

**B.L.D.E.A's V.P.Dr.P.G.HALAKATTI COLLEGE OF ENGINEERING AND
TECHNOLOGY VIJYAPUR 586103**

INDEX FILE 7 & 8th SEMESTER QUESTION PAPERS JAN/FEB 2023

5th, 7TH and 8th SEMESTER

CIVIL DEPARTMENT

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15CV71

Seventh Semester B.E. Degree Examination, Jan./Feb. 2023
Municipal and Industrial Wastewater Engineering

Time: 3 hrs.

Max. Marks: 80

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
 2. Draw neat sketches wherever required.*

Module-1

- 1 a. Discuss the factors affecting sewage flow. (06 Marks)
 b. A 300 mm diameter sewer laid at a gradient of 1 in 150 is flowing full. Check whether the velocity is self cleansing for a Manning's $N = 0.013$. Also calculate the discharge. (06 Marks)
 c. Discuss the advantages and disadvantages of combined system of sewerage. (04 Marks)

OR

- 2 a. Draw a neat sketch of oxidation pond and explain the principle of working. (06 Marks)
 b. Draw a neat sketch of a building layout indicating positions of sanitary fittings and house drainage arrangements. (04 Marks)
 c. Calculate the storm water discharge for the following data for a district:
 20% area with run off coefficient 0.9
 25% area with 0.7, 30% area with 0.45
 15% area with 0.25 and remaining area with 0.05.
 Area of district = 2.4 Hectares
 Maximum intensity of rainfall = 0.25 mm/hr (06 Marks)

Module-2

- 3 a. Design a circular sewer running half full to carry sewage for the following data:
 Population of town = 1,50,000
 Per capita water demand = 135 Lpcd
 Peak flow rate = 2
 Slope of sewer = 1 in 400. Take $n = 0.013$
 Check whether velocity is self cleansing. (06 Marks)
 b. Give the various hydraulic elements or steps followed for a circular sewer design. (04 Marks)
 c. Write an explanatory note on sewage farming. (06 Marks)

OR

- 4 a. Discuss the oxygen sag analysis/curve with a neat sketch. (06 Marks)
 b. Determine the minimum flow in the stream if the final BOD of stream is not to exceed 30 mg/L for the following data:
 Sewage discharge = 1.5 MLD
 BOD of sewage = 100 mg/L
 Stream water BOD = 10 mg/L (06 Marks)
 c. Give the conditions favorable for land selection before sewage disposal. (04 Marks)

Module-3

- 5 a. Draw a neat flow diagram for the treatment of sewage from a city and note the various unit operations and unit processes. (06 Marks)
 b. Explain the working principle of treatment using a trickling filter with a neat sketch. (06 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
 2. Any rev calling of identification, appeal to evaluator and/or equations written e.g. 42+8=50, will be treated as malpractice.

- c. Design a set of circular trickling filter units for treating 5 MLD of sewage.
 BOD of sewage = 150 mg/L, Effective depth = 2 m
 Organic loading = 1500 kg/hectare-mt/day
 Hydraulic loading = 25 million lt/hectares/day (04 Marks)

OR

- 6 a. Explain briefly the Activated sludge process used in the treatment of sewage. (06 Marks)
 b. With a neat sketch explain the working of a Rotating Bio Contactor (RBC). (06 Marks)
 c. Explain briefly mechanism of sludge digestion. (04 Marks)

Module-4

- 7 a. Distinguish between Industrial and Domestic waste water (Three points on each). (06 Marks)
 b. Discuss the various effects of industrial waste water discharges into water bodies. (06 Marks)
 c. Explain the term re-use and recycling of waste water. (04 Marks)

OR

- 8 a. Explain the advantages of combined treatment of waste water. (06 Marks)
 b. Discuss the term stream sampling. (06 Marks)
 c. Give the BIS standards for discharge of sewage and industrial wastes into surface water sources (Any four parameters only). (04 Marks)

Module-5

- 9 a. With a neat flow diagram explain the treatment of Cotton Textile Mill waste. (06 Marks)
 b. With a neat flow diagram indicate the sources of waste from a tannery. (06 Marks)
 c. Give the typical values of characteristics of sugar industrial waste. (04 Marks)

OR

- 10 a. Discuss the cost recovery methods from distillery effluents. (06 Marks)
 b. A dairy discharges streams of high BOD, low BOD and saline effluents. Give the strategy/type of treatment. (06 Marks)
 c. Discuss briefly the use of various industrial wastes as raw materials for other manufacturing processes. (04 Marks)

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15CV72

Seventh Semester B.E. Degree Examination, Jan./Feb. 2023 Design of RCC and Steel Structures

Time: 3 hrs.

Max. Marks: 80

- Note: 1. Answer any TWO questions, choosing ONE full question from each module.
2. Use of IS-456, IS-800, SP(6), steel tables and SP(16) may be permitted.*

Module-1

- 1 Design a cantilever retaining wall to retain earth embankment 4m above the existing ground level. Density of the soil is 18kN/m^3 . Angle of internal friction between soil particles is 30° . Safe bearing capacity of the foundation soil may be taken as 200kN/m^2 . Coefficient of friction between soil and concrete surface is 0.5. The design must include all the necessary checks. Use M20 grade concrete and Fe-415 steel. Write a neat sketch of reinforcement details in stem, Toe and heel slab. (40 Marks)

OR

- 2 Design the portal frame with fixed base for the following details. Spacing of the portal frame is 4m c/c. Centre to centre distance between columns of the frame is 8m. Height of the column measured between top of footing to the axis of the beam is 4m. The thickness of roof slab supported by portal frame is 120mm. Live load acting on the roof is 1.5kN/m^2 . Use M20 grade concrete and Fe-415 steel. Safe bearing capacity of the foundation soil is 150kN/m^2 . The existing ground level is 0.6m above the top surface of the footing. Analyze the portal frame by suitable classical methods and hence design the column, beam and footing with all necessary checks and write a neat sketch reinforcement details. (40 Marks)

Module-2

- 3 Design the top chord, bottom chord, main sling member and support joint of a roof truss with its geometry as shown in Fig.Q.3. The analyzed forces in various members due to dead load, live load and wind load is furnished in Table Q.3. Determine the maximum design forces in the members due to various combination of loads with partial safety factors as per IS-800. Use 18mm diameter bolts of grade 4.6 for all the connections. The cross section dimension of the supporting reinforced concrete columns at the ends are $230\text{mm} \times 300\text{mm}$ with 300mm edge placed parallel to plane of the truss. The design must comprise of all the necessary checks and write a neat sketch of design details. M20 grade concrete is used in the supporting columns.

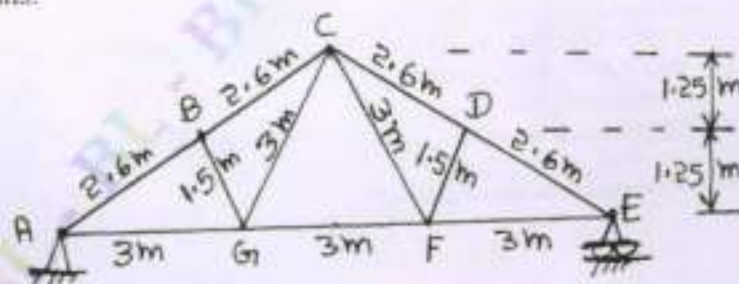


Fig.Q.3

Table Q.3

Members	Dead load forces kN	Live load forces kN	Wind load forces kN
AB, BC, CD, DE	-68.0	-62.5	+181.6
AG, GF, FE	+62.0	+57.0	-152.4
BG, DF, CG, CF	+30.0	+28.4	-73.0

Note: - = Compressive Force

+ = Tensile Force.

(40 Marks)

OR

- 4 Design a welded plate girder with thick web plate without having intermediate transverse stiffeners. Effective span of the girder is 21m and the girder is subjected to uniformly distributed service load of 60kN/m inclusive of its self weight in addition to two concentrated loads of magnitude 500kN each, placed at one third and two third span points. The girder is laterally supported for its entire span. Design the components such as web plate, flange plate and bearing stiffens. Design the joints with continuous fillet weld and all the design process must ensure the necessary safety checks. Write a neat sketch of design details. (40 Marks)

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15CV741

Seventh Semester B.E. Degree Examination, Jan./Feb. 2023 Design of Bridges

Time: 3 hrs.

Max. Marks: 80

- Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Use of IS456, IRC-6, IRC-21, Pigeaud's curves, SP16 and relevant charts are permitted.*

Module-1

- 1 a. Classify bridges on various parameters. (08 Marks)
b. Explain the terms linear waterway and economic span of the bridge. (08 Marks)

OR

- 2 a. What are the forces acting on bridges? (08 Marks)
b. Explain any two methods of computation of discharge. (08 Marks)

Module-2

- 3 Compare the bending moment and SF values considering IRC class AA (tracked) and IRC class A loading with regard to slab bridge for the following data:
Effective span = 6.5 m
Overall depth = 500 mm
W.C. thickness = 80 mm
Road width = 7.5 m
Foot path = 1 m wide (on either side) (16 Marks)

OR

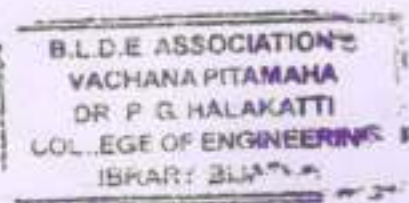
- 4 a. Write a note on Skew bridges. (10 Marks)
b. Explain the terms effective width of dispersion and effective length of dispersion of load. (06 Marks)

Module-3

- 5 The slab panel of an RCC T-beam and slab deck is 2.5m wide between main beams and 4m long between cross girders. Design the slab for IRC class A loading, for the following data:
Slab thickness = 200 mm, W.C. = 80 mm. M_{20} grade concrete and Fe 415 grade steel. (16 Marks)

OR

- 6 Design the cross girder for the following data:
Span of bridge = 14m
Panel size = 3m \times 3.5m
Spacing of main girders = 3m
Width of road way = 7.5m
Slab thickness = 300mm
W.C. thickness = 80 mm
IRC class AA tracked vehicle loading adopt M_{20} grade concrete and Fe415 steel. (16 Marks)



Important Note: 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
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Module-4

- 7 Design a box culvert having inside dimensions of $3\text{m} \times 3\text{m}$. The culvert is subjected to superimposed D.L. of 16 kN/m^2 and L.L. including impact factor of 52 kN/m^2 . Density of soil is 18 kN/m^3 . Angle of repose of soil is 30° . Use M_{25} grade concrete and Fe415 steel. Consider culvert is running full condition. (16 Marks)

OR

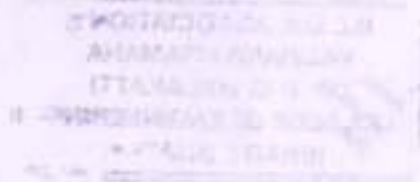
- 8 Design a suitable pipe culvert to carry a discharge of $5\text{ m}^3/\text{s}$. The height of road embankment is 6m . Width of road is 7.5m side slope of embankment is $1.5:1$. The safe velocity is 3 m/s . Class AA tracked vehicle is to be considered as L.L. Take $C_e = 1.5$, $C_s = 0.01$ and unit weight of soil $= 20\text{ kN/m}^3$. (16 Marks)

Module-5

- 9 a. Explain the major types of abutments for bridges. (10 Marks)
b. What are the loads acting on piers? (06 Marks)

OR

- 10 Write short notes on : (08 Marks)
a. Bridge bearings (08 Marks)
b. Expansion joints for bridge decks (08 Marks)



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15CV751

Seventh Semester B.E. Degree Examination, Jan./Feb. 2023 Urban Transportation and Planning

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Define Urbanization and explain causes of Urbanization. (08 Marks)
b. What are the Transportation problems and identify? Explain briefly. (08 Marks)

OR

- 2 a. Define Mass Transportation. What are the advantages and disadvantages of Mass Rapid Transit System? (10 Marks)
b. Differentiate between the Bus Rapid Transit System and Metro Rail System. (06 Marks)

Module-2

- 3 a. Define 'Zone'. Mention the different factors considered in dividing the whole area into zones. (08 Marks)
b. List the different sampling techniques. Explain any two briefly. (08 Marks)

OR

- 4 a. Mention the different types of transport surveys. Explain any one type briefly. (08 Marks)
b. Define Expansion Factor. Explain briefly the accuracy check necessary for the data collection by any survey. (08 Marks)

Module-3

- 5 a. Explain the factors governing trip generation and attraction rates. (08 Marks)
b. What is Category Analysis? Mention the assumptions made in Category Analysis. (08 Marks)

OR

- 6 a. What is Trip Distribution? Explain Growth Factor method in Trip Distribution. (05 Marks)
b. A study area has been divided into four zones A, B, C and D. The results of trip generation analysis and the present trip distribution matrix is included in the following table:

		A	B	C	D
Produced trips	Present	150	90	180	80
	Future	300	170	270	240
Anticipated trips	Present	120	100	150	130
	Future	180	300	300	200

Develop the future distribution of trip matrix using:

(i) Uniform factor method (ii) Average factor method

Present trip distribution matrix is as shown below:

O \ D	D	A	B	C	D
A	40	40	40	30	
B	20	20	30	20	
C	40	30	50	60	
D	20	10	30	20	

(11 Marks)

Module-4

- 7 a. Explain the Gravity Model Method briefly. (08 Marks)
 b. Define Modal Split. Explain in brief the factors affecting Modal Split. (08 Marks)

OR

- 8 a. Explain briefly the Opportunity Model and its types. (06 Marks)
 b. The total trips produced in and attracted to the three Zones A, B and C of a survey area in the design year are tabulated as :

Zone	Trip produced	Trip attracted
A	2000	3000
B	3000	4000
C	4000	2000

It is known that the trips between two Zones are inversely proportional to the second power of the travel time between Zones, which is uniformly 20 min. If the trip interchange between Zones B and C is known to be 600. Calculate the trip interchange between Zones A and B, A and C, B and A, C and B. (10 Marks)

Module-5

- 9 a. Explain briefly the Diversion Curves. (08 Marks)
 b. Explain briefly the All-or-Nothing Assignment. (08 Marks)

OR

- 10 a. Discuss "Selection of Land use Transport Model". (08 Marks)
 b. Write a flowchart of Fundamental Structure of Lowry Model and explain the Principal Components of the Model. (08 Marks)

CBCS SCHEME

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17CV71

Seventh Semester B.E. Degree Examination, Jan./Feb. 2023 Municipal and Industrial Wastewater Engineering

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Describe in brief various types of water carriage system stating advantages and disadvantages of each. (10 Marks)
- b. What do you understand by Dry Weather flow? Discuss in brief various factors affecting the dry weather flow. (10 Marks)

OR

- 2 a. With a neat sketch explain the working of manholes. (10 Marks)
- b. A certain district of city has a projected population of 50000 residing over an area of 40 hectares. Find the design discharge for the sewer line, for the following data:
- i) Rate of water supply = 200 liters per capita per day.
 - ii) Average impermeability co-efficient for the entire area = 0.3
 - iii) Time of concentration = 50 minutes
- The sewer line is to be designed for a flow equivalent to the wet weather flow plus twice the dry weather flow. Use U.S. Ministry of Health formula. Assume that 75% of water supply reaches in sewer as wastewater. (10 Marks)

Module-2

- 3 a. What do you understand by the term Self-Cleaning velocity and limiting velocity in sewers? (10 Marks)
- b. A circular sewer of 1m diameter carries a certain discharge while running full. What will be the depth of flow and the corresponding velocity ratio if the discharge in the sewer is reduced to one fourth the value? Assume that N remains constant at all states of flow. (10 Marks)

OR

- 4 Write short note on :
- a. Oxygen Sag Curve
 - b. Sewage Farming and Sewage Sickness
 - c. Zone of Pollution
 - d. Dilution Factor.



