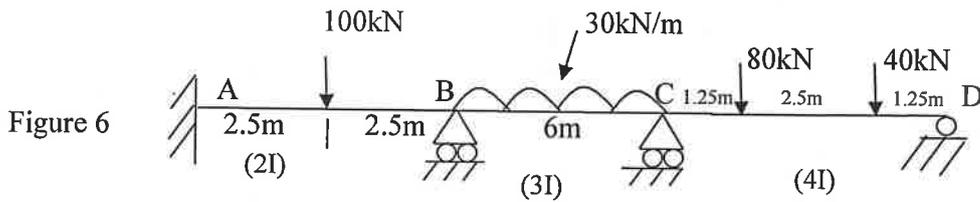wind) as shown in Figure below. Sketch the bending moment diagram.

120 KN A   B   C   D

3.50m

180 KN E   F   G   H

—7.00m—   —3.50m— —5.00m— 3.50m

I   J   K   L
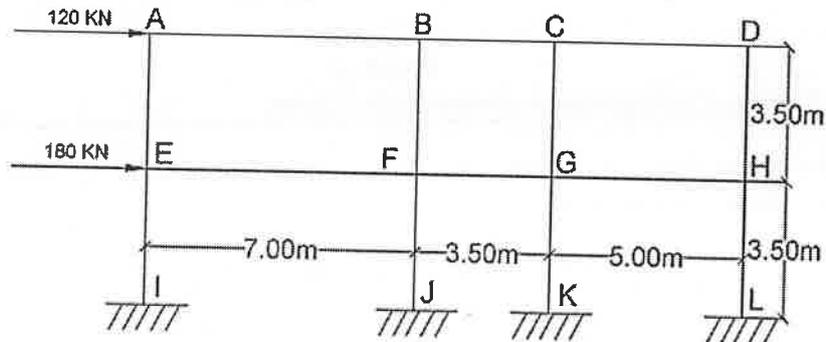
OR

13. B). Analyze the building frame shown in Figure below by cantilever method.   10M

10kN

4m

14kN

4m

20kN
5m   5m

4m

(P.T.O..)

14. A). Analyze the beam shown in figure 6, by stiffness method and determine the rotations and 10M
end reactions. Also draw bending moment diagram for E=200GPa, I= 5×10⁴mm⁴.

Figure 6

100kN   30kN/m
                        80kN   40kN
A   B   C 1.25m   2.5m   1.25m D
2.5m | 2.5m   6m
(2I)   (3I)   (4I)

OR

14. B). Analyze the beam shown in figure 7, by flexibility method and determine end reactions. 10M
Also draw bending moment diagram for E=200GPa, I= 5×10⁴mm⁴.

Figure7

50kN   10kN/m
                      50kN
A   B   C1.25 D
2m | 2m   4m
(2I)   (3I)
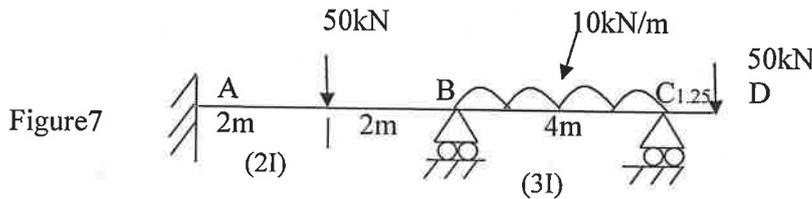
15. A). Determine the forces in the members of the indeterminate truss in Fig 8 removing BE as 10M
the redundant one. The cross sectional size of members are AB=DE=30cm²,
BC=EA=BD=20cm², CD=AD=BE=15cm².

30kN   B   60kN   30kN
A   C
                                                    3m
E
     4m   D   4m
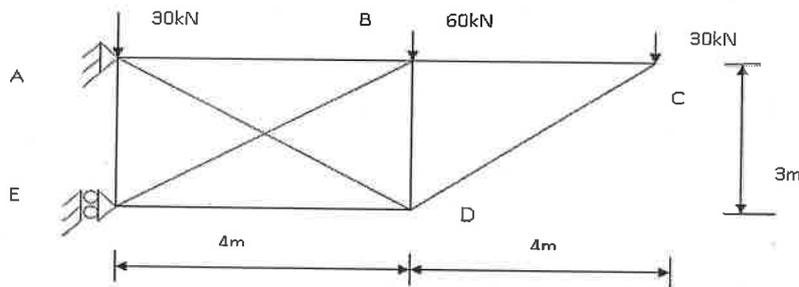
OR

15. B). Construct the influence line for shear at point D which is the mid span of member AB 10M
shown in continous beam in Figure 9 . Compute the value of maximum shear at D if the
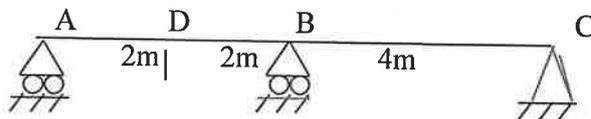beam carries a UDL of 10kN/m and the UDl can occupy a single span fully or portion of
span.

