H.T No: | | | | | | | | | | | **R22**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : **B.Tech V Semester Regular Examinations December-2024**
Course Name : **Structural Analysis-II**
Course Code : **A401314**
Branch : **Civil Engineering**
Date & Session : **18-12-2024 AN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark. **10x1=10M**

1.	What is the difference between carry over factor and distribution factor	1 M
2.	What are the reasons for sway in portal frames	1 M
3.	What is the advantage of Kani's method over Moment Distribution method?	1 M
4.	What are the conditions in which side sway don't occur	1 M
5.	Is it possible to develop the flexibility matrix for an unstable structure?	1 M
6.	What is the difference between pin jointed and rigid jointed frames?	1 M
7.	What are the properties of elastic curve?	1 M
8.	How are the basic equations of a stiffness matrix obtained?	1 M
9.	Name the type of rolling loads for which the absolute maximum bending moment occurs at the mid span of the beam?	1 M
10.	Draw influence lines for support reactions in a simply supported beam	1 M

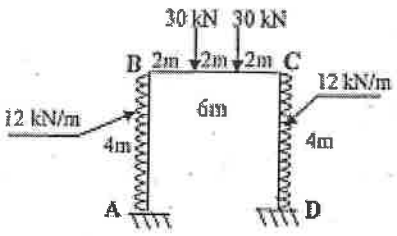
PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). A two hinged parabolic arch at span l and rise h carries a uniformly distributed load of w per unit run over the left half of span. The moment of inertia of the arch rib varies as the secant of the slope of the rib axis. Obtain the expression for the horizontal thrust H at the supports. If l = 25 m and h = 5 m and w = 25 kN/m, calculate (i) H at the supports and (ii) B.M at the quarter span point on the right half of the arch. **10M**

OR

11. B). Analyze the symmetrical portal frame shown in Fig. by moment distribution method. Given, E = 200kN/mm^2 and I= 20x106mm^4 **10M**

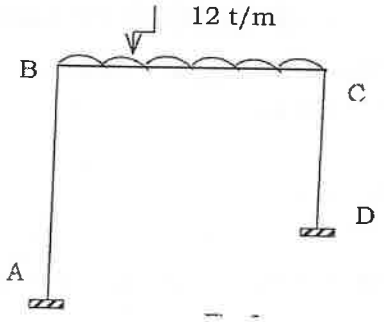


12. A). A cable of span 100 m and dip 10 m carries a load of 10kN/m of horizontal span find the maximum tension in the cable and inclination of the cable at the support. Find the forces transmitted to the supporting pier if the cable passes over smooth pulleys on top of the pier. The anchor cable is 30° to the horizontal. Determine the maximum bending moment of the pier if the height of the pier is 18 m. **10M**

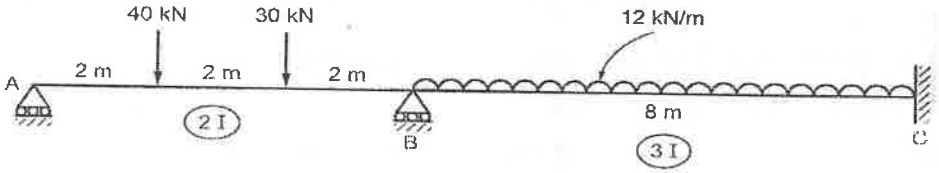
(P.T.O..)

OR

12. B). A portal frame ABCD has lengths AB= 6m, BC=8m and CD=3m as shown in Fig. Analyze the portal frame using Kani's method. Sketch the bending moment diagram. 10M

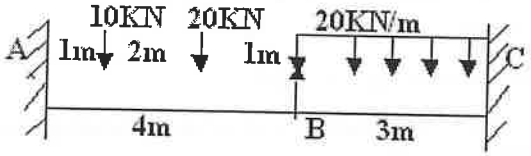


13. A). Examine the moment of the continuous beam shown in fig below by flexibility matrix method 10M



OR

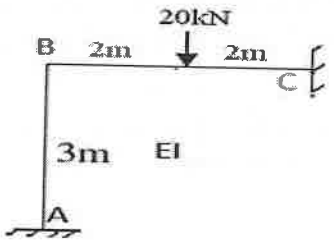
13. B). Analyze the Continuous beam shown in figure using flexibility method. Find the bending moments at A and B. EI is constant 10M



14. A). A continuous beam ABCB is simply supported over the supports A, B, C and D. AB = 10m, BC = 8m and CD=10m. Moment of inertia is constant throughout. A single concentrated central load of 12 kN acts on AB and a uniformly distributed load of 10kN /m acts over BC, Examine the final forces by stiffness matrix method and draw BMD. 10M