(20 Marks)

Module-3

- 5 a. With neat flow diagram of waste water treatment explain the function of each component. (10 Marks)
- b. Explain the physical and chemical characteristics of sewage. (10 Marks)

OR

- 6 a. With neat sketch explain the working of trickling filter. (10 Marks)
- b. Write a short note on :
- i) Sequential batch reactor
 - ii) Moving bed reactor. (10 Marks)

Module-4

- 7 a. Write the difference between domestic sewage and industrial waste water. (10 Marks)
b. Explain strength reduction and neutralization methods. (10 Marks)

OR

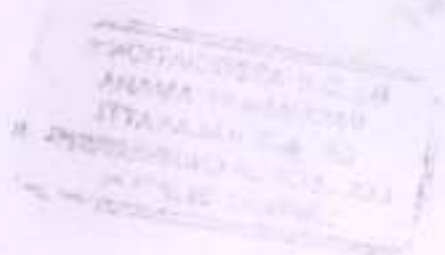
- 8 a. List and explain the ion exchange process in inorganic solid removal techniques. (10 Marks)
b. Explain the merits and demerits of combined treatment. (10 Marks)

Module-5

- 9 a. Explain the source and characteristics of cotton and textile industry. (10 Marks)
b. With neat flow diagram explain distilleries waste water treatment components. (10 Marks)

OR

- 10 a. Write the sources and treatment and cement industry. (10 Marks)
b. Write the characteristics of pharmaceutical industry waste water and explain the flow diagram of pharmaceutical waste water treatment components. (10 Marks)



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Seventh Semester B.E. Degree Examination, Jan./Feb. 2023 Hydrology and Irrigation Engineering

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Define Hydrology. Explain the importance of Hydrology. (06 Marks)
- b. With Engineering representation, explain Hydrologic cycle with processes involved in it. (06 Marks)
- c. A catchment has five raingauge stations. In a year, the annual rainfall recorded by the gauges are 78.8cm, 90.2cm, 98.6cm, 102.4cm and 70.4cm. For a 6% error in the estimation of the rainfall, determine the additional number of gauges needed. (08 Marks)

OR

- 2 a. List the types of precipitation and explain the forms of precipitation. (06 Marks)
- b. Briefly explain with a neat sketch : i) Rainfall Hyetograph ii) Moving average curve iii) Mass curve. (06 Marks)
- c. Define Precipitation. Explain with neat sketch, how its amount is measured using Symon's raingauge. (08 Marks)

Module-2

- 3 a. Define Evaporation and also factors affecting evaporation. (06 Marks)
- b. Describe the estimation of evaporation by using Meyer's and Rohwer's equation. (06 Marks)
- c. Write short notes on :
i) Reservoir Evaporation and control ii) Consumptive use. (08 Marks)

OR

- 4 a. Explain what is Evapo - transpiration and also factors affecting Evapo - transpiration. (06 Marks)
- b. Describe the method of determining infiltration capacity using a double ring infiltrometer. (08 Marks)
- c. Explain the following :
i) Horton's Infiltration equation ii) ϕ - index iii) W - index. (06 Marks)

Module-3

- 5 a. Define Runoff. List and explain the factors affecting it. (10 Marks)
- b. Define Hydrograph. With neat sketch, explain component parts of Hydrograph. (10 Marks)

OR

- 6 a. Find the ordinates of a storm hydrograph resulting from a 3 hour storm with rainfall of 2, 6.75 and 3.75cm during subsequent 3 hours intervals. The ordinates of unit 3 - hour hydrograph are given in the following table :

Hours	03	06	09	12	15	18	21	24	03	06	09	12	15	18	21	24
Ordinates of unit hydrograph (cumecs)	0	110	365	500	390	310	250	235	175	130	95	65	40	22	10	0

Assume an initial loss of 5mm, infiltration index of 2.5mm/hour and base flow of 10 cumecs.

(10 Marks)

- b. The hourly ordinates of a 2 – hour unit hydrograph are given below. Derive a 6 – hours unit hydrograph for the same catchment.

Time (h)	00	01	02	03	04	05	06	07	08	09	10
Discharge (cumecs)	0	1.0	2.7	5.0	8.0	9.8	9.0	7.5	6.3	5.0	4.0

Time (h)	11	12	13	14	15
Discharge (cumecs)	2.9	2.1	1.3	0.5	0.0

(10 Marks)

Module-4

- 7 a. Define Irrigation. Briefly explain the benefits and ill effects of Irrigation. (08 Marks)
 b. Briefly explain with neat sketch, the working and design of Bandhara Irrigation. List its advantages and disadvantages. (12 Marks)

OR

- 8 a. Define Duty, Delta and Base period. Derive the relationship between them. (04 Marks)
 b. Explain the factors affecting the duty of water crops and crop seasons in India. (08 Marks)
 c. An Irrigation canal has gross commanded area of 80,000 hectares out of which 85% is culturable irrigable. The intensity of irrigation for Kharif season is 30% and for Rabi season 60%. Find the discharge required at the head of the canal if the duty at its head is 800 hectares/cumecs for Kharif season and 1700 hectares/cumecs for Rabi season. (08 Marks)

Module-5

- 9 a. Write difference between the Lacey's and Kennedy's theory. (04 Marks)
 b. Define the terms : i) Gross commanded area ii) Culturable commanded area
 iii) Intensity of irrigation iv) Time factor. (08 Marks)
 c. Using Lacey's theory, design an irrigation channel for the following data :
 Discharge $Q = 50$ cumecs ; Silt factor $f = 1$; Side slopes $\frac{1}{2} : 1$. (08 Marks)

OR

- 10 a. Explain the types of canals and alignment of canals. (10 Marks)
 b. Define Reservoir. With a neat sketch, explain Zones of storage in a Reservoir. (10 Marks)

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18CV71

Seventh Semester B.E. Degree Examination, Jan./Feb. 2023
Quantity Surveying and Contract Management

Time: 3 hrs.

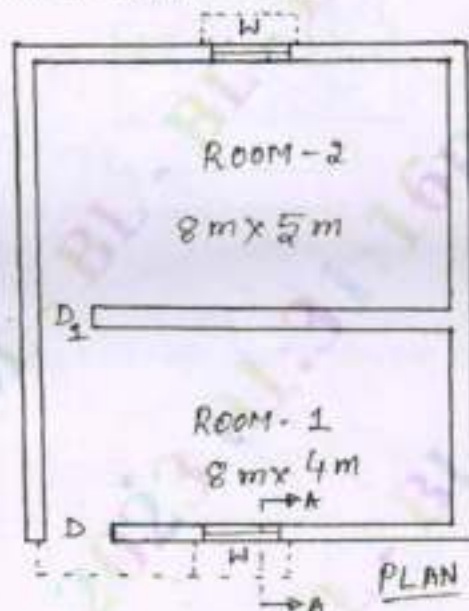
Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

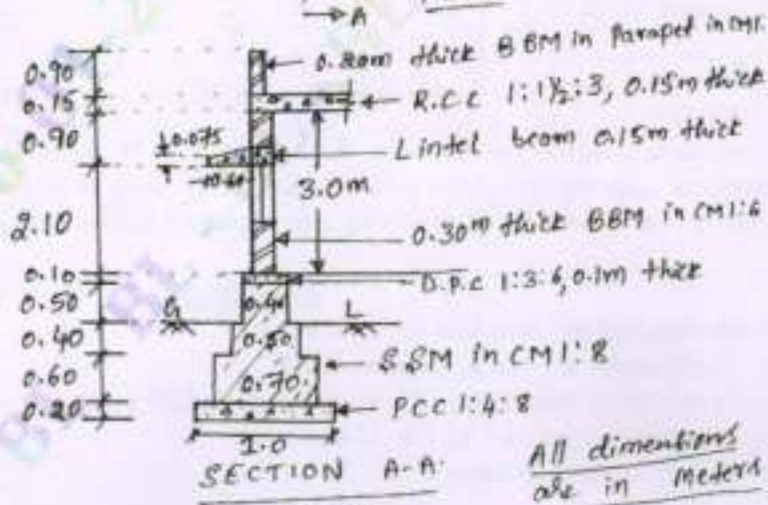
1 The details of the two room building are shown in the Fig.Q1. Estimate the quantities and cost of the following items of works:

- i) Earth work excavation for foundation in ordinary soil at Rs. 390/m³.
- ii) Cement concrete bed 1:4:8 for wall foundations at Rs.3600/m³.
- iii) SSM (Size Stone Masonry) in CM 1:8 for foundation and basement at Rs. 2600/m³.
- iv) First class BBM (Burnt Brick Masonry) work for super structure in CM1:6 at Rs. 5400m³
- v) RCC 1 : 1½ : 3 roof slab at Rs. 4800/m³.



SCHEDULE OF OPENINGS

- D - 1.2 x 2.1
- D₁ - 1.0 x 2.1
- W - 1.0 x 1.2



All dimensions are in meters

Fig.Q1

(20 Marks)

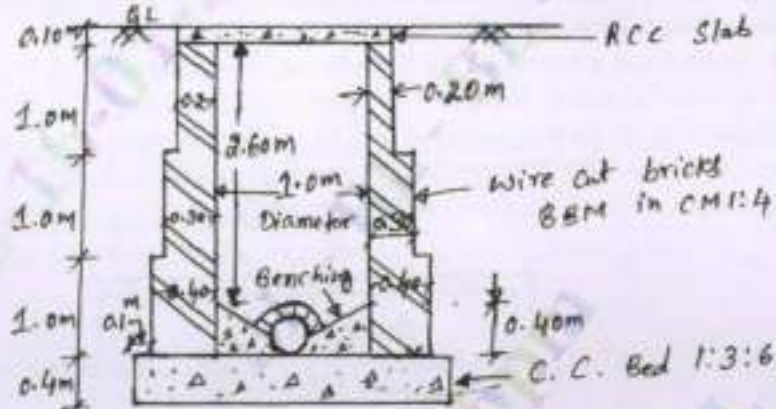
Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8=50, will be treated as malpractice.

OR

- 2 What is an estimate? Explain briefly purpose and different types of estimate (any three). (20 Marks)

Module-2

- 3 The details of manhole is given in Fig.Q3. Estimate the quantities of the following items:
- Earthwork excavation for foundation in hard soil
 - B.B.M in CM 1 : 4 for walls
 - RCC roof slab in C.C 1 : 2 : 4
 - Plastering in CM 1 : 3 for inside walls
 - Bed concrete in CC 1 : 3 : 6.



Manhole Cross Section Details
Fig.Q3

(20 Marks)

OR

- 4 Estimate the quantities and cost of earth work for a portion of the road from the following data:

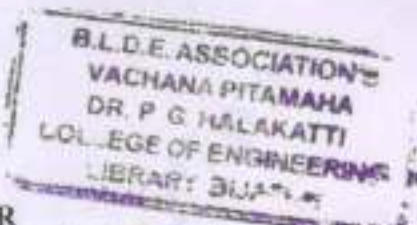
Distance in 'm'	0	100	200	300	400	500	600	700	800	900	1000	1100	1200
R.L. of ground	114.50	114.75	115.25	115.20	116.10	116.85	118.00	118.25	118.10	117.80	117.75	117.90	117.50
R.L. of formation	115	← Upward gradient 1 in 200 →						← Downward gradient 1 in 200 →					

Formation width of road is 10m. Side slope 2 : 1 in banking and 1.5:1 in cutting. Use Mid sectional area method. Cost of earthwork in banking at Rs.300/m³ and cost of earthwork in cutting is at Rs.400/m³. Draw longitudinal profile of the road. (20 Marks)

Module-3

- 5 Write detailed specification for following :
- Earthwork excavation for foundation
 - Burnt brick masonry for super structure in CM 1 : 6.
 - Plastering work in CM 1:6, 12mm thick
 - R.C.C work proportion 1 : 2 : 4.

(20 Marks)



OR

- 6 Workout from the first principles the rate per unit of the following items of works. (20 Marks)
- i) PCC 1 : 4 : 8 for foundation
 - ii) BBM in CM 1:6 for super structure
 - iii) RCC roof slab 1 : 1½ : 3 with 1% steel
 - iv) 12mm thick plastering for inside walls in CM 1 : 6.

Module-4

- 7 List the types of contract. Briefly explain any three types of contract. (20 Marks)

OR

- 8 Write short notes on : (20 Marks)
- a. Tender and its process
 - b. Administrative approval
 - c. Prequalification
 - d. Elements of Standard tender document.

Module-5

- 9 Write short notes on : (20 Marks)
- a. EMD and SD
 - b. Sinking fund
 - c. Suspension of work
 - d. Mobilization and Equipment advance

OR

- 10 What is valuation? Explain briefly purpose and methods of valuation of buildings. (20 Marks)

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Seventh Semester B.E. Degree Examination, Jan./Feb. 2023 Design of RCC and Steel Structures

Time: 3 hrs.

Max. Marks: 100

- Note: 1. Answer any TWO full questions, choosing ONE full question from each module.
2. Use of IS-456, IS-800, SP-16, SP(6) – steel tables are permitted.
3. Assume missing data suitably.*

Module-1

- 1 Design slab and beam type combined footing for two columns of size 300mm × 300mm and 400 × 400mm subjected to 500kN and 700kN respectively. The centre to centre spacing between columns is 3.50m. The width of the footing is restricted to 1.5m. Take SBC of soil = 150kN/m². Use M₂₅ and Fe415 grades. Also show reinforcement in L/S and C/S. (50 Marks)

OR

- 2 Design a cantilever retaining wall to retain an earth embankment 4m high above ground level. The density of earth is 18kN/m³ and its angle of repose is 30°. The embankment is horizontal at top. The S.B.C. of soil is 200kN/m². The coefficient of friction between soil and concrete is 0.5. Adopt M-20 and Fe415 grades. Draw C/S elevation of retaining wall. (50 Marks)

Module-2

- 3 A line diagram of a roof truss with internal loads and forces in each members are shown in Fig.Q.3. Design the various members of the roof truss along with their end connection with bolt using property class 5.6 black bolts. Also design the bearing plate at the support for the reaction and anchor bolts for an uplift force of 15kN. Draw elevation of truss greater than half span. (50 Marks)

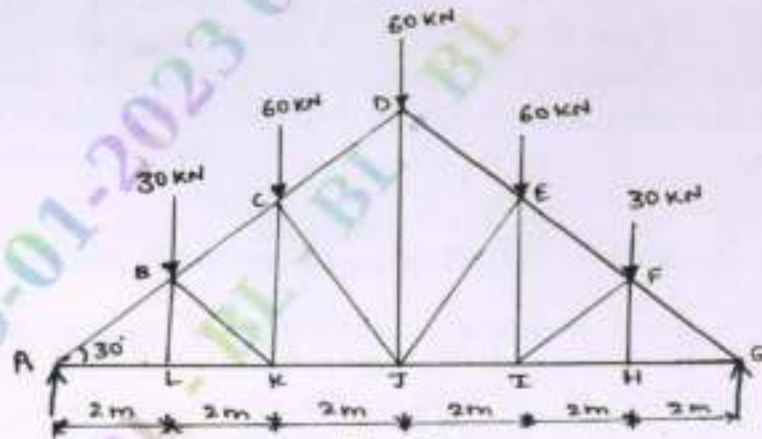


Fig.Q.3

Tabulation of member forces

Members	Length (m)	Force (kN)	Nature of Force
AB, GF	2.31	240.00	Compression
BC, FE	2.31	210.00	Compression
CD, ED	2.31	160.04	Compression
AL, GH	2.00	207.84	Tension
LK, HI	2.00	207.84	Tension
KJ, IJ	2.00	181.82	Tension
BL, FH	1.154	0.00	-
BK, FI	2.31	30.00	Compression
CK, EI	2.31	15	Tension
CJ, EJ	3.05	66.05	Compression
DJ	3.46	66.00	Compression

OR

- 4 Design a simply supported gantry girder to carry an electrically operated travelling crane with the following data:
 Span of crane bridge = 25m
 Column spacing = span of gantry girder = 8m
 Wheel Base = 3.5m
 Crane capacity = 200kN
 Weight of crane bridge = 150kN
 Weight of Trolley = 75kN
 Min Hook Distance = 1.0m
 Weight of Rail = 0.30kN/m
 Height of Rail = 105mm
 Also draw sectional elevation.

