Hall Ticket Number :

Code: 20A17CT

IV B.Tech. I Semester Supplementary Examinations May / June 2024

Bridge Engineering

(Civil Engineering)

Max. Marks: 70   Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)

2. In Part-A, each question carries **Two marks.**

3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

		CO	BL
1. Answer **all** the following short answer questions	(5 X 2 = 10M)		
a) Write the IRC specifications for Road bridges.		CO1	L2
b) Explain the 'Effective width method' in the design of slab bridges.		CO2	L2
c) What is a cross beam in T-beam bridge construction and write the key functions of cross beams?		CO3	L2
d) Write down the types of shear connectors used in the composite bridges.		CO4	L1
e) Sketch and show the different types of piers used for bridges.		CO5	L1

PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

                                                                                      Marks   CO   BL

UNIT–I

		Marks	CO	BL
2.	The clear vent way of box culvert is 4.5 x 4.5 m. Design the box culvert assuming a dead load of 0.1 MPa and a live load of 0.3MPa. Assume the density of soil. The angle of repose is 35 degrees. Adopt M30 grade concrete and Fe415 steel. Sketch the details of reinforcements in the box culvert.	12M	CO1	L3

OR

		Marks	CO	BL
3.	Design an elastomeric pad bearing for a two lane reinforced concrete T-beam bridge for 15 m effective span having the following data: Vertical sustained load- 300 kN Vertical dynamic load- 60 kN Horizontal sustained load- 80kN Coefficient of friction = 0.65 Modulus of rigidity-1 N/mm2 M 20 grade concrete.	12M	CO1	L4

UNIT–II

		Marks	CO	BL
4.	Design a RC slab culvert for a clear span of 8m and a carriageway of 10m. Kerb on either side is 350mm. Assume uniform slab thickness of 650 mm and a wearing coat of 75mm thick. Kerb details need not be designed. Sketch the reinforcement details in the slab. Consider single train of IRC Class AA tracked vehicle loading.	12M	CO2	L4

OR

5. **Design a slab culvert to suit the following data:** Effective span – 6.5 m; Thickness of wearing coat – 80 mm; Width of road – 7.5 m with kerbs 600 mm on either side; Loading – IRC Class AA tracked vehicle; Materials – M25 grade concrete and Fe-415 Grade HYSD bars. Sketch the details of reinforcements in the deck slab.   12M CO2 L5

<div align="center">

UNIT–III
</div>

6. Design a cantilever slab of T beam and slab bridge deck using the following data. Width of roadway – 7.5 m, width of kerb – 0.6 m, depth of kerb – 0.3 m, number of longitudinal girders – 3, width of girder – 0.3 m, spacing of longitudinal girders – 2.5m, thickness of wearing coat – 0.1 m, type of loading – IRC class A wheel loads. Use M25 grade of concrete and Fe415 steel. Design the cantilever slab. Sketch the reinforcement details for the above problem.   12M CO3 L5

OR

7. Design the intermediate longitudinal girder of a T beam and slab bridge for the following data: Effective span = 10 m Carriage way width = 7.5m Kerb = 600mm width on either side Provide three longitudinal beams.. Loading = IRC Class A vehicle Adopt M30 concrete and Fe 415 grade steel. Shear check is not required.   12M CO3 L4

<div align="center">

UNIT–IV
</div>

8. Sketch and show various parts of a composite girder bridge indicating how it is supported on the pier.   12M CO4 L2

OR

9. Using the following particulars, design a plate girder bridge for a broad gauge track : Span: 20m; To level of the railway embankment: 120m; Bed level of the stream: 110m; G.L suitable for foundation: 100m; Stream bond top level: 101.50m.   12M CO4 L3

<div align="center">

UNIT–V
</div>

10. Discuss about the stability analysis of abutments.   12M CO5 L3

OR

11. With neat sketch, explain well foundation and its components.   12M CO5 L2

<div align="center">

*** End ***
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Code: 20A17GT

IV B.Tech. I Semester Supplementary Examinations May / June 2024

Design and Drawing of Irrigation Structures

(Civil Engineering)

Max. Marks: 70   Time: 3 Hours

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Answer any one question from the following (1 x 70 = 70Marks)

Marks   CO   BL

1. Design a canal regulator-cum-road bridge with the following data : **Hydraulic particulars of canal upstream** :

    Bed width: 15 m.

    Bed level : +20.00 m

    F.S depth: 2 m.

    F.S.L: +22.00m.

    Top level of bank: +23.00m.

    Full supply discharge:20 m³/s

    The right bank is 5m. wide and left bank is 2 m. wide.

