H.T No: | | | | | | | | | | | **R18** | **Course Code: A30123**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech VI Semester Supplementary Examinations January-2025

Course Name: Design and Drawing of Steel Structures

(Civil Engineering)

Date: 06.01.2025 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.	Explain the concept of plasticity and yield strength.	2 M
2.	List out the advantages of welded joints over riveted joints.	2 M
3.	Write short notes on Buckling class of cross section.	2 M
4.	What are different types of column bases?	2 M
5.	Explain about Web crippling.	2 M
6.	Differentiate between laterally supported & unsupported beams.	2 M
7.	Write short notes on column splice.	2 M
8.	Explain the procedure for design of connection between flange and web plates.	2 M
9.	What are Purlins, explain briefly?	2 M
10.	Explain briefly the various loads to be considered for the design of roof trusses.	2 M

PART-B

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

11.A).	A tie member 75mm x 8mm connected to a 10mm thick gusset plate is to transmit a load of 90kN. Design the fillet weld and calculate the necessary overlap. Assume site welding.	10M

OR

11. B).	A welded plate girder is to be fabricated using web plates 1600mm deep &16mm thick, flange plates 400mm wide &30mm thick. The girder is to be used over a simply supported span of 20m, carrying a load of 20KN/m including its own weight. Design a suitable welded connection between the web &flange, taking permissible stress in weld as 110KN/mm^2.	10M
12. A).	Design a slab base of rectangular base plate having equal projections for a column ISHB 300 @ 577 N/m carrying an axial factored load of 1000 KN. Use M20 Grade concrete and E250 Grade steel.	10M

OR

12. B).	An ISMB 350 @ 514 N/m is used as a column. The column is laterally supported in the plane of major axis at the height of 3.5m and in the plane of minor axis at the height of 2.5m. both the ends may be assumed as hinged. What is the design load carrying capacity of the column? The grade of the steel E250.	10M
13. A).	Design a simply supported beam of span 5m carrying a reinforced concrete floor capable of providing lateral restrained to top compression flange. The UDL is made up of 20KN/m imposed load &20KN/m dead load (section is stiff against bearing). Assume Fe 410 Grade steel.	10M

(P.T.O..)

OR

13. B). Design a laterally restrained simply supported beam to carry a UDL of 44kN/m. the effective span of the beam is 8m. A bearing length of 75mm is provided at the supports. 10M

14. A). What is truss? What are different types of truss, explain with neat sketch? 10M

OR

14. B). Determine the wind pressure to be considered on sloping roof from the following data: 10M

i. The building is located in Pondicherry.
ii. Span of the roof 11m.
iii. Pitch of the roof 1/4.
iv. Height of the eaves above the ground is 5m.
v. Risk coefficient, k_1=1, terrain factor K2=0.82 & topographic factor k_3=1.
vi. Assume normal permeability.

15. A). A welded plate girder is made of a web 2000mm deep & 20mm thick & flange 500m wide & 40mm thick. The span of the girder is 28m and total load per metre inclusive its own weight is 27KN/m. Design a suitable welded connection between web & the flange. 10M

OR

15. B). Write the design procedure of plate girder with stiffness. 10M

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H.T No: | | | | | | | | | | | **R18** | **Course Code: A30124**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech VI Semester Supplementary Examinations January-2025

Course Name: Foundation Engineering

(Civil Engineering)

Date: 08.01.2025 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.	What do you understand by Geophysical method of soil exploration?	2 M
2.	Differentiate between representative and non-representative sample.	2 M
3.	Define slope stability.	2 M
4.	Name two types of slope failures.	2 M
5.	What is active earth pressure?	2 M
6.	What is the Rankine's theory of earth pressure?	2 M
7.	Differentiate between uniform and differential settlement.	2 M
8.	List out the different types of shallow foundations.	2 M
9.	What is the difference between a driven pile and a bored pile?	2 M
10.	Explain two applications of well foundations.	2 M

PART-B

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

11.A).	Write short notes on the following i) Comparison of SPT and DCPT ii) Electrical resistivity method iii) Floating foundation.	10M
	OR	
11. B).	Explain wash boring technique in detail with neat sketch.	10M
12. A).	i) What is difference between stability Number and Safety factor?	5M
	ii) Explain in different modes of failure of foundation in soil.	5M
	OR	
12. B).	Discuss the factors affecting the stability of earth slopes and the methods used to analyze slope stability.	10M
13. A).	A detailed explanation of Coulomb's earth pressure theory, highlighting its assumptions, derivation, and applications.	10M
	OR	
13. B).	A comparison between Rankine's and Coulomb's theories, focusing on their assumptions, applicability, and limitations.	10M
14. A).	Define shallow foundations and explain their importance in civil engineering.	10M
	OR	
14. B).	Explain the measures taken to improve soil conditions and increase the bearing capacity of shallow foundations.	10M
15. A).	Briefly explain the different types of pile foundations, including end-bearing piles, friction piles, and combined piles with neat sketch.	10M
	OR	
15. B).	An explanation of the factors influencing the stability and load-carrying capacity of well foundations.	10M