(50 Marks)



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18CV732

Seventh Semester B.E. Degree Examination, Jan./Feb. 2023 Air Pollution and Control

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Missing data, if any, may be suitably assumed.

Module-1

- 1 a. Differentiate between Primary and Secondary air pollutants with examples. (08 Marks)
b. Define air pollution and explain the various sources of air pollution. (12 Marks)

OR

- 2 a. Enumerate the effects of air pollution on human health. (08 Marks)
b. Explain Photo Chemical Smog. Explain the chemical reactions involved with hydrocarbons in photochemical smog formation. (12 Marks)

Module-2

- 3 a. Enumerate the meteorological parameters that influence the dispersion of pollutants in atmosphere. Explain briefly. (10 Marks)
b. What is plume behavior? Explain how plume behaves in different atmospheric conditions with neat sketches. (10 Marks)

OR

- 4 a. Describe plume rise with a neat sketch. State the factors affecting plume rise. Enumerate the various formulas used to calculate plume rise. (10 Marks)
b. Find the effective stack height if 40m stack releases SPM at a rate of 1.25gm/sec. The atmospheric pressure is 10.8m of water. The temperature of ambient air and gas are 27°C and 400°C respectively. The stack diameter is 2.3m, stack gas velocity is 6m/sec and wind velocity is 1.8m/sec. (10 Marks)

Module-3

- 5 a. Define the term air quality monitoring and explain the basic considerations to be made in air sampling. (08 Marks)
b. List and explain the principles to be followed to ensure correct sampling. (12 Marks)

OR

- 6 a. Enumerate the objectives of stack sampling. (06 Marks)
b. Describe with a neat sketch the procedure for measurement of suspended particulate matter in ambient air using high volume sampler. (14 Marks)

Module-4

- 7 a. Explain with neat sketch, working of Electro Static Precipitators. (10 Marks)
b. Explain with neat sketch, working of Fabric filters. List some of operating problems. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eq. 42+8 = 50, will be treated as malpractice.

OR

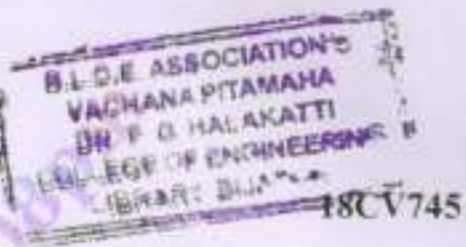
- 8 a. Enumerate the advantages and disadvantages of cyclone separator. (10 Marks)
b. List and explain the factors influencing the Industrial Plant Location. (10 Marks)

Module-5

- 9 a. Explain the types of emissions due to automobiles. (10 Marks)
b. Define Noise pollution. List the sources of noise pollution. List the techniques that can be employed to control noise pollution at source. (10 Marks)

OR

- 10 Write explanatory notes on any four of the following : (20 Marks)
- Acid rain and its effects
 - Bhopal Gas Tragedy
 - Air Quality Standards
 - National Environmental Policy
 - Global Warming
 - Montreal Protocol V/s Kyoto Protocol.



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Seventh Semester B.E. Degree Examination, Jan./Feb. 2023 Urban Transport Planning

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Define Urbanization. List and explain the urban class groups. (06 Marks)
- b. What is Para-transit system and what are the factors influencing Para transit system. (07 Marks)
- c. Compare between Bus and Light Rail system. (07 Marks)

OR

- 2 a. What are the causes of urbanization? (06 Marks)
- b. List and explain the different effects of urbanization. (07 Marks)
- c. Write merits and demerits of Metro and BRTS system. (07 Marks)

Module-2

- 3 a. Define study area. What are the factors to be considered while selecting external cordon line? (06 Marks)
- b. Explain Home interview survey. (07 Marks)
- c. What are the four basic movements for which survey data are required? (07 Marks)

OR

- 4 a. Define Zoning. What are the points to be kept in view when dividing the area into zones? (07 Marks)
- b. Define sampling. (06 Marks)
- c. Explain Road Side Interview Survey. (07 Marks)

Module-3

- 5 a. Explain Trip and its classification. (04 Marks)
- b. What is Multiple Linear Regression Model? What are the assumptions made in MLR analysis? (08 Marks)
- c. Let the trip rate of a zone is explained by the household size done from the field survey. It was found that the household size are 1, 2, 3 & 4. The trip rate of the corresponding household is as shown in below table. Fit a linear equation relating trip rate and household size.

		Household Size (x)			
		1	2	3	4
Trips Per Day (y)	1	1	2	4	6
	2	2	4	5	7
	3	2	3	3	4

(08 Marks)

OR

- 6 a. Explain the factors governing trip generation and attraction. (06 Marks)
- b. What is aggregated and disaggregated analysis? (06 Marks)

- c. Trips originating from zone 1, 2, 3 of a study area are 78, 92 and 82 respectively. Those terminating at zone 1, 2, 3 are given as 78, 96 and 78 respectively. If growth factor is 1.3 and cost matrix is shown below, find the expanded growth trip table.

O/D	1	2	3	O_i
1	20	30	28	78
2	36	32	24	92
3	22	34	26	82
d_j	78	96	78	252

(08 Marks)

Module-4

- 7 a. Explain Gravity model. (04 Marks)
 b. What are the factors affecting Modal Split? (08 Marks)
 c. The total trips produced in and attracted to the three zones A, B and C of a survey area in the design year are tabulated below.

Zone	Trips Produced	Trips attracted
A	2000	3000
B	3000	4000
C	4000	2000

It is known that the trips between two zones are inversely proportional to the second power of the travel time between zones which is uniformly 20 minutes. If the trip interchange between zones B and C is known to be 600. Calculate the trip interchange between A & B, A & C, B & A and C & B. (08 Marks)

OR

- 8 a. Draw the flowchart for modal split carried out after trip distribution. (07 Marks)
 b. Explain opportunity model. (07 Marks)
 c. Explain Desire line diagram with neat sketch. (06 Marks)

Module-5

- 9 a. Explain purpose of trip assignment. (06 Marks)
 b. Explain all-or-nothing assignment. (07 Marks)
 c. What are the difficulties in transport planning for small and medium cities? (07 Marks)

OR

- 10 a. Explain Minimum Path-free. (06 Marks)
 b. What is Lowry Derivative Model? (07 Marks)
 c. Explain Capacity Restraint Techniques. (07 Marks)

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Seventh Semester B.E. Degree Examination, Jan./Feb. 2023 Environmental Protection and Management

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Define 'Environment' and 'Environment Management'. Explain in what way the National Development effects the Environment parameters with an example. (08 Marks)
- b. List various National policies for Environment protection with its year of implementation. Do we have any regulation to deal with e - waste? (06 Marks)
- c. Write a short note on Corporate responsibilities for the Environment Protection. (06 Marks)

OR

- 2 a. Briefly explain 'System Approach' to Environment Management. Does it really help to make 'Sustainable Society'? (06 Marks)
- b. Explain Business strategy drivers and barriers with an illustration. (06 Marks)
- c. Discuss the following : i) Abatement of Pollution ii) Conservation of Resources. (08 Marks)

Module-2

- 3 a. Highlight the importance of "Environmental Management Objectives" for the Society and Industry. (06 Marks)
- b. Distinguish between Mass standard stream standers and Emission standards with examples. (06 Marks)
- c. In the context of Environmental Performance Evaluation (EPE), define the following terms :
i) Closing the loops in Industries ii) Benchmarking. (08 Marks)

OR

- 4 a. Explain Environmental Quality Objectives to meet Environmental goals in an Organisation. (06 Marks)
- b. Write a short note on "Minimum National Standards" and "Environment Performance Indicators". (10 Marks)
- c. Briefly explain the 'Concept of Clean Technology' and 'Zero Discharge Technology' for Environment Protection. (04 Marks)

Module-3

- 5 a. Elaborate 'EMAS' to improve Environmental performance of an Industry. Also mention the process parameters involved. (06 Marks)
- b. Write short notes on :
i) Concept of continual improvement and pollution prevention. (08 Marks)
ii) Training awareness and competence. (06 Marks)
- c. Mention contents of ISO 14001. (06 Marks)

OR

- 6 a. Discuss Environment Management System (EMS) as per ISO 14001 and mention its benefits for Environmental performance. (08 Marks)
- b. Briefly explain about Environmental Management Programs. Does it really help to achieve Environmental Objectives? (06 Marks)
- c. How do you communicate and document Environment Management issues in an Industrial Organisation? (06 Marks)

Module-4

- 7 a. Define 'Environmental Audit' and list its requirements as per ISO 19011. (06 Marks)
- b. Write short note on :
i) Due Diligence Audit ii) Roles and Qualifications of Auditors. (08 Marks)
- c. What do you understand by 'Environmental Non - Conformance'? Suggest corrective and preventive actions to overcome Non - Conformance. (06 Marks)

OR

- 8 a. Explain in brief Environmental performance indicators and their performance evaluation. (10 Marks)
- b. Contents of Environmental Statement - Form V. (06 Marks)
- c. List out objectives of 'Waste Audit'. (04 Marks)

Module-5

- 9 a. Write briefly about the pollution prevention control activities for a Tanning Industry. (06 Marks)
- b. How do you classify and characterize hazardous waste? (07 Marks)
- c. Explain Transboundary movement of pollutants with an example. How to manage this problem? (07 Marks)

OR

- 10 a. Mention Waste Audit procedure for following Industries :
i) Mandya Pulp and Paper Mill ii) Reymond's Textile Ltd. (10 Marks)
- b. What are the safe treatment and disposal methods for Hazardous waste? (10 Marks)

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Eighth Semester B.E. Degree Examination, Jan./Feb. 2023
Quantity Surveying and Contracts Management

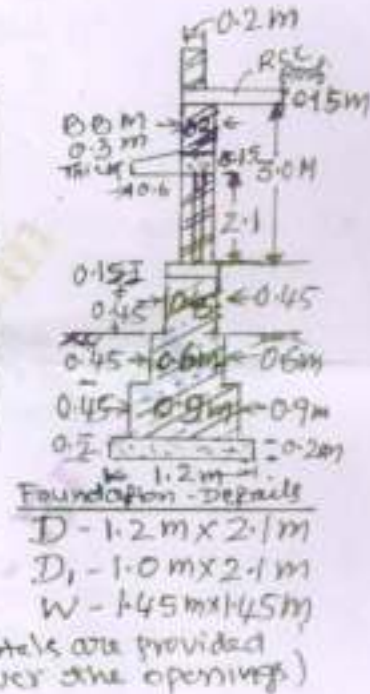
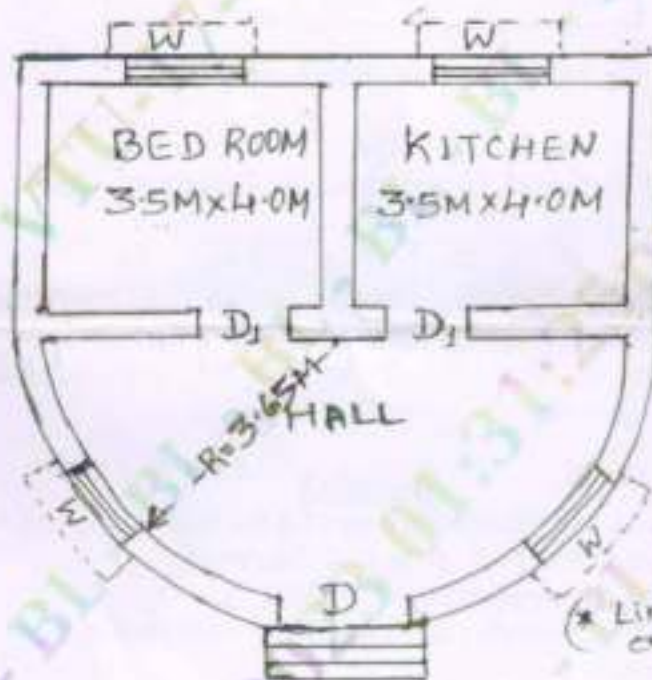
Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 The details of the Residential Building are shown in the Fig. Q1. Estimate the following items of work :
- Earth work Excavation for foundation in soft soils at Rs 350/cum.
 - Size stone masonry (SSM) in CM 1 : 8 for foundation and basement at Rs 2200/cum.
 - 1st class Brick work for super-structure in CM 1 : 6 at Rs 2500/cum.
 - Plastering for ceiling in CM 1 : 3 at Rs 220/SQM.



PLAN - Fig. Q1.

(16 Marks)

OR

- 2 Explain the different types of Estimates used in making of estimate. (16 Marks)

Module-2

- 3 Estimate the quantities of the following items of work for the manhole shown in Fig. Q3.
- Earthwork Excavation for foundation.
 - CC 1 : 3 : 6 for foundation.
 - 1st class bricks in CM 1 : 6 for walls.
 - Cement pointing in CM 1 : 2 for inner face.
 - RCC 1 : 2 : 4 for slab over the manhole.

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8 = 50, will be treated as malpractice.

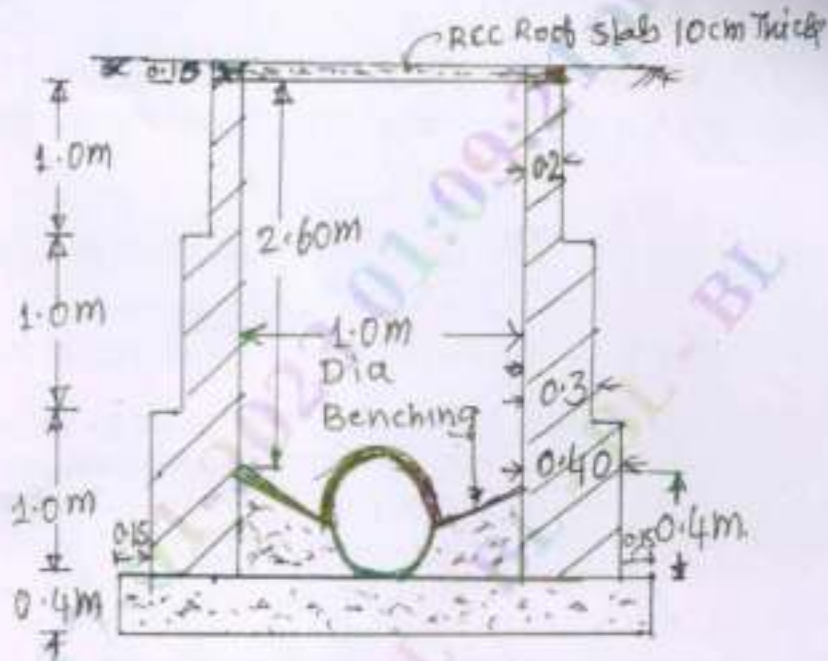


Fig. Q3 Cross – Sectional details

(16 Marks)

OR

- 4 Calculate the Quantity of Earthwork for a road of 12m formation width with the following data using mid sectional area method.