    Hydraulic particulars of canal downstream :

    Full supply discharge : 16 m³/s

    Bed width: 16 m.

    Bed Level: +20.00 m.

    F.S depth: 1.75 m.

    F.S.L. +21.75 m.

    Top level of bank: +22.75 m.

    Top widths of banks are the same as those on the upstream side. The regulator carries a road way single lane designed for I.R.C loading class 'A'. Provide clear freeboard of 1m. above F.S.L for the road bridge. Good foundation soil is available at +19.00m.

    Assume the ground level site as +22.00m.

    Draw to a suitable scale the following :   CO2
    (a) Half plan at top and half plan at foundation level and   CO3   L3
    (b) Half sectional elevation.   70M   CO5   L4

OR

2. Design the surplus weir of a tank forming part of a chain of tanks. The combined catchment area of the group of tanks is 30 sq.km. and the area of the catchment intercepted by the upper tanks is 24 sq.km. It is decided to store water in the tank to a level of + 11.00 m. above M.S.L, limiting the submersion of foreshore lands up to a level of +11.75 m above M.S.L. The general ground level at the proposed site of work is + 10.00 m, and the ground level below the proposed surplus slopes off till it reaches +9.00 m. in about 6 m. distance. The tank bund has a top width of 2m. at level +13.50m. with 2:1 side slopes on either side. The tank bunds are designed for a saturation gradient of 4:1 with 1m. clear cover. Provision may be made to make Kutcha regulating arrangements to store water up to M.W.L in times of necessity. The foundations are of hard gravel at a level of 8.50 m. near the site of work. (Assume Ryve's Coefficient C as 9 and modified Coefficient c as 1.50).

    Draw to a suitable scale the following :
    (a) Section across weir and   CO1   L3
    (b) Half plan at top and half plan at foundation level.   70M   CO2   L4

*** End ***

Code: 20A17MT

IV B.Tech. I Semester Supplementary Examinations May/June 2023
Disaster Management
(Common to CE & CSE)

Max. Marks: 70   Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A
(Compulsory question)

1. Answer *all* the following short answer questions (5 X 2 = 10M)

		CO	BL
a)	Differentiate risk and vulnerability.	1	1
b)	Write any four impacts due to natural disasters.	2	1
c)	Write about the scope of crisis management.	4	1
d)	Enlist the components of disaster risk reduction.	3	2
e)	Enlist the post disaster situations.	5	2

PART-B
Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

			Marks	CO	BL
		UNIT–I			
2.	a)	Describe the occurring of earthquake, its types of waves, impacts on society.	6M	1	2
	b)	Describe any recent earthquake in India with one case study.	6M	1	2
		OR			
3.	a)	Explain about the types of floods.	4M	1	2
	b)	Describe any recent case study of flood disaster in India.	8M	1	2
		UNIT–II			
4.	a)	Give complete classification of man-made disasters.	4M	2	1
	b)	Describe about Bhopal gas tragedy with all details.	8M	2	2
		OR			
5.	a)	Explain about Bio-war.	4M	2	2
	b)	Describe about Covid-19, its occurrence and its impacts on world.	8M	2	2
		UNIT–III			
6.	a)	What is crisis management and mention its methods.	6M	3	2
	b)	Explain types of evacuation plans	6M	3	2
		OR			

7. a) Explain about the monitoring of hazardous components in industries. 6M 3 2

   b) Discuss about the mock drills of evacuation during disaster. Take any one disaster as example. 6M 3 2

UNIT–IV

8. a) Define Disaster Risk Reduction (DRR) and discuss its stages. 6M 4 2

   b) Discuss the methods adopted by National Disaster Management Authority (NDMA) towards DRR in India. 6M 4 3

OR

9. a) Explain any three methods of disaster risk assessment. 9M 4 2

   b) Explain about any one international body working towards risk reduction. 3M 4 2

UNIT–V

10. a) Enlist about the change in land use pattern and its effects on human settlements in your native district. 4M 5 2

    b) Explain about the statement: 'capacity building of society'. 8M 5 2

OR

11. a) Describe the methods and its strategies of rebuilding aftermath. 6M 5 2

    b) Discuss about the disaster resistant design in built environment. 6M 5 2

*** End ***

Code: **20A17ET**

IV B.Tech. I Semester Supplementary Examinations May / June 2024
Foundation Engineering
(Civil Engineering)

Max. Marks: 70   Time: 3 Hours
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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
   2. In Part-A, each question carries **Two marks.**
   3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A
(Compulsory question)