A   D   B   C
   2m| 2m   4m   Fig 9

✳✳✳✳✳

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech V Semester Supplementary Examinations December-2024
Course Name: Transportation Engineering-I
(Civil Engineering)

Date: 30.12.2024 FN   Time: 3 hours   Max.Marks: 70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions
Each question carries TWO marks.   10x2=20M

1.	What is the necessity of highway planning?	2 M
2.	List the classification of road based on first 20 year road plan.	2 M
3.	What are the factors affecting for friction?	2 M
4.	What do you mean by grade compensation? Write equation for it.	2 M
5.	List the applications of speed studies in traffic engineering.	2 M
6.	What are the classifications of traffic signals?	2 M
7.	Draw the number of conflict points in case of four legged un-signalized intersection.	2 M
8.	What is the concept of a rotary intersection?	2 M
9.	List the various physical properties of road aggregate.	2 M
10.	What is the necessity of highway drainage?	2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). i) Discuss the significant recommendations of Jayakar Committee report? Mention how this helped in road development in India.   5M

ii) Explain with neat sketches the various obligatory points considered while aligning a highway.   5M

OR

11. B). Compare the second and third twenty year road plan. Bring out the salient features of each plan.   10M

12. A). i) Derive an expression for finding the stopping sight distance at level and at grades.   5M

ii) While aligning a highway in a built up area, it was necessary to provide a horizontal circular curve of radius 325m. Design the following geometric features: (a) Super elevation, (b) Extra Widening of pavement, (c) Length of transition curve.   5M

OR

12. B). i) A vertical summit curve is formed when a descending gradient of 1 in 30 meets another ascending gradient of 1 in 80. Find the length of the summit curve to provide the required sight distance (SSD and OSD) for a design speed of 75kmph.   5M

ii) Derive an expression for calculating the length of overtaking sight distance with neat figures   5M

13. A). i) The spot speed data at a particular location are normally distributed with a mean speed of 51.7kmph & a standard deviation of 8.3kmph. What is the probability that (a) speed exceeds 65kmph (b) speed lies between 40 & 70kmph (c) what is the 85th percentile speed.   5M

(P.T.O..)

ii) From an In-out survey conducted for a parking area consisting of 40 bays, the initial count was found to be 30.The number of vehicles coming in and out of the parking lot for a time interval of 5 minutes is as shown in the table. Find the accumulation, total parking load, average occupancy and eefficiency of the parking lot.   5M

Time	In	Out
5	3	2
10	2	1
15	4	2
20	5	4
25	6	2
30	7	8
35	8	6
40	7	2
45	6	3
50	5	6
55	2	1
60	3	2

OR

13. B). i) What are the applications of location file, spot maps, collision diagrams and condition diagrams.   5M

ii) Discuss the different types of traffic signals along with its advantages and disadvantages.   5M

14. A). The width of carriageway approaching an intersection is 15 m. The entry and exit width at rotary is 10m. The traffic approaching intersection from the four is as shown in figure. Find the capacity using the given data   10M
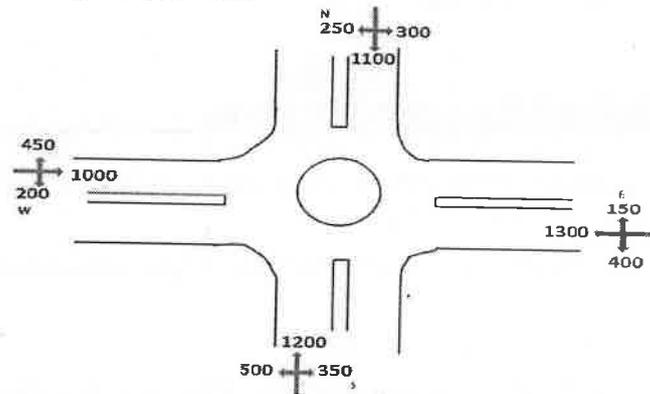

Fig 1. Rotary intersection with traffic data.

OR

14. B). i) Explain clearly how the actual crossing manoeurve of traffic is avoided in traffic rotary though the traffic may have to otherwise go in cross directions of radiating roads.   5M

ii) Discuss about importance of channelization. Explain how it is provided at different at grade intersections with neat sketches.   5M

15. A). i) Discuss the importance of bitumen grading based on viscosity parameters. Bring the importance VG – 30 and VG – 40 bitumen use in highway constructions as per IS 73 2016 guidelines.   5M

ii) Explain the construction steps in case of a water bound macadam road.   5M

OR

15. B). i) Discuss the importance of strength test in case of soil –subgrade. Explain how it is performed in the laboratory in brief.   5M

ii) Explain the causes of distresses in rigid pavements? Discuss the treatment and remedial measures for improving the distresses.   5M

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