Chainage	80	81	82	83	84	85	86	87	88
RL of Ground	108.6	109.25	109.4	108.85	108.5	107.25	106.8	107.15	107.20

The Road formation level at the chainage 80 is 108.6m at a uniform falling gradient of 1 in 200. Length of one chainage is 30m. Side slopes in cutting is 1.5 : 1 and in banking is 2 : 1. Draw the longitudinal profile of the ground.

(16 Marks)

Module-3

- 5 Write the Civil Engineering specification in detail for the following items of work :
- Plain cement concrete in CC 1 : 3 : 6 for foundation bed.
 - First class Brick work for super structure in CM 1 : 6.
 - Plastering to Burnt Brick Masonry walls in CM 1 : 6 for outside.
 - Painting to wood works.

(16 Marks)

OR

- 6 Workout from First Principles the analysis of rates for the following Civil Engineering works :
- Earthwork Excavation for foundation in ordinary soil.
 - Coursed Rubble stone masonry in CM 1 : 8 for foundation and plinth.
 - R.C.C work in Roof slab in CC 1 : 1.5 : 3. Excluding the cost of steel and centering.
 - White washing 2 coats on a coat of primer to new plaster surface.

(16 Marks)

Module-4

- 7 a. Explain the following terms :
- Administrative approval.
 - Technical sanction
 - Letter of intent.
 - Bid submission.
- b. Mention the elements of standard tender documents.

(08 Marks)

(08 Marks)

OR

- 8 Mention the different types of contract. Explain any four types of contract. (16 Marks)

Module-5

- 9 Explain the following terms :

- i) EMD and SD.
- ii) Suspension of work and Time limit for completion.
- iii) Liquidated Damages and Bonous.
- iv) Escalation and claims.

(16 Marks)

OR

- 10 a. Define Depreciation and explain the different methods of Depreciation. (08 Marks)
b. Define Valuation and briefly explain the different methods of valuation. (08 Marks)

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15CV82

Eighth Semester B.E. Degree Examination, Jan./Feb. 2023 Design of Pre-Stressed Concrete Elements

Time: 3 hrs.

Max. Marks: 80

- Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Use of IS 1343 is permitted.
3. Use of IS 1343-1980 and IS 1343:2012 code books are permitted.
4. Assume any missing data suitably.*

Module-1

- 1 a. Differentiate between pre-tensioning and post tensioning. (08 Marks)
- b. List the advantages and disadvantages of prestressed concrete over RCC. (08 Marks)

OR

- 2 a. Explain (i) Tendon (ii) Concentric tendon (iii) Eccentric tendon (iv) Pressure line. (08 Marks)
- b. A rectangular concrete beam 100mm wide and 250mm deep spanning over 8m. It is prestressed by a straight cable at an eccentricity of 40mm with a prestressing force of 250kN. It carries a live load of 1.2 kN/m. Calculate the resultant stress distribution at the centre of the beam. Take density of concrete as 24 kN/m³. (08 Marks)

Module-2

- 3 a. Explain various losses in prestressed concrete with the equations. (08 Marks)
- b. Find the percentage loss of prestress for the following data [Refer Fig.Q3(b)] :

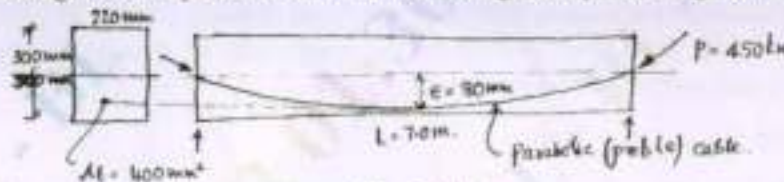


Fig.Q3(b)

$E_{\text{Steel}} = 2.1 \times 10^5 \text{ MPa}$; $E_c = 0.333 \times 10^5 \text{ MPa}$

Creep coefficient = 2 ; Shrinkage strain = 0.0002

Anchorage slip = 1.8mm ; Relaxation of steel = 3%

(08 Marks)

OR

- 4 a. List the factors affecting deflection of PSC beam and explain load-deflection characteristics. (08 Marks)
- b. A PSC beam of Rectangular section is shown in Fig.Q4(b). The cable is straight with eccentricity 50mm. $E_c = 36 \text{ kN/mm}^2$. LL on beam is 4 kN/m. Find the deflection due to prestress, self weight and LL; Take creep coefficient 1.8. Find also long term deflection.

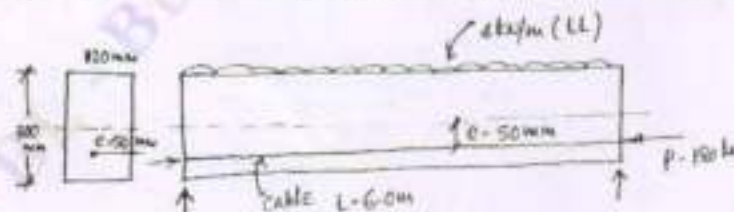


Fig.Q4(b)

(08 Marks)

Module-3

- 5 a. Calculate the ultimate moment capacity of a pre-tensioned section of size $300\text{mm} \times 500\text{mm}$ with an effective cover as 100mm . Take characteristic strength of concrete 42 N/mm^2 and $f_{pu} = 1900\text{ N/mm}^2$ with $A_{ps} = 600\text{mm}^2$. (08 Marks)
- b. Find the ultimate moment of Resistance of T-beam shown in Fig.Q5(b). Area of prestressing steel (A_{ps}) 4700 mm^2 ; $f_{ck} = 40\text{ N/mm}^2$; $f_{pu} = 1600\text{ N/mm}^2$; $d = 1600\text{ mm}$.

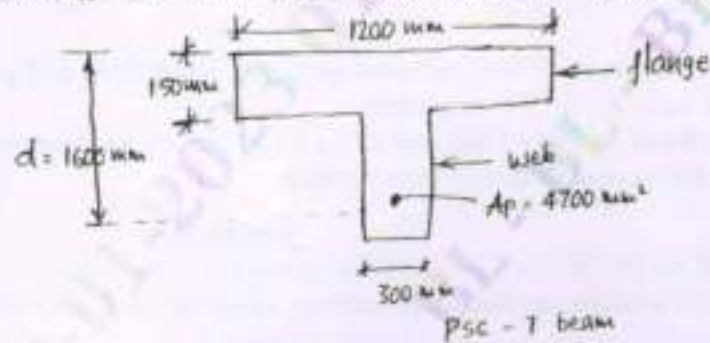


Fig.Q5(b)

(08 Marks)

OR

- 6 a. Explain the modes of flexural failure in PSC beam. (08 Marks)
- b. A pre-tensioned concrete beam of rectangular section subjected to an ultimate bending moment of 100 kN-m . Design the section. $f_{ck} = 50\text{ N/mm}^2$, $f_p = 1600\text{ N/mm}^2$. Assume $b = d/2$ and $x_u/d = 0.5$. (08 Marks)

Module-4

- 7 a. Explain the various shear cracks in PSC beam. (08 Marks)
- b. A PSC beam of span 10m rectangular in cross section 120mm wide and 300mm deep axially pre-stressed by a cable carrying an effective force of 180 kN . Total udl on beam is 5 kN/m (including dead load). Compare the magnitude of principal tension developed in the beam with and without axial prestress. (08 Marks)

OR

- 8 a. What are the different methods to improve the shear resistance of PSC beam? (04 Marks)
- b. A prestressed concrete beam of unsymmetrical section is shown in Fig.Q8(b); the fibre stress distribution diagram 15 N/mm^2 at the top and zero at the bottom. Total vertical shear force is 2500 kN . Compute the principal tension at the centroidal axis at the support. (12 Marks)

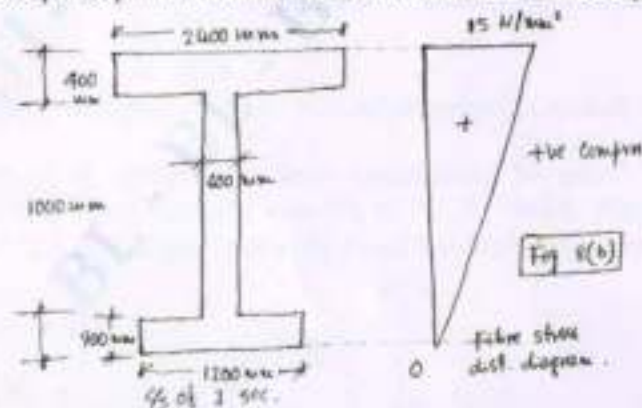


Fig.Q8(b)

(12 Marks)

Module-5

- 9 a. Explain end block and anchorage zone stresses with types of reinforcement. (08 Marks)
b. The end block of a post-tensioned beam (300×300)mm in cross section subjected to concentric anchorage force 900 kN by a circular plate of area 15000 mm². Calculate bursting tension and design anchorage reinforcement, by IS-1343 code provision. (08 Marks)

OR

- 10 a. List the advantages of composite construction. (02 Marks)
b. A pre-cast pretensioned beam 150mm wide and 300mm is prestressed with initial prestressing force of 200 kN located at 50mm from the soffit. The beam is incorporated in composite section by casting a top flange 500mm × 100mm. The composite section supports a live load of 12 kN/m² over span of 6m. Calculate the resultant stress developed in beam and cast-in-situ slab. Take loss ratio (η) = 80%. Assume unproped construction. Take density of concrete 24 kN/m³. Draw the stress distribution diagrams. (14 Marks)

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Eighth Semester B.E. Degree Examination, Jan./Feb. 2023 Pavement Design

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Mention the different layers of Rigid Pavements. Explain the functions of each, with neat sketch. (08 Marks)
- b. Explain the factors that effect design and performance of highway pavement. (08 Marks)

OR

- 2 a. Bring out the points of difference between Highway and Airport Pavements. (08 Marks)
- b. State the assumptions and limitations of Boussinesq's theory. (08 Marks)

Module-2

- 3 a. Calculate design repetitions for 20 year period for various wheel load equivalent to 22.68 kN. Using the following traffic survey data on a four lane road (08 Marks)

Wheel load kN	22.68	27.22	31.75	36.29	40.82	45.36
ADT in both direction CVPD	←		215			→
% of total traffic volume VPD	13.17	15.30	11.36	14.11	6.21	5.84

- b. Explain McLeod method of Pavement design. (08 Marks)

OR

- 4 a. Explain how ESWL is determined by
 - i) Equal Stress Method
 - ii) Equal Deflection Method.(08 Marks)
- b. Design the thickness of Pavement given that CBR of subgrade is 5% , Present traffic is 500 CVPD , Annual rate of growth = 9% , Vehicle damage factor = 2.5% . The design is to be done for intermediate lane. Use chart Q4(b). (08 Marks)

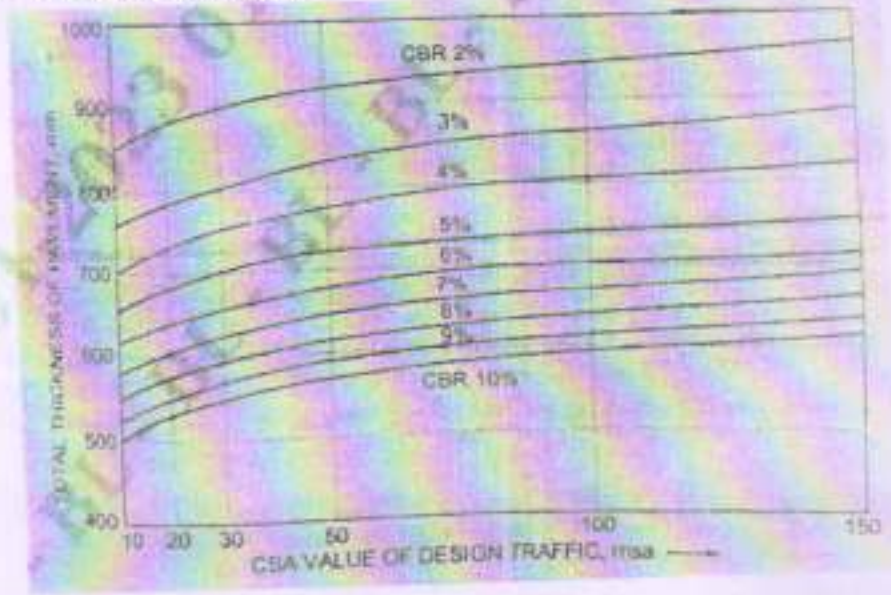


Fig. Q4(b)

Module-3

- 5 a. What are the general causes of Pavement failure? (08 Marks)
- b. With neat sketches, explain the following Pavement failures :
 - i) Alligator cracking
 - ii) Shear failure.(08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written esp. 42+8 = 50, will be treated as malpractice.

OR

- 6 a. Explain the various steps involved in conducting falling weight deflectometer. (08 Marks)
 b. Briefly explain Functional Evaluation of Flexible pavement. (08 Marks)

Module-4

- 7 a. A CC Pavement of 200mm thickness has longitudinal joint at 3.5m and transverse joint at 4.5m. Modulus of subgrade reaction is 0.1 N/mm^3 and Modulus of elasticity of cement concrete is $3 \times 10^4 \text{ N/mm}^2$. Find the wheel load stresses at critical location of the slab due to wheel load of 51kN, with radius of contact area 150 mm. Use Westergaard's equations. (08 Marks)
 b. Explain the process of warping during day and night in CC Pavements. (08 Marks)

OR

- 8 a. Determine warping stresses in a 200mm thick slab with size of $4.6 \text{ m} \times 3.5 \text{ m}$. Temperature difference top and bottom slab = 22°C . Assume $E = 3.5 \times 10^4 \text{ N/mm}^2$, $K = 0.06 \text{ N/mm}^3$, $\mu = 0.15$. Use Fig. Q8(a). (08 Marks)



Fig. Q8(a)

- b. Write short notes on importance of : i) Dowel bars ii) Tie bars. (08 Marks)

Module-5

- 9 a. Explain briefly the importance of reinforcement in slab for rigid pavements. (08 Marks)
 b. Write short notes on : i) Mud Pumping ii) Shrinkage Cracks. (08 Marks)

OR

- 10 a. Explain the necessity of providing i) Expansion joint ii) Longitudinal joint. (08 Marks)
 b. A cement concrete pavement has a thickness of 26cm and lane width of 3.5m. Design the tie bars along the longitudinal joints using the data given below :
 Allowable working stress in steel tie bars, $S_s = 1250 \text{ kg/cm}^2$.
 Unit weight of CC, $W = 2400 \text{ kg/m}^3$.
 Maximum value of friction coefficient, $f = 1.2$.
 Allowable tensile stress in deformed tie bar, $S_t = 2000 \text{ kg/cm}^2$.
 Allowable bond stress in deformed bars, $S_b = 24.6 \text{ kg/cm}^2$. (08 Marks)

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17CV81

Eighth Semester B.E. Degree Examination, Jan./Feb. 2023
Quantity Surveying and Contracts Management

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 Prepare a detailed estimate of a R.C.C. column with foundation footing from the given drawing Fig.Q1.