OR

14. B). Analyze the frame shown in figure by stiffness matrix method and draw bending moment diagram. Take EI =constant 10M



15. A). Two point loads of 100kN and 200kN spaced 3m apart cross a girder of span 12 meters from left to right with the 100kN leading. Draw the ILD for shear force and bending moment and find the values of maximum bending moment and find the values of maximum shear force and bending moment at a section 4m from the left hand support. Also evaluate the absolute maximum bending moment due to the given loading system 10M

OR

15. B). Draw the influence line for moment at 'B' MB for the two span continuous beam ABC simply supported at A and C, AB=4m, BC=5m. EI is constant. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : **B.Tech V Sem Regular Examinations December-2024**
Course Name : **Geotechnical Engineering**
Course Code : **A401311**
Branch : **Civil Engineering**
Date & Session : **20-12-2024 AN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark. **10x1=10M**

1. What is weathering in the context of soil formation? 1 M
2. Define water content and porosity. 1 M
3. Define pore water pressure. 1 M
4. List the factors affecting the permeability of soil. 1 M
5. What is Isobar? 1 M
6. Differentiate between compaction and consolidation. 1 M
7. Define co-efficient of compressibility. 1 M
8. Differentiate primary and secondary consolidation. 1 M
9. Compare the advantages of the triaxial test to those of the direct shear test. 1 M
10. List the laboratory tests to determine the shear strength of soils. 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). i) A sample of dry soil weighs 68gm. Find the volume of voids if the total volume of the sample is 40ml and the specific gravity of solids is 2.65. Also determine the void ratio. 5M

ii) Discuss Indian standard soil classification system. 5M

OR

11. B). i) What is block diagram? What is its use? 5M

ii) Differentiate between the dry sieve analysis and wet sieve analysis. 5M

12. A). i) What is Darcy's law? What are its limitations? 5M

ii) Discuss the laboratory tests for coefficient of permeability of soils. 5M

OR

12. B). i) Explain the uses of flownet. 5M

ii) A sand deposit is 10m thick and overlies a bed of soft clay. The ground water table is 3m below the ground surface. If the sand above the ground water table has degree of saturation of 45%. Plot the diagram showing the variation of the total stress, pore water pressure and the effective stress. The void ratio of the sand is 0.70. Take G= 2.65. 5M

(P.T.O..)

13. A). Discuss the following from compaction test. 10M

i) Degree of compaction, ii) Zero air void line, iii) Compaction effort.

OR

13. B). Explain about Newmark's influence charts for irregular areas and state its uses. 10M

14. A). A 3m thick clay layer beneath a building is overlain by a permeable stratum and is underlain by an impervious rock. The coefficient of consolidation was found to be 0.025 cm^2/min the final expected settlement for the layer is 8 cm. Ho much it will take for 80% of total settlement to take place? Determine the time required for a settlement of 2.5 cm to occur. Compute the settlement that would occur in one year. 10M

OR

14. B). Explain with the help of neat sketch, how do you determine coefficient of consolidation by square root time method. 10M

15. A). When do you use the following shear tests and give reasons: 10M

(i) shear box;

(ii) vane shear test;

(iii) unconfined compression test.

OR

15. B). i) Discuss the Mohr's coulomb concept of shear strength of soil. 5M

ii) Discuss briefly the UU and CU tests and their applicability. 5M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : **B.Tech V Sem Regular Examinations December-2024**
Course Name : **Hydrology and Water Resources Engineering**
Course Code : **A401313**
Branch : **Civil Engineering**
Date & Session : **23-12-2024 AN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark. **10x1=10M**

1. What is hydrological equation? 1 M
2. List the various forms of precipitation. 1 M
3. What do you understand by the term infiltration? 1 M
4. Enumerate the various factors affecting run-off from a basin area. 1 M
5. Define hydrograph. 1 M
6. List out the assumptions of unit hydrograph. 1 M
7. Define the term transmissivity 1 M
8. List out the properties of an aquifer. 1 M
9. Define Non-modular Canal outlet. 1 M
10. What are the advantages of lining of an irrigation canal? 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). i) Explain in brief the various sub-systems of the hydrologic cycle. 5M
ii) The average rainfall of 5 rain gauges in the base stations are 89, 54, 45, 41 and 55 cm, If the error in the estimation of rainfall should not exceed 10 %, how many additional gauges may be required 5M

OR

11. B). i) Explain missing rainfall data estimation. 5M
ii) Enlist the different recording type of rain gauges and explain any one of type rain gauge with suitable sketch in brief. 5M

12. A). i) Explain Blaney and Criddle equation for estimating evapotranspiration. 5M
ii) The amounts of rainfall for 6 successive days on a catchment were 2, 5, 7, 8, 5, and 1 cm. If the φ- index for the storm is 4 cm/day, find the total surface runoff. 5M

OR

12. B). i) Describe the methods of computing run-off from a catchment area. 6M
ii) Explain any two methods of reducing the evaporation loss from a free water surface. 4M

(P.T.O..)