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H.T No: | | | | | | | | | | | **R18** **Course Code: A30125**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech VI Semester Supplementary Examinations January-2025

Course Name: Estimation and Costing

(Civil Engineering)

Date: 10.01.2025 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. Which method is more preferable short wall, long wall or centre line method? Why? 2 M
2. List the duties of quantity surveyor. 2 M
3. What are the factors to be considered in earthwork for canals? 2 M
4. Define sub base and base in roads. 2 M
5. What do you infer from schedule of rates? 2 M
6. For a central government project which rates are to be referred and followed? Why? 2 M
7. What is the necessity to calculate the bar bending schedule? 2 M
8. What is meant by overhead cost? 2 M
9. Identify the difference between Market value and guide line value. 2 M
10. Define the term scrap value. 2 M

PART-B

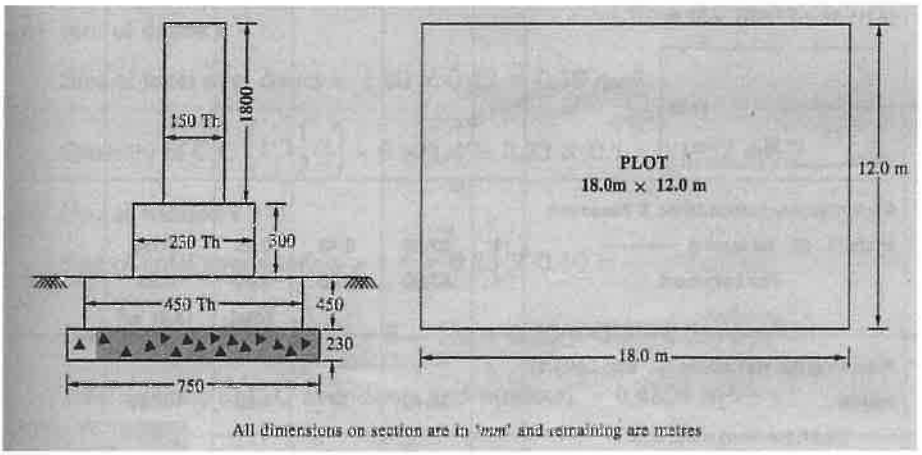
Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Write in Detail about the Types of Estimation and explain any one method of preparing approximate estimates. 10M

OR

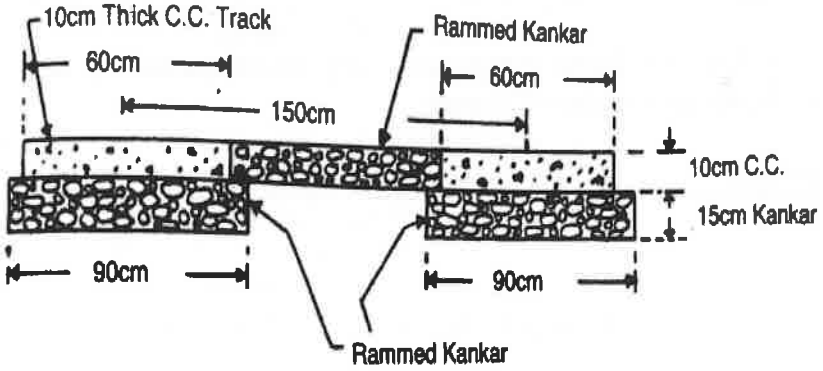
11. B). Estimate the quantities of material required for the compound wall shown in fig for the following items. 10M

i. Earth work excavation for foundation.
ii. Brick masonry in foundation and basement in cm (1:8).
ii. Plastering the wall above the ground level with CM (1 :5)



(P.T.O..)

12. A). Find a detailed estimate for the 'cement concrete road' given in Figure below. 10M



OR

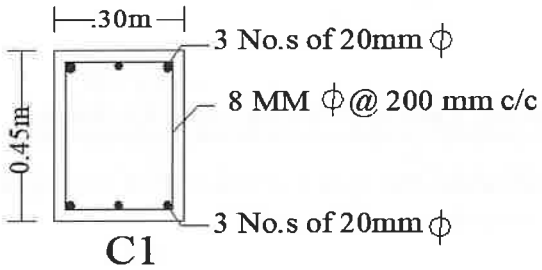
12. B). Describe in detail rate analysis for canal work. 10M