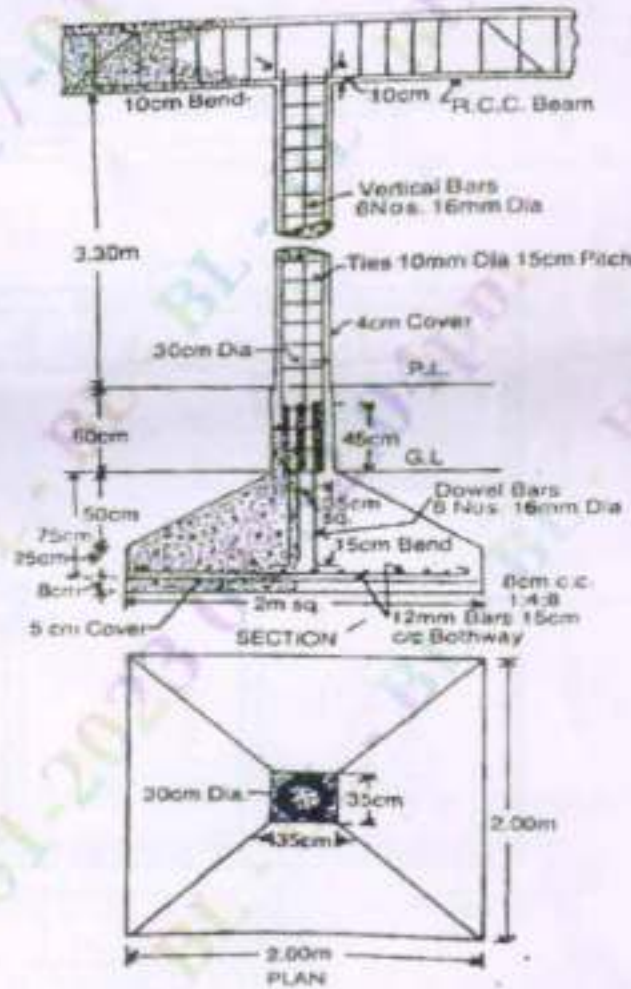


Fig.Q1

Assume rate of cement concrete as Rs.8000/m³ and steel Rs.75/kg.

(20 Marks)

OR

- 2 The details of residential building is shown in Fig.Q2. Estimate the quantities and the cost of the following items of works.
- Earthwork excavation for foundation in ordinary soil @ Rs.300/m³.
 - SSM in foundation and basement in CM 1:6 @ Rs.3000/m³.
 - BBM in superstructure in CM 1:6 @ Rs.7000/m³.

Important Note: 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written e.g. 42+8 = 50, will be treated as malpractice.

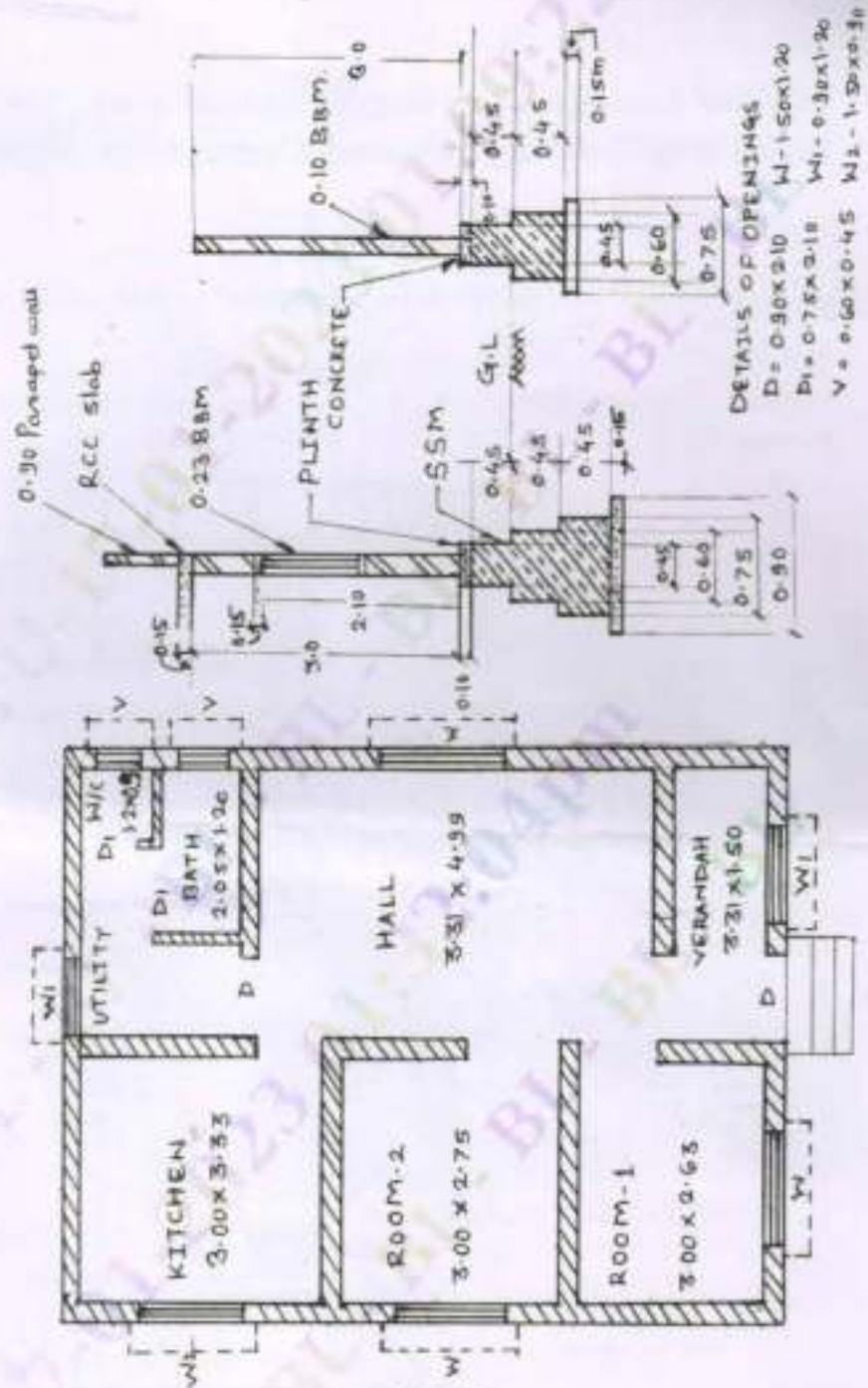


Fig.Q2

(20 Marks)

Module-2

3 The details of septic tank are shown in the Fig.Q3. Estimate the quantities for the following items of work and cost of abstract.

- (i) Earth work in excavation for foundation @ Rs.300/m³.
- (ii) BBM in CM 1:4 for side walls @ Rs.7000/m³.
- (iii) Plastering for internal walls in CM 1:5 @ Rs.200/m².
- (iv) RCC 1: 1½ : 3 for cover slab @ Rs.4000/m².

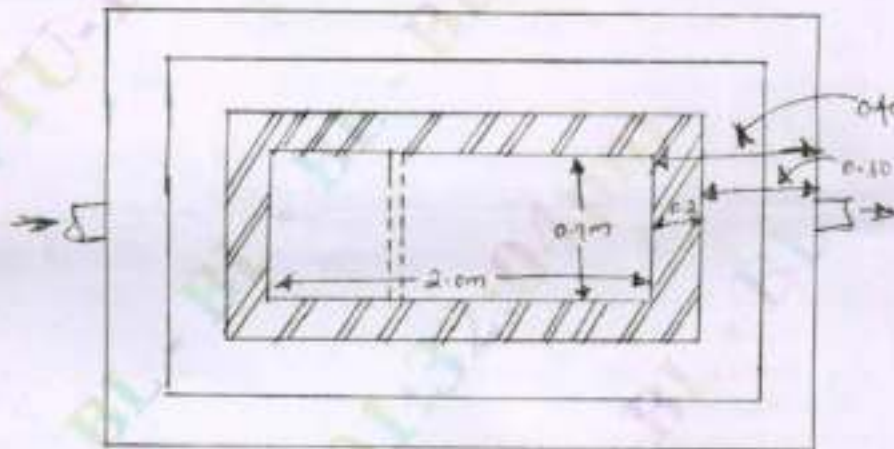
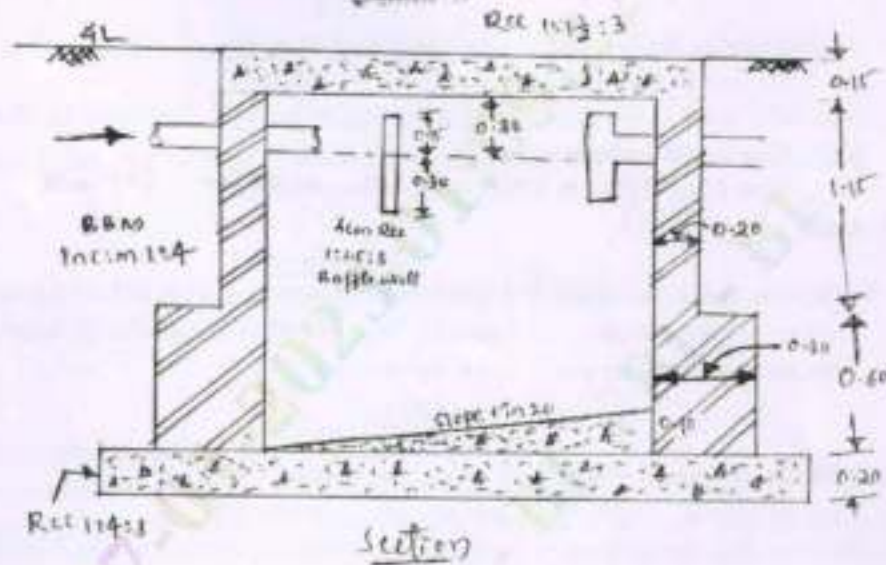


Fig.Q3

(20 Marks)

OR

- 4 Estimate the quantity of earthwork from chainage 20 to 26 measured with a standard 20 m chain from the following data adopting average end area formula.

Chainage (M)	20	21	22	23	24	25	26
Ground level	88.10	87.74	87.80	88.20	90.75	90.20	89.98
				90.40			

The formation level at chainage 20 is 88.50 m and the road has a rising gradient of 1:100. The formation width of the road is 10 m and side slopes in cutting 1:1 and banking 2:1.

(20 Marks)

Module-3

- 5 Write the specification for the following:
- Cement concrete 1:2:4 for roof slab.
 - Damp proof course 2.5 cm in CC 1:1.5:3.
 - Painting on Woodwork.
 - Mosaic or Terrazzo Floor

(20 Marks)

OR

- 6 Analyze rates from first principle for the following:
- (i) 20 mm thick plaster for walls with CM 1:6.
 - (ii) CC 1:1.5:3 for beams with 2% steel.
 - (iii) Random rubble masonry for foundation in CM 1:8.
 - (iv) First class BBM in CM 1:4 for superstructure.
- (20 Marks)

Module-4

- 7 a. What are the advantages and disadvantages of Cost Plus Fixed Fee Contract? (08 Marks)
 b. Define: (i) Quotation (ii) Security Deposit (iii) Work charge establishment (06 Marks)
 c. Explain briefly "The piece work agreement". (06 Marks)

OR

- 8 a. List the elements of standard tender document. (06 Marks)
 b. Explain measurement book and nominal muster roll. (08 Marks)
 c. Discuss the circumstances for termination of contract and laws binded for it. (06 Marks)

Module-5

- 9 a. Define:
- | | | | |
|---------------------|--------------------|------------------------|------------|
| (i) Obsolescence | (ii) Salvage value | (iii) Mortgage | |
| (iv) Years purchase | (v) Annuity | (vi) Capitalised value | (06 Marks) |
- b. Differentiate between market value and book value. (06 Marks)
 c. Describe the factors affecting the value of a property. (08 Marks)

OR

- 10 a. Write short notes on:
- (i) Compensation for delay in completion
 - (ii) Secured Advance Payment
 - (iii) Final Payment
- (12 Marks)
- b. Calculate the value of a property leased on a ground rent of Rs.800 per month. The lease has to run for 15 years. The net Rack rent of the property is Rs.2000 per month. Assume ground rent secured at 6% p.a. for reversionary value, interest @ 8% p.a. (for 6% p.a. assume $YP = 9.712$, for 8% p.a. assume $YP = 8.559$ for 15 years) (08 Marks)

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17CV82

Eighth Semester B.E. Degree Examination, Jan./Feb. 2023
Design of Prestressed Concrete Elements

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Use of ISI343 is permitted.*

Module-1

- 1 a. Distinguish between pretensioning and post tensioning. (05 Marks)
b. What is pressure line or thrust line? Explain its significance with sketches. (05 Marks)
c. A rectangular concrete beam of cross section 120mm wide and 300mm deep is prestressed by a straight cable carrying an effective force of 180kN at an eccentricity of 50mm. The beam supports an imposed load of 3.14kN/m over a span of 6m. If the modulus of rupture of concrete is 5N/mm^2 , evaluate the load factor against cracking assuming the density of concrete as 24kN/m^3 . (10 Marks)

OR

- 2 a. Explain why high strength steel and high strength concrete are used in prestressed concrete. (06 Marks)
b. A rectangular concrete beam, 100mm wide by 250mm deep spanning over 8m is prestressed by a straight cable carrying an effective prestressing force of 250kN located at an eccentricity of 40mm. The beam supports a live load 1.2kN/m.
i) Calculate the resultant stress distribution for the central cross section of the beam. The density of concrete is 24kN/m^3 .
ii) Find the magnitude of prestressing force with an eccentricity of 40mm which can balance the stresses due to dead and live loads at the bottom fibre of the central section of the beam. (14 Marks)

Module-2

- 3 a. List the various types of losses in prestressed concrete members. Explain the types of loss of prestress in post tensioned members only. (06 Marks)
b. In a prestressed pretensioned concrete beam of c/s 200mm \times 300mm and span 6m, with an initial prestressing force of 400kN, at an eccentricity of 70mm by tendons of area 400mm^2 . Assume $E_s = 2 \times 10^5\text{N/mm}^2$ and $E_c = 0.33 \times 10^5\text{N/mm}^2$, creep coefficient is 2, shrinkage coefficient = 0.0002 and relaxation in steel = 3% of initial stress. Find the percentage loss in prestress. (14 Marks)

OR

- 4 a. List the factors influencing deflections of prestressed concrete members. (06 Marks)
b. A post tensioned prestressed concrete beam of span 8m with a rectangular section 300mm wide by 400mm deep is prestressed by a cable containing initial force of 1500kN. If the beam supports a live load of 20kN/m excluding its self weight, compute the initial deflection due to prestress, self weight and live loads for the following cases:
i) The cable profile is straight with a constant eccentricity of 100mm.
ii) The cable profile is parabolic with a dip of 100mm at mid span and concentric at supports. Assume the modulus of elasticity of concrete as 36kN/mm^2 . (14 Marks)

Module-3

- 5 a. Explain the different types of flexural failures observed in prestressed concrete beam. (06 Marks)
- b. A prestressed T-section has a flange width of 300mm and the thickness of the flange is 200mm. The rib is 150mm wide by 350mm deep. The effective depth of the cross section is 500mm. Given $A_p = 200\text{mm}^2$, $f_{ck} = 50\text{N/mm}^2$ and $f_p = 1600\text{N/mm}^2$. Determine the flexural strength of the section. (14 Marks)

OR

- 6 A post tensioned prestressed concrete beam of rectangular section 300mm wide is to be designed to resist a live load moment of 360kNm on a span of 12m. Assuming 10% loss and limiting tensile and compressive stress to 1.5MPa and 18MPa respectively. Calculate the minimum possible depth and the prestressing force and corresponding eccentricity. Take $D_c = 24\text{kN/m}^3$. (20 Marks)