13. A). A 6-hr UH for a basin has the following ordinates: 10M

Time (hr.)	0	6	12	18	24	30	36	42	48	54	60	66
Ordinates of 6-hr UH (m3/s)	0	20	60	150	120	90	66	50	32	22	10	0

Determine the ordinates of 12-hr UH, using S-curve method.

OR

13. B). i) Explain in detail the separation of base flow in a hydrograph. 5M

ii) Explain the components of hydrograph with neat sketch. 5M

14. A). i) Derive the relationship between duty and delta. 5M

ii) From an alluvial basin having an area of 3000 sq km in a year time 200 Mm3 of groundwater was pumped, resulting in drop of groundwater table by 9 m. Estimate the specific yield of the aquifer. Assume the specific retention as 10 %. 5M

OR

14. B). A 30cm diameter well penetrates 25m below the static water table. After 24 hour of pumping at 5400 liter/min, the water level in a test well at 90m is lowered by 0.53 m and in a well 30m away the drawdown 1.11 m calculate i) What is the transmissibility of the aquifer. ii) Also determine the drawdown in the main well. 10M

15. A). i) Describe different types of outlets mentioning their suitability for different sets of field conditions. 5M

ii) Explain in brief the causes of water logging. 5M

OR

15. B). i) Explain how the planning of canal alignments will be done. 5M

ii) How lining of irrigation channels is done? 5M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination	:	**B.Tech V Sem Regular Examinations December-2024**
Course Name	:	**Airports, Railways and Waterways**
Course Code	:	**A401401**
Branch	:	**Civil Engineering**
Date & Session	:	**28-12-2024 AN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark. **10x1=10M**

1. What do you mean by ballast? 1 M
2. List the cause of kinks in rails. 1 M
3. Write the importance of widening of gauge in curves. 1 M
4. Mention the allowable super elevation in Broad Gauge & Meter Gauge tracks. 1 M
5. What is grade compensation? 1 M
6. Differentiate between Gravitational yard and Hump yard. 1 M
7. Write a short note about hangar. 1 M
8. What is the significance of wind rose diagram? 1 M
9. Differentiate jetty and dolphin. 1 M
10. Define mooring buoy. 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). What is a sleeper? List the functions and types of sleepers. 10M

OR

11. B). Briefly explain the functions of different components of permanent way with a neat sketch. 10M

12. A). Derive expression for super elevation in railways. 10M

OR

12. B). Explain in detail about the various types of gradients used in railway track and grade compensation. 10M

13. A). What is Points and crossing? List their types, draw a neat sketch of right hand turnout and explain. 10M

OR

13. B). Discuss the importance of track maintenance drainage and explain how it is achieved. 10M

14. A). The length of runway at standard condition is 2500m. Determine the required runway length at an airport site with the following particulars. 10M

Mean maximum daily temperature = 44.5^{0}C

Mean average daily temperature = 28.3^{0}C

Elevation of site above MSL = 350 m

Effective gradient of runway =0.21%

(P.T.O.)

OR

14. B). Draw a typical layout of an international airport in India and show locations of Runway, Taxiway, Apron, Airport building, Parking and Circulation area. 10M

15. A). Briefly explain the various types of dredging in harbour. 10M

OR

15. B). Draw a neat sketch of a harbour layout and show the various components. Mention the objectives of each component. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : **B.Tech V Sem Regular Examinations December-2024**
Course Name : **Structural Engineering-I**
Course Code : **A401310**
Branch : **Civil Engineering**
Date & Session : **26-12-2024 AN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark. **10x1=10M**

1. Differentiate between dead load and live load. 1 M
2. What is the purpose of the Limit State Method in design? 1 M
3. What is development length? 1 M
4. What is the formula for calculating shear stress in a reinforced concrete beam? 1 M
5. List the Classification of slabs. 1 M
6. What is a two-way slab? 1 M
7. What is the slenderness ratio of a column? 1 M
8. What is the maximum permissible slenderness ratio for a short column? 1 M
9. When is a combined footing used? 1 M
10. List out the different types of footings. 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Explain about balanced, under reinforced and over reinforced sections with neat sketches as per limit state method. 10M