1. Answer all the following short answer questions   (5 X 2 = 10M)   CO   BL

a) Compute the area ratio of a thin walled tube samples having an external diameter of 6cm and a wall thickness of 2.25mm. Do you recommend the sampler for obtaining undisturbed soil samples? Why?   1   2

b) What is Taylor's Stability Number?   2   2

c) What are the different modes of failure of retaining walls?   3   1

d) Define Net Ultimate bearing capacity and Net safe bearing capacity.   4   2

e) A 30cm diameter concrete pile is driven into a homogeneous consolidated clay deposit (cu=40kN/m^2,   =0.7). If the embedded length is 10m, estimate the safe load. (F.S-2.5, Nc =9.0)   5   3

PART-B
Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

                                                           Marks   CO   BL

UNIT–I

2. a What do you understand by disturbed and undisturbed samples? How would you obtain undisturbed soil samples?   6M   1   2

   b The field N-Value in a deposit of fully submerged fine sand was 40 at a depth of 6m. The average saturated unit weight of the soil is 19kN/m^3.
   Calculate the corrected N-Value as per IS: 2131-1981.   6M   1   3

OR

3. a Briefly explain 'Bore log'   4M   1   2

   b List all the information to be presented in a sub-soil investigation report.   8M   1   3

UNIT–II

4. a Discuss the friction circle method for the stability analysis of slopes.   6M   2   3

   b An excavation is made with a vertical face in clay soil which has Cu=50kN/m^2, $_t$=18kN/m^3 .Determine the maximum depth of excavation, so that the excavation is stable.   6M   2   4

OR

5.   An embankment 10m high is inclined at 35^0 to the horizontal. A stability analysis by the method of slices gave the following forces: N=900 kN, T=420kN, U=200 kN. If the length of the failure arc is 23.0m, find the factor of safety. The soil has c= 20kN/m^2 and   = 15^0.   12M   2   4

UNIT–III

6. Discuss the principles of the design of retaining walls. 12M 3 4

OR

7. Check the stability of the gravity retaining wall shown in fig.1. Take allowable soil pressure equal to 600kN/m². Use Coulomb's theory.
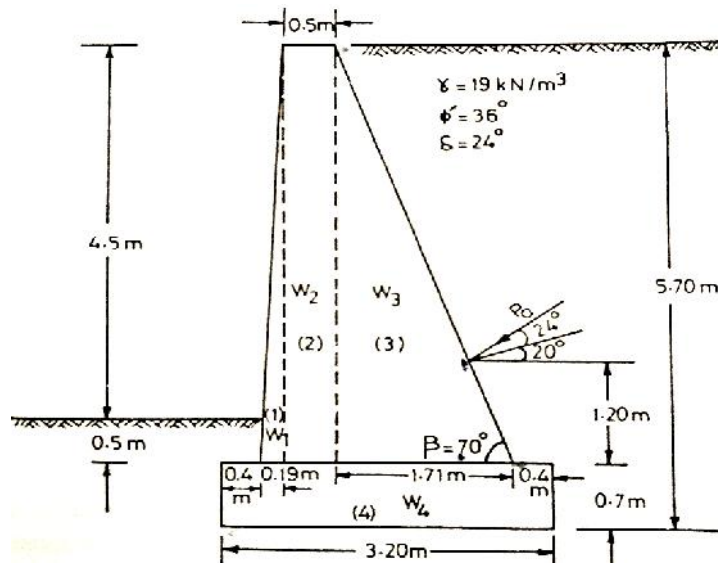

Fig.1 12M 3 4

UNIT–IV

8. a Differentiate between the general shear failure and the local shear failure. 6M 4 2

b Determine the ultimate bearing capacity of a strip footing, 1.20m wide, and having the depth of the foundation of 1.0m. Use Terzaghi's theory and assume general shear failure. Take $\emptyset' = 35^0$. =18kN/m³, c'= 15kN/m², Nc=57.8, Nq=41.4 and N =42.4. 6M 4 4

OR

9. a Discuss the effect of the water table on the bearing capacity of the soil. 6M 4 3

b Explain the causes of the settlement of soils. 6M 4 2

UNIT–V

10. a Describe various types of pile foundations. 6M 5 2

b A concrete pile 30cm dia., is driven into medium dense sand, $\emptyset' = 35^0$, =21kN/m³, k=1.0. Tan =0.70, for a depth of 8m. Estimate the safe load, taking a factor of safety of 2.50. 6M 5 4