Module-4

- 7 a. Explain the types of shear cracks in structural concrete. (06 Marks)
- b. A concrete beam of rectangular section 200mm wide and 650mm deep is prestressed by a parabolic cable located at an eccentricity of 120mm at mid span and zero at the supports. If the beam has a span of 12m and carries uniformly distributed live load of 4.5kN/m, find the effective force necessary in the cable for zero shear stress at the support section. For this condition, calculate the principal stresses. The density of concrete is 24kN/m^3 . (14 Marks)

OR

- 8 a. Explain different methods of improving shear resistance of PSC members. (05 Marks)
- b. A simply supported beam $120\text{mm} \times 300\text{mm}$ in section having a span of 7m is prestressed with a parabolic cable which has maximum eccentricity of 100mm at mid span and minimum eccentricity of 20mm at support, both below CGC of concrete. Effective prestressing force in the cable is 300kN. The beam carries a Udl of 30kN/m exclusive of self weight. Determine the principal tension at 0.6m from the left support and 20mm above the centroidal axis. Take density of concrete as 24kN/m^3 . (15 Marks)

Module-5

- 9 A precast tension unit of rectangular section of size $100\text{mm} \times 200\text{mm}$ is used as a part of composite beam to a span of 5.0m. This unit is prestressed by a tendons with their centroids coinciding with the bottom kern point. The initial force in the tendon is 150kN. The loss of prestress may be assumed to be 15%. The unit is incorporated as web of a composite beam by casting a slab of flange width of 400mm and thickness of 40mm. On the top of the precast unit with the composite beam supports a live load of 8kN/m. Compute the resultant final stresses developed in the precast and cast in situ concrete assuming the pretensioned unit as propped construction. Draw the resultant stress diagrams. (20 Marks)

OR

- 10 A composite T-girder of span 5m is made up of a pretensioned rib $100\text{mm} \times 200\text{mm}$, with an in situ cast slab 400mm wide and 20mm thick. The rib is prestressed by a parabolic cable having an eccentricity of 33.33mm at centre of span and zero at supports carrying an initial force of 150kN. The loss of prestress may be assumed to be 15%. Check the composite T-beam for the limit state of deflection if it supports an imposed load of 3.2kN/m for
- Unpropped construction
 - Propped construction.
- Assume modulus of elasticity of 35kN/mm^2 for precast beam and in situ cast elements. (20 Marks)

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Eighth Semester B.E. Degree Examination, Jan./Feb. 2023
Design of Pre-Stressed Concrete

Time: 3 hrs.

Max. Marks: 100

- Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Use of IS 1343-1980 is permitted.
3. Assume any data required suitably and indicate.*

Module-1

- 1 a. Define pre-stressed concrete. State its advantages over reinforced concrete. (06 Marks)
b. Explain with a neat sketch "Hoyer Long Line" system of pre-stressing. (06 Marks)
c. Explain the concept of load balancing with different cable profiles. (08 Marks)

OR

- 2 A concrete beam of symmetrical I-section spanning 8 m has the width and thickness of flanges equal to 200 mm and 60 mm respectively. The overall depth of the beam is 400 mm. The thickness of the web is 80 mm. The beam is prestressed by a parabolic cable with an eccentricity of 150 mm at the centre and zero at the supports with an effective force of 100 kN. The live load on the beam is 2 kN/m. Draw the stress distribution diagram at the central section for.
(i) Prestress + Self weight (ii) Prestress + Self weight + Live load.
Take density of concrete as 24 kN/m³. (20 Marks)

Module-2

- 3 a. List the various types of losses in prestressed concrete beams and write the equations used to determine them. (08 Marks)
b. A rectangular beam 200 mm × 400 mm is simply supported over a span of 8 m. The position of the parabolic pre-stressing cable is 80 mm from Soffit at mid span and 125 mm from top at supports of the force in the cable is 400 kN and $f_{ck} = 38 \text{ MPa}$.
Calculate
(i) The deflection at mid span when the beam is supporting self weight.
(ii) The magnitude of the central concentrated load which restores the beam at mid span to the level of supports. (12 Marks)

OR

- 4 a. List the various factors affecting deflection in prestressed concrete beams. (04 Marks)
b. A post tensioned rectangular beam 300 mm × 600 mm in section is pre-stressed with an internal pre-stress of 950 N/mm². There are four straight cables each of area 250 mm². The cables are situated at 125 mm from the soffit. Determine the percentage loss of pre-stress due to concrete. Assume the following:
Shrinkage strain of concrete = 2×10^{-5} ; Modular ratio = 6
Ultimate Creep Strain of concrete = 4×10^{-6} (16 Marks)

Module-3

- 5 A pre-stressed concrete beam rectangular in cross section 200 mm × 500 mm deep is prestressed by tendons having an area of 600 mm² located at 100 mm from the soffit of the beam. Take $f_{ck} = 40 \text{ N/mm}^2$, $f_p = 1600 \text{ N/mm}^2$. Estimate the ultimate flexural strength of the beam for the following cases as per IS code recommendations.
(i) If the beam is pre tensioned.
(ii) If the beam is post tensioned with effective bond. (20 Marks)

1 of 2

OR

- 6 A post tensioned T-section of overall depth 1200 mm having a flange width of 1000 mm and thickness of flange 150 mm, width of rib 200 mm is stressed with four number of 12-7 mm wires. The centre of gravity of tendons is located at a distance of 150 mm from the soffit of the beam. If $f_{ck} = 40 \text{ N/mm}^2$ and $f_p = 1600 \text{ N/mm}^2$, calculate the flexural strength of the section. (20 Marks)

Module-4

- 7 A concrete beam of rectangular section, 200 mm wide and 650 mm deep is pre-stressed by a parabolic cable located at an eccentricity of 120 mm at mid span and zero at the supports. If the beam has a span of 12 m and carries a uniformly distributed live load of 4.5 kN/m, find the effective force necessary in the cable for zero shear stress at support section. For this condition, calculate the principal stresses. Take density of concrete as 24 kN/m^3 . (20 Marks)

OR

- 8 A PSC beam of span 8 m is stressed with parabolic cable of eccentricity $e = 20 \text{ mm}$ above cge at ends and 120 mm below cge at centre. The pre stress is 600 kN. The total load on the beam is 30000 N/m. The cross-section consists of flanges $300 \text{ mm} \times 60 \text{ mm}$ and web $400 \text{ mm} \times 80 \text{ mm}$. Design a suitable shear reinforcement near the support section. Assume M_{30} cement concrete. (20 Marks)

Module-5

- 9 The end section of an I-beam is thickened to a rectangular section 600 mm wide and 300 mm wide and 1200 mm deep for a length of 1200 mm from end and is provided with 3 nos. of cables, each consisting of 120 mm diameter anchorage cone. The cables are placed as shown in Fig. Q9, and effective prestress in each case is 450000 N. Design the end anchorage by the empirical method advocated by cement and Congress association. Assume tensile stress in mild steel as 140 N/mm^2 . (20 Marks)

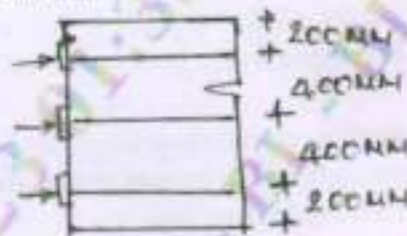


Fig. Q9

OR

- 10 a. The end block of a post tensioned beam 80 mm wide and 160 mm deep. A pre-stressing wire 7 mm diameter, stressed to 1200 N/mm^2 has to be anchored against the end block at the centre. The anchorage plate is $50 \text{ mm} \times 50 \text{ mm}$. The wire bears on the plate through a female cone of 20 mm diameter. Given, the permissible stress in concrete at transfer $f_{ct} = 20 \text{ N/mm}^2$ and the permissible shear stress in steel as 94.5 N/mm^2 . Determine the thickness of the anchorage plate. (10 Marks)
- b. The end block of a prestressed concrete beam 200 mm wide and 300 mm deep, has two Freyssinet anchorages of 100 mm diameter with their centres at 75 mm from the top and bottom of the beam. The force transmitted by each anchorage being 200 kN. Estimate the maximum tensile stress and the bursting tension developed. (10 Marks)

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Fifth Semester B.E. Degree Examination, Jan./Feb. 2023
Construction Management and Entrepreneurship

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Define Management. Explain the characteristics of management. (10 Marks)
 b. What are the functions of management? (10 Marks)

OR

- 2 a. Explain in detail construction project formulation. (10 Marks)
 b. Define Grant chart. (04 Marks)
 c. Explain with example concept of activity on arrow and activity on node. (06 Marks)

Module-2

- 3 a. Write short note on class of labour. (10 Marks)
 b. Describe wages and statutory requirement applicable to construction industry. (10 Marks)

OR

- 4 a. How construction equipment classified according to function. (10 Marks)
 b. Discuss the Material Management Functions and Inventory Management. (10 Marks)

Module-3

- 5 a. Define Quality in Construction. Explain about Total Quality Management. (10 Marks)
 b. Describe importance of safety in construction with examples. (10 Marks)

OR

- 6 a. Define the following :
 (i) Ethics (ii) Morals (iii) Values and Integrity (10 Marks)
 b. Explain Professional Duties and Professional and Individual Rights. (10 Marks)

Module-4

- 7 a. Explain the principles of Engineering Economics. (10 Marks)
 b. Explain problem solving and decision making in engineering economics. (10 Marks)

OR

- 8 a. Explain in brief with interest formula for different type of
 (i) Single payment (ii) Equal payment (iii) Uniform gradient series. (10 Marks)
 b. A company has to replace a present facility after 10 years at an outlay of Rs.500000=00. It plans to deposit an equal amount at the end of every year for the next 10 years at an interest rate of 15% compounded annually. Find the equivalent amount that must be deposited at the end of every year for the next 10 years. (10 Marks)

Module-5

- 9 a. Define Micro, Small and Medium Enterprises (MSME). What are the characteristics of MSME? (10 Marks)
 b. What is Entrepreneurship Development? Explain in brief. (10 Marks)

OR

- 10 a. Write a short notes on Role and Functions performed with respect to entrepreneurship:
 (i) KIADB (ii) TECSOK (iii) SIDBI (iv) DIC (10 Marks)
 b. What is project report? List salient features of Project Report. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
 2. Any revealing of identification, appeal to evaluator and/or equations written e.g. 42+8 = 50, will be treated as malpractice.

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Fifth Semester B.E. Degree Examination, Jan./Feb. 2023 Analysis of Indeterminate Structures

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 Analyze the continuous shown in Fig. Q1 by slope deflection method. Draw BMD, SFD and elastic curve. In the beam joint B sinks by 10 mm. Given $EI = 4000 \text{ KN.m}^2$



Fig. Q1

(20 Marks)

OR

- 2 Analyze the portal frame shown in Fig. Q2 by slope deflection method. Draw BMD and SFD.

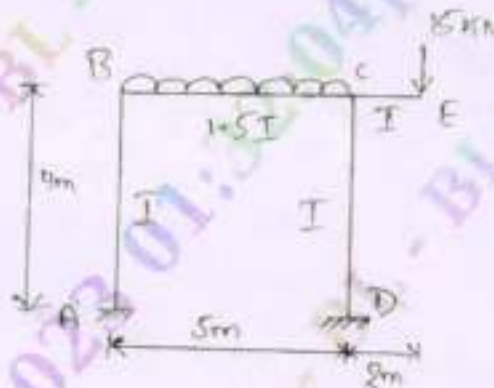


Fig. Q2

(20 Marks)

Module-2

- 3 Analyze the continuous beam shown in Fig. Q3 by moment distribution method, if support B yields by 9 mm. Take $EI = 1 \times 10^{12} \text{ N.mm}^2$ throughout. Draw BMD and SFD.

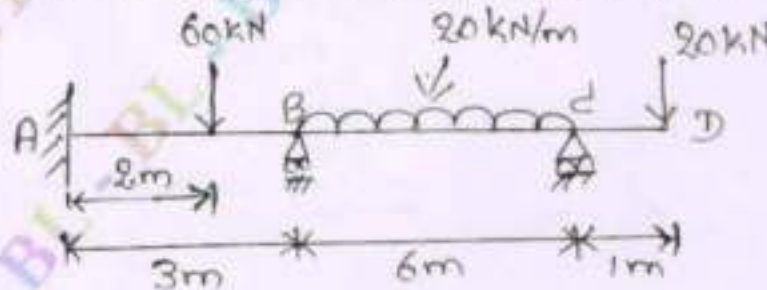


Fig. Q3

(20 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8 = 50, will be treated as malpractice.

OR

- 4 Analyze the frame shown in Fig. Q4 by moment distribution method and draw bending moment diagram.

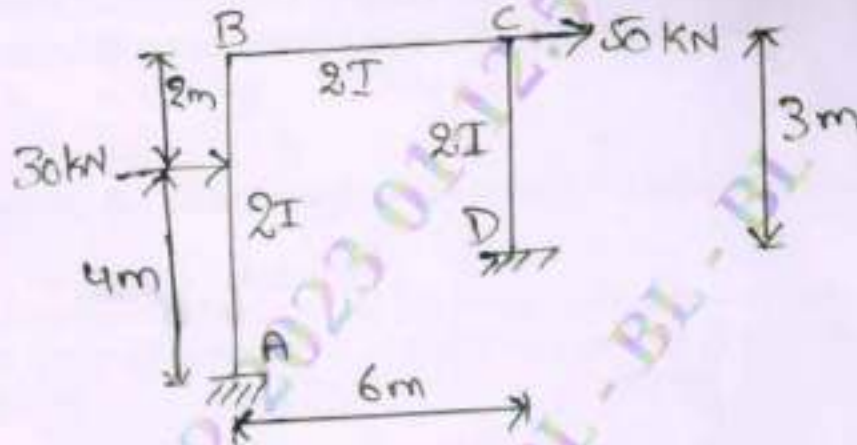


Fig. Q4

(20 Marks)

Module-3

- 5 Analyze the continuous beam shown in Fig. Q5 by Kani's method. Draw BMD and SFD.

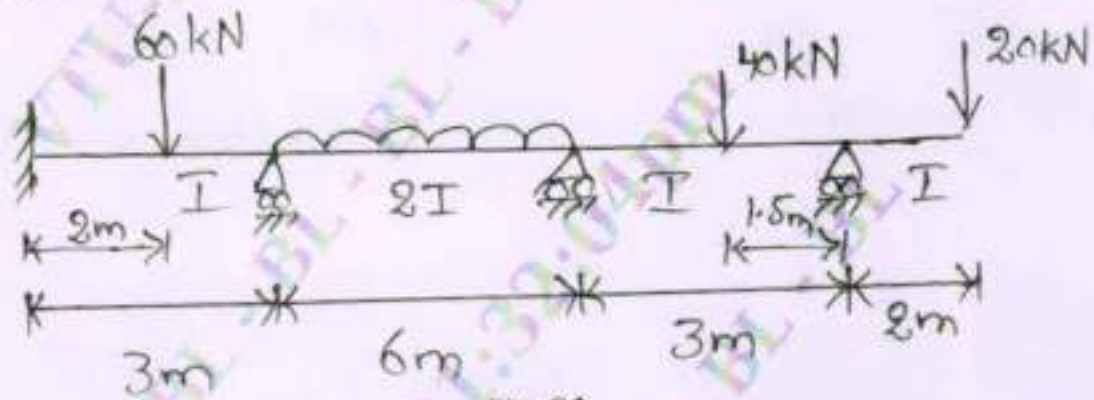


Fig. Q5

(20 Marks)

OR

- 6 Analyze the frame shown in Fig. Q6 by Kani's method. Draw BMD.