OR

11. B). Determine the moment of resistance of a doubly reinforced concrete beam section, 300 mm wide and 400 mm effective depth, reinforced with 2 bars of 16 mm diameter in compression zone and 3 bars of 20 mm diameter in tension zone. Determine the moment of resistance of the section. Use M 25 grade concrete and Fe 500 steel. 10M

12. A). A simply supported beam of 5.5 m effective span, is to carry a uniformly distributed load (dead load) of 35 kN/m including its self weight, and a live load of 40 kN/m. Design the beam for shear using Limit state method. Use M35 concrete and Fe 500 grade steel. Sketch the reinforcement details. 10M

OR

12. B). Design the shear reinforcement of a beam of size 300 mm x 500 mm which is subjected to a working shear force of 120 kN. The beam is made up of M25 concrete and is reinforced with 4-20 Φ bars and Fe415 steel. 10M

(P.T.O..)

13. A). A simply supported roof slab of clear size 7m x 3m subjected to a live load of 4kN/m^2. use M25 concrete and Fe415 steel. The slab rest on 230 mm thick masonry walls all around. 10M

OR

13. B). Design an RCC slab of clear room dimension 4 m x 5m supported on four walls 300 mm each width and carry live load 4 kN/m^2. Assume corners of slab held down, neatly sketch detail the slab reinforcement. (Concrete grade M25 and Steel grade Fe415). 10M

14. A). Discuss in detail about the design of short and long columns. 10M

OR

14. B). Design a square reinforced column of size 400 mm to carry an ultimate load of 1000 kN at an eccentricity of 160 mm. Use 20 grade of concrete and Fe415 grade of steel. 10M

15. A). Design a square footing of uniform thickness for an axially loaded column of 450mm x 450 mm size. The safe bearing capacity of soil is 190 kN/m^2. Load on column is 850 kN. Use M20 concrete and Fe 415 steel. 10M

OR

15. B). Explain the steps involved in the design of combined footings. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : **B.Tech V Sem Regular Examinations December-2024**
Course Name : **Transportation Engineering**
Course Code : **A401312**
Branch : **Civil Engineering**
Date & Session : **30-12-2024 FN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE mark. **10x1=10M**

1. Give the Classification of urban roads. 1 M
2. What are the ideal requirements of a highway alignment? 1 M
3. Name any two cross section elements in highway geometric design. 1 M
4. State any two functions of transition curves. 1 M
5. What are the three traffic flow parameters? 1 M
6. List any two important uses of spot speed study. 1 M
7. Mention any two important tests on aggregates. 1 M
8. Name the test conducted for testing hardness or softness of bitumen. 1 M
9. Enumerate the layers in a typical flexible pavement. 1 M
10. Identify any two types of overlays. 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). What are the various methods of classifying the roads? Explain the modified classification of roads based on Nagpur plan. 10M

OR

11. B). Explain with neat sketches various factors controlling the alignment of a new highway. 10M

12. A). The speeds of overtaking and overtaken vehicles are 100 and 80 km/h, respectively on a two way traffic road. If the acceleration of overtaking vehicle is 0.53 m/s^2, Calculate the safe overtaking sight distance. Also mention the minimum length of overtaking zone. Sketch the location of sign posts. 10M

OR

12. B). The design speed of a highway is 80 km/h. There is a horizontal curve of radius 200m on a certain locality. Calculate the super elevation needed to maintain this speed. If the maximum super elevation of 0.07 is not to be exceeded. Calculate the maximum allowable speed on this horizontal curve as it is not possible to increase the radius. Safe limit of transverse coefficient of friction is 0.15. Assume any other data required suitably. 10M

13. A). What is meant by Level of Service (LoS)? Explain the various factors affecting capacity and LoS. 10M

OR

13. B). Explain the various causative factors and remedial measures for Road accidents. 10M

(P.T.O..)

14. A). Enumerate the various tests conducted for characterization of aggregates and explain any two of them. 10M

OR

14. B). Explain the significance and step by step procedure of conducting ductility test and softening point test on bitumen. 10M

15. A). Itemize various types of pavements with merits and demerits of each type with a neat sketch showing the cross-section and also explain the functions of each layer. 10M

OR

15. B). Explain the CBR method of pavement design as per the guidelines given in IRC 37 2012. How is this method useful to determine the thickness of component layers? 10M

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