OR

11. a What is negative skin friction? What is its effect on the pile? 6M 5 2

b A group of 9 piles in a row was driven into a soft clay extending from ground level to a great depth. The diameter and the length of the piles were 30cm and 10m respectively. The unconfined compressive strength of the clay is 70kPa. If the piles were placed 90cm c/c, compute the allowable load on the pile group based on a shear failure criterion for a factor of safety of 2.5. Take Nc=9,Assume =1.0 6M 5 4

*** End ***

Hall Ticket Number :

Code: 20A17OT

IV B.Tech. I Semester Supplementary Examinations May / June 2024
Watershed Management
(Civil Engineering)

Max. Marks: 70   Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A
(Compulsory question)

1. Answer *all* the following short answer questions   (5 X 2 = 10M)

		CO	BL
a)	What is the function of a watershed?	CO1	L1
b)	Bring out the role of people's participation in watershed management	CO2	L2
c)	List out the different types of erosion	CO3	L2
d)	What are the various types of rain water harvesting?	CO4	L1
e)	Write a short note on land grading operation	CO5	L1

PART-B
Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

		Marks	CO	BL
	UNIT–I			
2.	Explain the necessity of watershed management in India & list out the principles of watershed management	12M	CO1	L1
	OR			
3.	Explain shape characteristics of watershed with diagrams.	12M	CO1	L2
	UNIT–II			
4.	List out the climatic factors that influence the erosion. Write short notes on raindrop erosion	12M	CO2	L2
	OR			
5.	Explain in detail various erosion control measures. What are the effects of erosion on land fertility and land capability?	12M	CO2	L1
	UNIT–III			
6.	List out the advantages and disadvantages of RWH	12M	CO3	L2
	OR			
7.	Explain rainwater harvesting with at least one successful case study	12M	CO3	L2
	UNIT–IV			
8.	Explain about different types of water harvesting.	12M	CO4	L2
	OR			
9.	Briefly explain about different runoff harvesting techniques for long term.	12M	CO4	L2
	UNIT–V			
10.	What is role of ecosystem? Explain mixed and strip cropping	12M	CO5	L2
	OR			
11.	Give a brief note on biomass management.	12M	CO5	L3

*** End ***

Hall Ticket Number : ☐☐☐☐☐☐☐☐☐☐

Code: 20A17LT

IV B.Tech. I Semester Supplementary Examinations May / June 2024

Air Pollution and Control Engineering
(Civil Engineering)

Max. Marks: 70   Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
   2. In Part-A, each question carries **Two marks.**
   3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A
(Compulsory question)

		CO	BL
1. Answer **all** the following short answer questions (5 X 2 = 10M)			
a) Which is the major chemical scavenger in the troposphere and it controls the atmospheric lifetime of most gases in the troposphere?		CO1	L1
b) Name any two effects of air pollution on plants.		CO2	L2
c) Match the Following			

   (i) Wet Neutral   – (A) DALR >SALR>ELR
   (ii) Absolute Stability   – (B) ELR >DALR>SALR
   (iii) Dry Neutral   – (C) DALR>SALR = ELR
   (iv) Absolute Instability   – (D) DALR = ELR>SALR   CO3   L2

d) Write the various factors governed for the choice of a particular type of detector in GC.   CO4   L3

e) How will you differentiate the dry impingement and wet impingement?   CO5   L4

PART-B
Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

	Marks	CO	BL

UNIT–I

2.	How do mobile sources impact air quality? What are the five types of mobile air pollution sources? State in your own words how air quality for mobile sources is managed India with a suitable case study.	12M	CO1	L1

OR

3.	The Bhopal disaster, also referred to as the Bhopal gas tragedy, was a <u>gas leak</u> incident on the night of 2–3 December 1984 at the <u>Union Carbide India Limited</u> (UCIL) <u>pesticide</u> plant in <u>Bhopal</u>, <u>Madhya Pradesh</u>, India. It is considered among <u>the world's worst</u> <u>industrial disasters</u>. Over 500,000 people were exposed to <u>methyl isocyanate (MIC)</u> gas. The highly toxic substance made its way into and around the small towns located near the plant. Why death percentage high? Explain in details.	12M	CO1	L1

UNIT–II

4. Write a brief note on global effects of air pollution due to green house effect and acid rain. 12M CO2 L3

OR

5. Briefly explain the effects of air pollution on human beings and plants. 12M CO2 L1

UNIT–III

6. a) Discuss in detail the Influence of Meteorological phenomena on Air Quality. 6M CO3 L3

    b) Write a short note on wind rose with a neat sketch. 6M CO3 L3

OR

7. Briefly explain the applications in the removal of gases like Sox, NOx, CO, HC. 12M CO3 L3

UNIT–IV

8. Explain with neat illustrations how Electrostatic Precipitators reduce Air Pollution? What is the maximum efficiency of electrostatic precipitator? Name the factors that affect the efficiency of an electrostatic precipitator. 12M CO4 L3