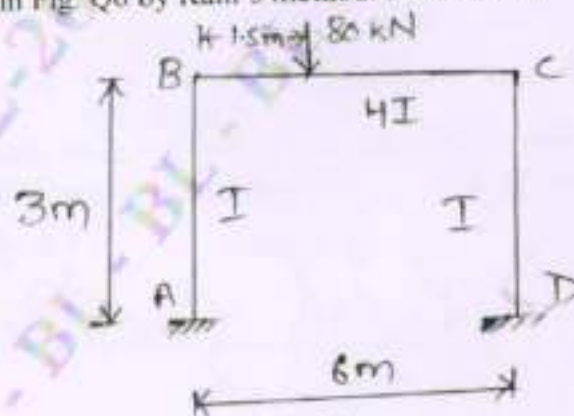


Fig. Q6

(20 Marks)

Module-4

- 7 Analyze the continuous beam shown in Fig. Q7 by flexibility matrix method. Draw BMD.

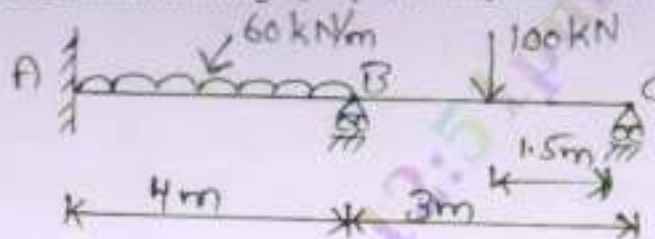


Fig. Q7

(20 Marks)

OR

- 8 Analyze the Pin-jointed truss shown in Fig. Q8. The cross sectional area of each member is 2000 mm^2 . Take $E = 200 \text{ kN/mm}^2$

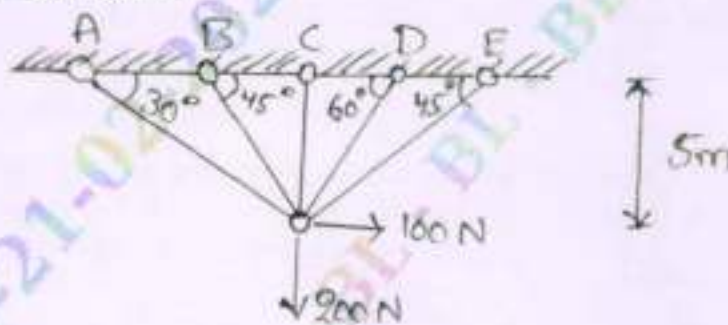


Fig. Q8

(20 Marks)

Module-5

- 9 Analyze the continuous beam shown in Fig. Q9 by stiffness matrix method. Draw BMD.

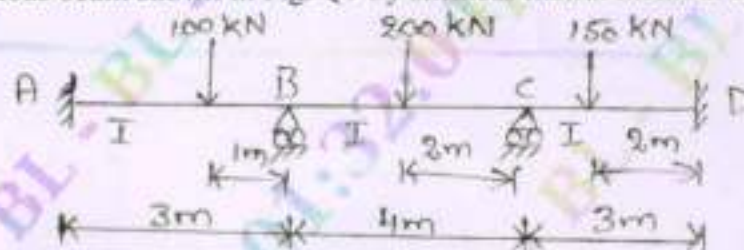


Fig. Q9

(20 Marks)

OR

- 10 Analyze the portal frame shown in Fig. Q10 by stiffness matrix method. Draw BMD.

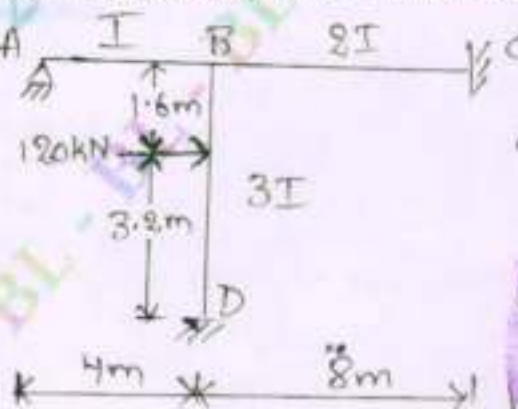


Fig. Q10

(20 Marks)

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Fifth Semester B.E. Degree Examination, Jan./Feb. 2023 Basic Geotechnical Engineering

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1. a. With the help of three phase diagram, define the terms, water content, bulk density, dry density, void ratio, air content, relative density. (08 Marks)
- b. With usual notations prove that $\gamma_d = \frac{(1 - \eta_s) \gamma_{sat}}{1 + \omega G}$. (06 Marks)
- c. The total weight (unit weight) of the glacial outwash soil is 16 kN/m^3 . The specific gravity of soil particles of the soil is 2.67. The water content of the soil is 17%. Calculate Dry unit weight, porosity, void ratio and degree of saturation. (06 Marks)

OR

2. a. What is consistency of soil? Define liquid limit, shrinkage limit, relative consistency and shrinkage ratio. (08 Marks)
- b. Explain soil classification according to BIS classification system. (06 Marks)
- c. Draw the grain size distribution curve and determine the uniformity coefficient and coefficient of curvature of the soil for the following data:

Sieve size (mm)	2.4	1.2	0.6	0.3	0.15	0.075	Pan
Mass of Soil retained (g)	0	5	25	215	225	25	0.5

(06 Marks)

Module-2

3. a. What are the different types of clay minerals commonly found in soils? Explain with their structure. (08 Marks)
- b. Explain soil structure, electrical diffuse double layer and base exchange capacity. (06 Marks)
- c. Explain factors affecting compaction. (06 Marks)

OR

4. a. Differentiate between standard and modified proctor tests. (04 Marks)
- b. Discuss the effect of compaction on different properties of soil. (08 Marks)
- c. The observations of a standard proctor test are given below:

Dry density kN/m^3	16.16	17.06	18.61	18.95	18.78	17.13
Water content (%)	9.02	8.81	11.25	13.05	14.40	19.25

- (i) Plot the compaction curve and determine OMC.
- (ii) Also compute the void ratio and degree of saturation at optimum condition.
Take $G = 2.77$.

(08 Marks)

Module-3

5. a. Discuss various factor affecting permeability of soils. (06 Marks)
- b. Explain quick sand and capillary phenomenon. (06 Marks)
- c. In a falling head permeability test, head causing flow was initially 500 mm and it drops 20 mm in 5 minutes. Calculate the time required for the head to fall to 250 mm. (08 Marks)

OR

- 6 a. What is flow net? Give its characteristics. (06 Marks)
 b. Explain the method of locating the phreatic line in a homogeneous earth dam with filter. (08 Marks)
 c. Explain effective stress, total stress, neutral stress in soil. What is the significance of effective stress? (06 Marks)

Module-4

- 7 a. Explain Mohr Columb failure theory of soil. (04 Marks)
 b. What are the factors affecting the shear strength of soil? (08 Marks)
 c. The stresses on a failure plane in a drained test on a cohesionless soil are as under:
 Normal stress (σ) = 100 kN/m²
 Shear stress (τ) = 40 kN/m²
 Determine the angle of shearing resistance and the angle which the failure plane makes with the major principal stresses. (08 Marks)

OR

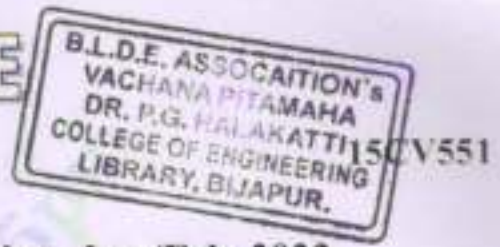
- 8 a. Classify the shear tests based on drainage conditions. How are these drainage condition, realized in the field. (06 Marks)
 b. What are the advantages and disadvantages of direct shear test over triaxial test? (06 Marks)
 c. A shear vane of 75 mm diameter and 110 mm length was used to measure the shear strength of a soft clay. If a torque of 600 N-m was required to shear the soil. Calculate the shear strength, the vane was then rotated rapidly to cause remoulding of the soil, the torque required in the remoulded state was 200 N-m. Determine the sensitivity of the soil. (08 Marks)

Module-5

- 9 a. Differentiate compaction from consolidation. (06 Marks)
 b. Explain mass spring analogy. (06 Marks)
 c. Explain the significance of pre consolidation pressure. Describe the Casagrande method of determining it. (08 Marks)

OR

- 10 a. Explain Pre-consolidated normally consolidated and under consolidated soil. (06 Marks)
 b. Explain curve fitting methods used in consolidation test? Explain any one with neat sketches. (08 Marks)
 c. A bed of compressible clay 4 m thick has pervious sand on the top and impervious rock at the bottom. In a consolidation test on an undisturbed sample of clay from this deposit, 90% settlement was reached in 4 hours, the sample was 20 mm thick. Estimate the time in years for the building founded over this deposit to reach 90% of its final settlement. (06 Marks)



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Fifth Semester B.E. Degree Examination, Jan./Feb. 2023 Air Pollution and Control

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Briefly explain primary and secondary pollutant with example. (08 Marks)
- b. Explain the various effects of air pollution on human beings. (08 Marks)

OR

- 2 a. Briefly explain photo-chemical smog and coal induced smog. (08 Marks)
- b. Enumerate the effect of air pollution on materials and plants. (08 Marks)

Module-2

- 3 a. List the meteorological parameter that influence the dispersion of pollutants in atmosphere. (08 Marks)
- b. Briefly explain: i) Wind rose diagram ii) Estimation of stack height. (08 Marks)

OR

- 4 a. With the help of neat sketch explain different types of plumes depending upon their environmental condition (any four). (08 Marks)
- b. With usual notations, explain Gaussian dispersion model. (08 Marks)

Module-3

- 5 a. List methods of sampling suspended particulate matter. Explain any one method in detail sketch. (08 Marks)
- b. Mention different chemical methods for analysis of air pollutant. Explain any one method in brief. (08 Marks)

OR

- 6 a. With neat sketch, describe the methods of gaseous sampling by sample train. (08 Marks)
- b. Enumerate the various method for analysis of air sample by instrumental method. Explain any one method to analysis SO_x. (08 Marks)

Module-4

- 7 a. Explain with a neat sketch the principle and working of fabric filter. Give the application. (08 Marks)
- b. What are the advantages and disadvantages of electrostatic precipitator? (08 Marks)

OR

- 8 a. With a neat sketch, explain the principle construction and working of a cyclone separator. (08 Marks)
- b. What are the advantages and disadvantages of venture scrubbers? (08 Marks)

Module-5

- 9 a. Define Noise. Discuss various sources of Noise. (08 Marks)
- b. Briefly explain control methods of automobile pollution. (08 Marks)

OR

- 10 a. Briefly discuss the various controlling methods of Noise pollution. (08 Marks)
- b. Briefly discuss the any two global episodes due to air pollution. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written e.g. 42+8 = 50, will be treated as malpractice.

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Question Paper Version : A

Fifth Semester B.E Degree Examination, Jan./Feb. 2023

Environmental Studies

(COMMON TO ALL BRANCHES)

Time: 2 hrs.]

[Max. Marks: 100

INSTRUCTIONS TO THE CANDIDATES

1. Answer all the **hundred** questions, each question carries one mark.
2. Use only **Black ball point pen** for writing / darkening the circles.
3. **For each question, after selecting your answer, darken the appropriate circle corresponding to the same question number on the OMR sheet.**
4. Darkening two circles for the same question makes the answer invalid.
5. **Damaging/overwriting, using whiteners** on the **OMR** sheets are strictly prohibited.

-
1. Which of the following is a possible producer in an ecosystem?
 a) Animal b) Plants c) Human beings d) Fish
 2. The largest reservoir of nitrogen in our planet is
 a) Oceans b) Biosphere c) Atmosphere d) Rivers
 3. India has the world's largest share of which of the following
 a) Manganese b) Mica c) Copper d) Diamond
 4. Identify the non renewable source of energy from the following:
 a) Coal b) Fuel cells c) Wind power d) Wave power
 5. Which of the following terminologies is not associated with the vertical structure of forest?
 a) Canopy b) Understory c) Forest floor d) First floor
 6. Which of the following is cause of class of biodiversity?
 a) Habitat degradation b) Invasion of non-native species
 c) Pollution d) All of these
 7. Air pollution from automobiles can be controlled by fitting
 a) Electrostatic precipitator b) Cyclone separator
 c) Wet collector d) Catalytic converter
 8. When the solid waste consists of large amount of organic matter and if the moisture content is high, which of the following methods of treatment will be ideal?
 a) Composting b) Palletizing
 c) Incineration d) Recycling

9. Chernobyl Nuclear Disaster occurred in the year
 a) 1984 b) 1985 e) 1986 d) 1987
10. The primary cause of acid rain around the world is
 a) Carbon dioxide b) Sulphur dioxide
 c) Carbon monoxide d) Ozone
11. World Environmental day is held every year on
 a) June 5th b) October 2nd c) April 22nd d) November 1st
12. Ozone layer thickness is measured in _____
 a) mm b) cm c) Dobson unit d) Db
13. First of the major environmental protection acts to be promulgated in India was
 a) The Water Act b) The Air Act
 c) The Environment Act d) Noise Pollution Rules
14. Blue baby syndrome is caused due to _____
 a) Manganese b) Ozone c) Silver d) Nitrate
15. World Earth's day is annually celebrated on
 a) April 22nd b) June 5th c) January 1st d) May 1st
16. The most important fuel used by nuclear power plant is
 a) U-235 b) U-238 c) U-245 d) U-248
17. Which of the following is a biotic component of ecosystem?
 a) Fungi b) Solar light
 c) Temperature d) Humidity
18. Abiotic component includes
 a) Soil b) Temperature
 c) Water d) All of these
19. The word "Environment" is derived from
 a) Greek b) French
 c) Spanish d) English
20. Which of the following is absorbed by green plants from the atmosphere?
 a) Carbon dioxide b) Water
 c) Nutrients d) All of these
21. Eutrophication is
 a) an improved quality of water in lakes
 b) a process in carbon cycle
 c) the result to accumulation of plant nutrients in water bodies
 d) a water purification technique
22. Primary consumer is
 a) Herbivores b) Carnivores
 c) Macro consumers d) Omnivores

23. Which among the following is a climatic factor?
 a) pressure
 b) humidity
 c) temperature
 d) all of these
24. Biodiversity can be broadly classified into how many types?
 a) 2
 b) 5
 c) 3
 d) 4
25. Hot spot areas have
 a) Low density of biodiversity
 b) Only endangered plants
 c) High density of hot springs
 d) High density of biodiversity
26. About _____ % of the earth's surface is covered by water.
 a) 53%
 b) 19%
 c) 71%
 d) 90%
27. Deforestation means
 a) preservation of forests
 b) destruction of forests
 c) monocrop cultivation
 d) agriculture
28. When did National Disaster Management Authority formed?
 a) 2000
 b) 2005
 c) 2010
 d) 2015
29. Disaster is an event arising out of
 a) result of hazard event
 b) causes of hazard event
 c) causes of disaster event
 d) all of these
30. The scientific study of earthquake is called
 a) seismograph
 b) seismology
 c) both a and b
 d) none of these
31. South Africa is leading exporter of which mineral?
 a) Copper
 b) Diamond
 c) Silver
 d) Gold
32. The word 'sustainable development' came into existence in the year.
 a) 1992
 b) 1978
 c) 1980
 d) 1987
33. The other word of landscaping is
 a) Reduction
 b) Restoration
 c) Removing topsoil
 d) Restore
34. Cloud seeding with silver iodide is based on the
 a) Bergeron process
 b) Collision-coalescence process
 c) Both a and b
 d) None of these
35. Environmental pollution is due to
 a) Rapid urbanization
 b) Deforestation
 c) Afforestation
 d) a and b
36. The liquid waste from bathroom and kitchen is called
 a) Sullage
 b) Domestic sewage
 c) Storm water
 d) Runoff