13. A). Prepare a rate analysis for RCC column for 6 columns of size 230mm x 300 mm. Assume M20 Grade concrete. 10M

OR

13. B). Explain the factors affecting rate analysis. 10M

14. A). Calculate the total quantity of bars (including ties) required for the column cross section shown below. 10M



OR

14. B). Define the following: 10M
- (i) Lumpsum Contract
- (ii) Schedule contract
- (iii) Item rate Contract

15. A). The capitalized cost of a building is Rs.5 laks, including all fittings of first class construction. If the rate of interest is 6%, Calculate net return from the property. Assume out goings as 15% on gross income. 10M

OR

15. B). State the different purposes of valuation of immovable properties and explain them. 10M

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H.T No: | | | | | | | | | | | R18 | Course Code: A30126

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech VI Semester Supplementary Examinations January-2025

Course Name: Water Resources Engineering

(Civil Engineering)

Date: 16.01.2025 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.	Discuses about infiltration indices.	2 M
2.	Draw a neat sketch of hydrologic cycle.	2 M
3.	State the assumptions of unit hydrograph.	2 M
4.	Define flow mass curve with neat sketch.	2 M
5.	List and explain factors affecting runoff in a catchment area.	2 M
6.	Define porosity and specific yield.	2 M
7.	What are the factors affecting duty?	2 M
8.	Define Flow and lift irrigation.	2 M
9.	Define kennedy & Lacey's Theory.	2 M
10.	Write short notes on canal linning.	2 M

PART-B

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

11.A).	Discuss various Rain gauges available for measurement of Precipitation.	10M
	OR	
11. B).	A 12 hour storm rainfall with following depths in cm occurs over a basin.3, 3.4, 8.6, 4.9, 11.5, 5, 3, 11, 5.4, 5.8, 1.6, 1.3. Surface runoff is 20.6 cm. Determine the average infiltration index.	10M
12. A).	Define the following terms Distribution of Runoff, Hydrograph, S – Hydrograph, Synthetic Unit Hydrograph.	10M
	OR	
12. B).	Write short notes on Aquifer parameters, porosity, specific yield, permeability and transmissivity.	10M
13. A).	Derive an expression for discharge from a well fully penetrating in unconfined Aquifer.	10M
	OR	
13. B).	Explain the various methods of Irrigation.	10M
14. A).	Discuss in detail about the duty and delta and factors affecting duty.	10M
	OR	
14. B).	Discuss in detail about crop rotation and write its advantage and different sequence of crop rotation.	10M
15. A).	Explain in detail about classification of canals draw a neat sketch of layout of canal system.	10M
	OR	
15. B).	Design an irrigation canal to carry a discharge of 40 cumecs. Assume N=0.0225, m=1 and B/D=2.5.	10M

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H.T No: | | | | | | | | | | | R18 | Course Code: A30143

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech VI Semester Supplementary Examinations January-2025

Course Name: Prestressed Concrete

(Civil Engineering)

Date: 18.01.2025 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.	Distinguish between Pre-tensioning and Post-tensioning.	2 M
2.	Differentiate concentric prestressing from eccentric prestressing.	2 M
3.	What is curvature effect?	2 M
4.	What is relaxation of stress in steel?	2 M
5.	Explain the concept of load balancing.	2 M
6.	List any two parameters that improves the shear resistance of prestressed concrete member	2 M
7.	What are the characteristics of an end block?	2 M
8.	What is transmission length?	2 M
9.	Define propped construction.	2 M
10.	What are the permissible limits for deflection in prestressed concrete members?	2 M

PART-B

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

11.A). Discuss the need of high strength steel and high strength concrete in prestressed members. 10M

OR

11. B). Explain any two post tension systems with neat sketches. 10M

12. A). A pre tensioned beam 400 mm wide and 600 mm deep is pre stressed by 12 wires each of 10 mm diameter initially stressed to 1200 N/mm^2 with their centroids located 100 mm from the soffit. Estimate the final percentage loss of stress due to elastic deformation, creep, shrinkage and relaxation using the following data: 10M

Relaxation of steel stress = 90 N/mm^2

Es =210 kN/mm2, EC = 35 kN/mm^2

Creep coefficient = 1.5

Residual shrinkage strain = 2 x 10^{-4}

OR

12. B). Discuss various losses to be accounted in post tensioned members. 10M

13. A). A box girder of pre-stressed concrete bridge of span 40m has overall dimensions of 1200mm by 1800mm. The uniform thickness of walls 200mm. The live load analysis indicates a maximum live load moment of 2000 kN-m at centre of span. The beam is pre-stressed by parabolic cables with an effective force of 7000 kN. The cables which are concentric at supports have an eccentricity of 800mm at centre of span section. Compute the resultant stresses at centre of span section using the internal resisting couple method. 10M

OR

13. B). Discuss the various types of flexural modes observed in prestressed concrete beams. 10M

(P.T.O..)