OR

9. What is the name of the equipment used to control waste gases through combustion? Using appropriate illustrations, explain the operation of the equipment in detail. Also, include the merits and demerits of the same. 12M CO4 L4

UNIT–V

10. What does "monitoring air quality" mean? Describe four different techniques for calculating air pollution indices to monitor air pollutants. 12M CO5 L3

OR

11. What role does air quality management play? Describe the significance of various stages of air quality management. 12M CO5 L4

*** End ***

Code: 20A17BT

R-20

IV B.Tech. I Semester Supplementary Examinations May / June 2024
Advanced Transportation Engineering
(Civil Engineering)

Max. Marks: 70   Time: 3 Hours
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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
     2. In Part-A, each question carries **Two marks.**
     3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A
(Compulsory question)

1. Answer *all* the following short answer questions   (5 X 2 = 10M)   CO BL

		CO	BL
a)	Define the term gauges and mention is types	1	1
b)	What do you mean be permanent way	2	1
c)	What is the principle of track circuiting	3	1
d)	Define is tunnel and under what situations tunnel has to be adopted.	4	1
e)	Define the term airport reference temperature	5	1

PART-B
Answer *five* questions by choosing one question from each unit (5 x 12 = 60 M)

                             Marks CO BL

UNIT–I

		Marks	CO	BL
2. a)	Bring out the development of railway system with reference to India	6M	1	2
b)	Explain on importance and significance (i) High speed tracks and (ii) tube railways	6M	1	2

OR

		Marks	CO	BL
3. a)	Explain the classification of railways lines and their track standards	6M	1	2
b)	Discuss the functions and requirements of an ideal railway track	6M	1	2

UNIT–II

		Marks	CO	BL
4. a)	Discuss the types of gauges and specific requirements for permanent way. Mention the different types of gauges provided in different countries.	6M	2	2
b)	Calculate the amount of cant and the maximum permissible speed for a 2° BG transitioned curve on a high-speed route with a maximum sanctioned speed of 110 km/h. The speed for calculating the equilibrium superelevation as decided by the chief engineer is 80 km/h and the booked speed of goods trains is 50 km/h.	6M	2	3

OR

		Marks	CO	BL
5. a)	A transition curve is to be used to join the ends of 3.94^0 circular curve with the straight. The length of the transition curve is 120m. Work out the shift and offsets at every 30m interval. How will you set this transition curve?	6M	2	3

b) What is creep? Discuss the theories propounded for the probable causes of creep. 6M 2 2

UNIT–III

6. a) Describe the different types and shapes of switches 6M 3 2

   b) Explain in detail the various items required for track maintenance 6M 3 2

OR

7. a) Draw a neat sketch of a left-hand turn out and show various parts on it. 6M 3 2

   b) Discuss in detail on how human and system contribution are leading to catastrophic accidents 6M 3 2

UNIT–IV

8. a) Explain the various factors affecting the choice of a method for soft rock tunneling 6M 4 2

   b) Discuss with neat sketches the different shapes of tunnels. Explain the advantageous and disadvantageous of each type. 6M 4 2

OR

9. a) Explain the essential parts of a shield. What are the steps involved in shield tunneling? What are the advantageous 6M 4 2

   b) Describe the steps involved in the Belgian method of tunneling. What are its advantages 6M 4 2

UNIT–V

10. a) Discuss the role of International Airport Authority of India for functioning of airports in India 6M 5 2

    b) The length of a runway under standard conditions is 2200m. The airport is to be provided at an elevation of 420m above the mean sea level. The airport reference temperature is 35^0C. The construction plan includes the following data.

End to end of runway (m)	Grade (percent)	End to end of runway (m)	Grade (percent)
0 to 300	+1.00	1800 to 2100	- 0.50
300 to 900	- 0.50	2100 to 2700	- 0.40
900 to 1500	+0.50	2700 to 3000	- 0.10
1500 to 1800	+1.00		

Determine the actual length of runway to be provided. Apply corrections for elevations and temperature as per ICAO and for gradient as per FAA specifications. 6M 5 4

OR

11. a) What are the different types of aircraft propulsions? Discuss in brief each type. 6M 5 2

    b) Explain the procedures of orienting the runway 6M 5 2

*** End ***