37. BOD means
 a) Biochemical Oxygen Demand
 b) Chemical oxygen demand
 c) Biophysical Oxygen Demand
 d) All of these
38. Which of the following source is surface water?
 a) Springs
 b) Streams
 c) Deep wells
 d) All of these
39. Which of the following is biodegradable?
 a) Plastics
 b) Domestic sewage
 c) Detergents
 d) a and c
40. Blaring sounds known to cause
 a) Mental distress
 b) High cholesterol
 c) Neurological problems
 d) All of these
41. "Minamata Disease" is caused due to
 a) Lead
 b) Arsenic
 c) Mercury
 d) Cadmium
42. Alternative eco-friendly fuel for automobiles is
 a) Petrol
 b) Diesel
 c) CNG
 d) Kerosene
43. Population explosion will cause
 a) Biodiversity
 b) Stress on ecosystem
 c) More employment
 d) None of these
44. Which of the following is having high population density?
 a) India
 b) China
 c) USA
 d) Western Europe
45. Demography is the study of
 a) Animals behaviour
 b) Population growth
 c) River
 d) None of these
46. Forest are called as _____
 a) Air purifier
 b) Earth's lungs
 c) Oxygen reservoir
 d) CO₂ absorbers
47. Which of the following is the facility that the urban people enjoy?
 a) Better quality of air
 b) Better communication access
 c) Large land at cheap rates
 d) None of these
48. Which of the following is an air pollutant?
 a) Carbon dioxide
 b) Oxygen
 c) Nitrogen
 d) Particulate matter
49. Cyoto toxic and expired drugs are disposed of by
 a) damping
 b) autoclave
 c) incineration
 d) chemical disinfection
50. The colour code of plastic bag for disposing of microbial laboratory culture waste.
 a) Black
 b) Red
 c) Blue
 d) White

51. Which of the following element make e-waste hazardous in nature?
 a) Land
 b) Glass
 c) Plastic
 d) Iron
52. What is the hazardous pollutant released from batteries?
 a) Arsenic
 b) Barium
 c) Cobalt
 d) Cadmium
53. What is the term used for reuse of sewage sludge?
 a) Compost
 b) Solids
 c) Biosolids
 d) Sludge
54. Reduction in brightness of the famous Taj Mahal is due to
 a) Global warming
 b) Air pollution
 c) Ozone depletion
 d) Afforestation
55. E.I.A. can be expanded as
 a) Environment and Industrial Act
 b) Environment of Impact Activities
 c) Environmental Impact Assessment
 d) Environmentally Important Activity
56. Organic Farming is
 a) Farming without using pesticides and chemical fertilizer
 b) Enhances biodiversity
 c) Promotes soil biological activity
 d) All of these
57. Bio-remediation means the removal of contaminants from
 a) Soil
 b) Wastewater
 c) Groundwater
 d) Both soil and ground water
58. Plants use _____ gas for photosynthesis.
 a) Oxygen
 b) Methane
 c) Nitrogen
 d) Carbon dioxide
59. What is the maximum allowable concentration of fluorides in drinking water?
 a) 1.0 mg/l
 b) 1.25 mg/l
 c) 1.50 mg/l
 d) 1.75 mg/l
60. Forest rich area in Karnataka is found in _____.
 a) Western Ghats
 b) Bandipur
 c) Nagarhole
 d) Mangalore
61. Among the fresh water available in the earth the percentage of surface water is about
 a) 50%
 b) 10%
 c) 5%
 d) less than 1%
62. Hepatitis is caused by
 a) Protozoa
 b) Virus
 c) Bacteria
 d) Fungus



63. In India groundwater resources are rich in
 a) Plains of river Kaveri and Krishna
 b) The Deccan plateau
 c) The Gangetic plains
 d) The plains of Netravati and Kapila
64. The required iron content in drinking water as specified by BIS is
 a) 300 mg/l
 b) 30 mg/l
 c) 3 mg/l
 d) 0.30 mg/l
65. Molasses from sugar industry is used to generate
 a) Biodiesel
 b) Hydrogen
 c) Bioethanol
 d) Biomethanol
66. Wind Farms are located in
 a) River basin
 b) Plain area
 c) Hilly area
 d) Valley area
67. Biomass consists of
 a) Lignin
 b) Hemi cellulose
 c) Cellulose
 d) All of these
68. Natural gas contains
 a) Carbon dioxide
 b) Hydrogen
 c) Methane
 d) Nitrogen
69. Anti tobacco day is mentioned on
 a) 31st May
 b) 30th June
 c) 31st July
 d) 31st August
70. Population explosion will cause
 a) Socio-Economic Problems
 b) Food Scarcity
 c) Energy crises
 d) All of these
71. In geosynchronous orbit altitude of the satellite is about
 a) 36,000 kms
 b) 10,000 kms
 c) 50,000 kms
 d) None of these
72. The Air (Prevention and Control of Pollution) Act was enacted in the year.
 a) 1987
 b) 1981
 c) 1991
 d) 1988
73. Kudremukh Iron ore mine, Karnataka was closed due to
 a) River pollution and threat to biodiversity
 b) Land encroachment
 c) Radioactive hazards
 d) Serious health hazard
74. On the eve of Gandhi Jayanthi which andolan was launched by our Honorable Prime Minister
 a) Swadeshi
 b) Sarvashikshana Abhiyana
 c) Suvamagrama
 d) Swach Bharath
75. An international agreement signed in the year 1987, to protect stratospheric ozone is known as
 a) Montreal protocol
 b) Kyoto protocol
 c) Earth summit
 d) None of these

76. The explosion of First Atomic Bomb was done in Hiroshima and Nagasaki in
 a) 1946 b) 1986 c) 1945 d) 1947
77. A dangerous pesticide which has been reported to cause physical deformities to people of Kerala and Karnataka states
 a) Endosulfan b) Fluorides c) DDT d) Dioxygene
78. Visible portion of EMR ranges between
 a) 0.4 - 0.76 μm b) 10.5 - 12.5 μm c) 8.0 - 14.0 μm d) None of these
79. Data representation in Raster data is by
 a) pixel b) points, lines and polygon
 c) latitude and longitude d) none of these
80. In water treatment, alum is used for
 a) softening b) coagulation c) filtration d) disinfection
81. GIS stands for
 a) Geostationary Interact Sector b) Geographical Information System
 c) Geotechnical Information Society d) Geothermal Investigation Site
82. LPG is a mixture of
 a) N_2 and H_2S b) CO_2 and N_2
 c) Propane and butanes d) Methane and CO_2
83. The Tiger Conservation Project was started in
 a) 1973 b) 1975 c) 1981 d) 2000
84. The leader of "Chipko Movement" is
 a) Sunderlal Bahuguna b) Medha Patkar
 c) Vandana Shiva d) Mahatma Gandhi
85. Which of the following is the source of Fly-ash?
 a) Vehicular exhaust b) Sewage
 c) Thermal power plant d) All of these
86. The permissible range of pH for drinking water as per the Indian Standard is
 a) 6 to 9 b) 6.5 to 8.5
 c) 6 to 8.5 d) 6.5 to 7.5
87. Water logging is a phenomena in which,
 a) Water patterns are rotated
 b) Soil root zone becomes saturated due to over irrigation
 c) Erosion of soil
 d) Soil degradation
88. Carbon content is higher in
 a) Living matter b) Soil
 c) Water d) Atmosphere
89. Springs means
 a) Surface water b) Atmosphere water
 c) Both (a) and (b) d) Ground water

90. Bio-remediation means deliberately introducing micro organisms to break pollutants.
a) Soil
b) Waste water
c) Ground water
d) Both soil and groundwater
91. The Karnataka State Pollution Control Board (KSPCB) was established in the year.
a) 1974
b) 1982
c) 1973
d) 1983
92. Which of the following is not a part of the hydrological cycle?
a) Precipitation
b) Infiltration
c) Transpiration
d) Perspiration
93. First International Earth Summit was hold at
a) USA
b) Russia
c) Rio-de-Janerio
d) Johannesburg
94. Which among the following has highest percentage of calorific value?
a) Anthracite
b) Peat
c) Lignite
d) Bituminous coal
95. Nitrogen fixing bacteria exists in
a) Leaf
b) Stem
c) Roots
d) Flower
96. The two major components of ecosystem are
a) Adiabatic and isotropic
b) Ecologic and climatologic
c) Cyclic and biologic
d) Abiotic and biotic
97. Geothermal energy is a
a) Heat energy
b) Wind energy
c) Current energy
d) Solar energy
98. The average life expectancy around the world is currently,
a) Decreasing
b) Increasing
c) Stabilizing
d) Not changing
99. The universal declaration of Human Rights was proclaimed by the UN in the year.
a) 1946
b) 1947
c) 1948
d) 1949
100. The objective of Integrated Child Development Service (ICDS) are
a) Immunization
b) Health check up and referral services
c) Pre-school non formal education
d) All of these

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Fifth Semester B.E. Degree Examination, Jan./Feb. 2023

Municipal Wastewater Engineering

Time: 3 hrs.

Max. Marks: 100

Note : 1. Answer any FIVE full questions, choosing ONE full question from each module.
 2. Assume any missing data.

Module-1

- 1 a. Explain merits, demerits and suitability of Combined system and Separate system of sewerage. (10 Marks)
- b. The following data is available regarding various types of area and the corresponding impermeability factor of a town. Roots 15% , 0.9 , pavements 20% , 0.8 , lawns 40% , 0.15, unpaired 15% , 0.20 , wooded 10% , 0.05. Determine the average co-efficient of runoff if total area of district is 20 hectares , determine the maximum storm water flow for a rainfall intensity of 50mm/hr having a frequency once in 5 years. Use Rational formula. (10 Marks)

OR

- 2 a. What is Sewer Appurtenances? Explain with a neat sketch, components of manhole. (08 Marks)
- b. With a neat sketch, explain various traps of sewer. (08 Marks)
- c. Draw a typical plan showing house drainage connections. (04 Marks)

Module-2

- 3 a. Write a flow diagram, employed for a conventional wastewater treatment plant. Indicate the importance of each unit. (08 Marks)
- b. What is Sampling? Mention the types of Sampling. (04 Marks)
- c. Combined sewer designed to serve area of 60km² with average population of 185 persons/hectare. The total quantity of sewage flow is 350 LPCD. Total storm run – off is 8.33m³/sec. Find the minimum velocity and gradient required to transport coarse sand in sewer of 40cm diameter with sand particles of 1mm diameter. Specific gravity 2.65 , B = 0.04 , f = 0.012 , n = 0.012. (08 Marks)

OR

- 4 a. Explain the various treatment unit operations and process used in waste water. (06 Marks)
- b. Derive an expression showing the nature of BOD reaction using 1 – order kinetics. (08 Marks)
- c. The BOD of a sewage sample incubated for 5 days at 30°C has been found to be 110mg/L. Calculate BOD₅ at 20°C assuming K₍₂₀₎ = 0.1/day. (06 Marks)

Module-3

- 5 a. With a neat sketch, explain the working of screen and skimming tanks. (10 Marks)
- b. What is Grit Chamber and why is it necessary to provide a grit chamber? Explain the configuration of grit chamber with the help of neat sketch. (10 Marks)

OR

- 6 a. Explain the concept of self – purification phenomenon in natural water. (04 Marks)
 b. Define De – oxygenation and Re – oxygenation. With a neat sketch, explain Oxygen sag curve. (06 Marks)
 c. A city discharges 1500 L/sec of sewage into a stream whose minimum rate of flow is 6000L/sec. The temperature of sewage as well as water is 20°C. The 5 day BOD at 20°C for sewage is 200mg/L and that of river water is 1 mg/L. The DO content of the sewage is zero and that the stream is 90% of saturation DO. If the minimum DO to be maintained in the stream is 4.5mg/L find out the degree of sewage treatment required. Assume $K_D = 0.1$, $K_R = 0.3$, Saturation DO @ 20°C as 9.17 mg/L. (10 Marks)

Module-4

- 7 a. Explain with a neat sketch, the working of Trickle filter. (10 Marks)
 b. What is meant by Activated Sludge process? Describe with sketch, the treatment of sewage by activated sludge process. (10 Marks)

OR

- 8 a. Mention the modification of Activated sludge process. Explain any four of them. (10 Marks)
 b. Explain the following :
 i) Rotating Biological Contactors ii) Aerobic and Anaerobic Process. (10 Marks)

Module-5

- 9 a. Explain the Nitrification and De – nitrification process in Advanced Wastewater treatment. (08 Marks)
 b. Explain the following Advance Wastewater Treatment Techniques :
 i) Advance Oxidation Processes ii) Electro Coagulation. (08 Marks)
 c. Explain the need for Advance Waste water Treatment. (04 Marks)

OR

- 10 With a neat sketch, explain the following Low Cost Treatment Techniques :
 a. Septic Tank.
 b. Soak Pits.
 c. Two – pit Latrins.
 d. Eco – toilet. (20 Marks)

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Fifth Semester B.E. Degree Examination, Jan./Feb. 2023

Highway Engineering

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain the different planning surveys to be conducted before finalizing the alignment. (08 Marks)
- b. Mention the Jayakar committee recommendations and its implementations. (08 Marks)
- c. Write a note on NHDP. (04 Marks)

OR

- 2 a. Explain the classification of roads based on function and location. (08 Marks)
- b. Explain the concept behind saturation system of road planning. (04 Marks)
- c. Write a note on (i) IRC (ii) Urban roads. (08 Marks)

Module-2

- 3 a. Define Alignment. Explain the factors controlling alignment. (09 Marks)
- b. What is Reaction Time? Explain the reaction time by using PIEV theory. (05 Marks)
- c. Define super elevation. Explain the attainment of super elevation in the field. (06 Marks)

OR

- 4 a. Explain the different types of gradients used in roadways. (08 Marks)
- b. Write a note on : (i) Shoulder (ii) Camber (iii) Drive way. (09 Marks)
- c. What concept involved in widening of pavement on horizontal curves? (03 Marks)

Module-3

- 5 a. With a neat sketch, explain the functions of component parts of pavement. (10 Marks)
- b. List the tests to be conducted on road aggregates. Explain impact test in detail. (10 Marks)

OR

- 6 a. Explain the desirable properties of subgrade soil. (08 Marks)
- b. Distinguish Tar and Bitumen. (05 Marks)
- c. Explain the desirable properties of road aggregates. (07 Marks)

Module-4

- 7 a. Explain the procedure involved in the preparation of subgrade layer along with quality control tests. (10 Marks)
- b. Mention the procedure followed in WBM layer preparation along with quality control methods. (10 Marks)

OR

- 8 a. Write a note on earthwork in cutting and filling. (10 Marks)
- b. Explain the procedure of concrete roads preparation. Also write the specification of materials used along with quality checks. (10 Marks)

Module-5

- 9 a. With neat sketches, explain the different methods of providing subsurface drainage system. (12 Marks)
b. Write a note on : (i) B-C ratio method (ii) IRR method. (08 Marks)
- OR**
- 10 a. Mention the significance of highway drainage. (06 Marks)
b. Explain about surface drainage system. (06 Marks)
c. Write a note on BOT and BOOT. (08 Marks)