14. A). Explain the following. 10M

i) Stress distribution in end block

ii) Transmission length

OR

14. B). The end block of a post tensioned concrete beam 300 mm×300 mm is subjected to a concentric anchorage force of 1000 kN by a freyssinet anchorage system of area 1100mm^2. Design, Discuss and detail the anchorage reinforcement for the end block 10M

15. A). A concrete beam having a rectangular section 100 × 300 mm is prestressed by a parabolic cable with an initial prestressing force of 240 kN. The cable has an eccentricity of 50 mm at the centre and concentric at the supports. If the span of the beam is 12 m and subjected to a live load of 5 kN/m. Calculate the short term deflection at midspan. Assume Ec = 38 kN/mm2, creep coefficient = 2, loss of prestress = 20%. Estimate the long-term deflection. 10M

OR

15. B). Discuss in detail the various steps involved in the design of composite sections. 10M

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H.T No: | | | | | | | | | | | **R15** | **Course Code: A2127**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech VI Semester Supplementary Examinations January-2025

Course Name: Advanced Structural Design

(Civil Engineering)

Date: 18.01.2025 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 different types of retaining walls.	2 M
2.	Draw a neat sketch of counterfort retaining wall and mention all the parts.	2 M
3.	What are the advantages and disadvantages of overhead water tank?	2 M
4.	Write and draw the different types of water tanks based on its shape.	2 M
5.	Write the limitations of direct design method in flat slabs.	2 M
6.	Draw the critical sections for shear of columns in flat slabs.	2 M
7.	Explain the pigeaud's curve in design of slab bridge.	2 M
8.	Write the different loads to be consider for the design of T-Girder bridge.	2 M
9.	What are the assumptions made in Janssen's theory?	2 M
10.	What are the different types of steel chimneys?	2 M

PART-B

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

11.A). A cantilever-retaining wall is required to retain earth 3.8 m high above the ground level. The backfill surface is inclined at an angle of 15° with the horizontal and the backfilled soil has a unit weight of 18 kN/m^3 and an angle of internal friction of 30°. The exposure condition is moderate. Assume that the SBC of soil is 150 kN/m^2 and that the coefficient of friction between the soil and concrete is 0.5. Design the RC retaining wall. 10M

OR

11. B). Design a counterfort-type retaining wall to retain a 6.8 m high back fill above the ground level. The unit weight and SBC of the soil at site are 14 kN/m^3 and 140 kN/m^2, respectively. The angle of internal friction of soil and coefficient of friction are 30 ° and 0.6, respectively. The exposure condition is moderate. 10M

12. A). Design a circular water tank with flexible connection at the base for a capacity of 5 lakh liters. The tank rests on a firm lever ground. The height of tank including a free board of 200mm should not exceed 4.5m. The tank is open at the top. Use M20 concrete and Fe415 steel. 10M

OR

12. B). A rectangular water tank 3X3m in plan and depth 3m is supported on a tower 6m height. Number of columns = 4. The columns are braced at mid height. The wind pressure on the tank may be taken as 1kN/m2. Assume the dead weight of tank is 160kN. The weight of water in the tank is 280kN. Adopt M20 grade of concrete and Fe415 steel. Design the columns and brace of the supporting tower. The columns are provided with a rigid foundation so that fixity conditions may be assumed at the column base. 10M

(P.T.O..)

13. A). Design the interior panel of a large single-storey warehouse flat slab roof with a panel size of 6 m X 6 m supported by columns of size 500 mm X 500 mm. The height of the columns is 5 m. Take live load as 3.0 kN/m^2 and the weight of finishes including waterproof treatment as 2.5 kN/m^2. Use M25 concrete and Fe 415 steel. Assume mild environment. 10M

OR

13. B). Design the interior panel of a flat slab 7.6mX6.6m in size, for a superimposed load of 8.75kN/m^2. Provide two-way reinforcement. Use M20 and Fe415 steel. 10M

14. A). Design a solid slab bridge required for a highway road having the following data. 10M
Width of carriage way = 7.5 m
Clear Span = 5m
Loading = IRC Class A
Width of Kerb = 600 mm
Materials = M 30 concrete and Fe 415 grade steel.

OR

14. B). Explain the 'Effective width method' in the design of slab bridges. 10M

15. A). Design a chimney of 66m height, having external diameter of 4m throughout the height. The chimney has fire brick lining of 100mm thickness, provided up to a height of 42m above ground level, with an air gap of 100mm. The temperature of gases above surrounding air is $200^{O}C$. Take coefficient of expansion of concrete and steel = $11X10^{-6}$ / ^{O}C, and E_s=$2.05X10^5$MPa. Use M25 grade of concrete. 10M

OR

15. B). Design a bunker to store 400kN of coal, for the following data: Unit weight of coal = 8.34kN/m^3; Angle of repose = 30^{O}. The stored coal is to be surcharged at its angle of repose. Take permissible stress in steel as 140N/mm^2. 10M

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