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

QUESTION PAPERS JUN/JUL 2024

CIVIL ENGINEERING

① 21 VI Sem. CV

CBCS SCHEME

USN | | | | | | | | | | |

21CV61

Sixth Semester B.E. Degree Examination, June/July 2024
Construction Management and Entrepreneurship

Time: 3 hrs. Max. Marks: 100

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

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.

Module-1

1 a. Define Management. Explain the characteristics of Management. **(08 Marks)**

b. Explain the functional areas of Management. **(08 Marks)**

c. Discuss the dependencies in a Gantt chart, with neat sketches. **(04 Marks)**

OR

2 a. With illustration, explain AoA and AoN Network diagrams. **(08 Marks)**

b. A Project consists of the following activities. Draw the network diagram, calculate EST, EFT, LST, LFT, FT and FF. **(08 Marks)**

Activity	10-20	10-30	20-40	30-40	20-50	40-50
Duration (days)	13	12	2	8	15	2

c. What is Work Break down structure? Mention its uses. **(04 Marks)**

Module-2

3 a. What are the factors affecting Labor Productivity in Construction Industry? Briefly explain. **(08 Marks)**

b. Calculate time required to grade and finish 50 kms of road formation with width equal to thrice the width of the motor grader, using six passes of the motor grader with speed for each of the successive two passes as 6 km/h, 8km/h and 10km/h respectively. Assume machine efficiency based on operation skill, machine characteristic and working condition as 80%. **(08 Marks)**

c. Discuss the class of labour in Construction Project. **(04 Marks)**

OR

4 a. Briefly explain the points to be considered for selection of Construction Equipments. **(08 Marks)**

b. A Company has purchased an equipment of Rs 1,50,000 with an estimated life of 10 years. The estimated salvage value of the equipment at the end of its lifetime is Rs 25,000/-. Determine the depreciation charge and book value at the end of various years using the decline balance method of depreciation by assuming 0.2 for K. **(08 Marks)**

c. List out the functions of Materials Management. **(04 Marks)**

Module-3

5 a. Explain the process of Project Quality Management. **(10 Marks)**

b. Explain the safety measures adopted during drilling and blasting. **(10 Marks)**

OR

6 a. Discuss in detail about the cost of Quality in Construction. **(10 Marks)**

b. Explain the types of Conflict of Interest. **(06 Marks)**

c. Discuss the following :

i) Gift and Bribes ii) Whistle Blowing. **(04 Marks)**

Module-4

7 a. What is Engineering Economy? Explain the principles of Engineering Economics. **(08 Marks)**

b. An engineer has two bids for an excavator to be installed in a new building. The detail of the bids for the excavator are as follows :

Bid	Engineer's Estimate		
	Initial Cost (Rs)	Service Life (Years)	Annual Operation Maintenance Cost
Company A	10,50,000	15	60,000
Company B	11,00,000	15	70,500

Determine which bid should be accepted based on the present worth method of comparison assuming 18% interest rate, compounded annually. **(12 Marks)**

OR

8 a. Explain Break Even Analysis. Mention the assumptions of Break Even Analysis. **(08 Marks)**

b. Determine the effective interest rate for a nominal annual rate of 8% that is compounded.
i) Daily ii) Monthly iii) Quarterly iv) Semi annually. **(12 Marks)**

Module-5

9 a. Discuss in detail about the Project report for starting a new venture. **(10 Marks)**

b. Explain the role and significance of Venture Capital. **(10 Marks)**

OR

10 a. Explain different types of feasibility study carried out to start business. **(10 Marks)**

b. What are the different ways to entry into International business? Explain any two ways. **(10 Marks)**

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21CV62

Sixth Semester B.E. Degree Examination, June/July 2024
Concrete Technology

Time: 3 hrs. Max. Marks: 100

Note: ***1. Answer any FIVE full questions, choosing ONE full question from each module.***
2. Use of Code book IS – 10262 – 2019 is permitted.

Module-1

1 a. Explain the constituents of cement with their percentage and their function. **(08 Marks)**

b. List out Bogues compounds C_2S, C_3S, C_3A and C_2AF. Explain their contribution towards gaining of strength of cement. **(08 Marks)**

c. Describe the process of hydration of cement. **(04 Marks)**

OR

2 a. Explain the manufacturing process of cement by dry process along with the flow chart. **(08 Marks)**

b. List the types of cement and briefly explain the properties and application of any four types of cement. **(08 Marks)**

c. Explain the importance of size, shape and texture of aggregate. **(04 Marks)**

Module-2

3 a. Explain the factors affecting the workability of fresh concrete. **(10 Marks)**

b. Mention various stages involved in manufacturing of discuss any three. **(10 Marks)**

OR

4 a. Define workability. How do you measure the workability of the concrete by slump cone apparatus with a neat sketch? **(10 Marks)**

b. Why curing is needed? Explain different methods of curing of concrete in detail. **(10 Marks)**

Module-3

5 a. Define admixture. Briefly explain the classification of admixture. **(10 Marks)**

b. Explain the effect of superplasticizer and accelerators on the properties of fresh and hardened concrete. **(10 Marks)**

OR

6 Design a concrete mix for grade M25

a.	Grade designation	: M25
b.	Type of cement	: OPC 43 grade
c.	Maximum nominal size of aggregate	: 20mm down
d.	Minimum cement content	: $300 kg/m^3$
e.	Water cement ratio	: 0.5
f.	Workability	: 75mm slump
g.	No chemical admixture	
h.	Fine aggregate	: Zone . II
i.	Exposure condition	: Moderate
j.	Method of concrete placing	: Manual
k.	Maximum cement content	: $450 kg/m^3$
l.	Specific gravity of cement	: 3.15
m.	Specific gravity of coarse aggregate	: 2.80
n.	Water absorption of coarse aggregate	: 1%
o.	Free surface moisture	: Nil
p.	Specific gravity of fine aggregate	: 2.65
q.	Water absorption of fine aggregate	: 2%
r.	Free surface moisture	: 2%.

(20 Marks)

Module-4

7 a. Explain the factors influencing the strength of concrete. **(10 Marks)**

b. What is maturity of concrete? Explain its significance in gaining the strength of concrete. **(10 Marks)**

OR

8 a. Explain the factors affecting modulus of elasticity of concrete. **(10 Marks)**

b. Explain flexural strength and split tensile strength lists on concrete. **(10 Marks)**

Module-5

9 a. What is durability of concrete? What are the factors affecting durability of concrete. **(10 Marks)**

b. Define shrinkage and creep of concrete. Discuss about the factors affecting shrinkage of concrete. **(10 Marks)**

OR

10 a. Explain in brief chloride and sulphate attack on concrete and its affect on durability of concrete. **(10 Marks)**

b. Explain the process of carbonation, freezing and thawing in concrete. **(10 Marks)**

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Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Use of IS800-2007, Handbook SPC(Part-1), 1964 is permitted.

Module-1

1 a. Describe briefly advantages and disadvantages of steel structures. **(06 Marks)**
b. State the upper bound, lower bound and uniqueness theorems. **(06 Marks)**
c. Explain the four classes of section as per IS 800:2007. **(08 Marks)**

OR

2 a. Explain the load combinations adopted in the design of steel structures. **(06 Marks)**
b. Determine the shape factor of a 'T' section having a flange width 100 mm and 10 mm thick with a web of 10 mm thick and 150 mm depth. **(08 Marks)**
c. Define : (i) Plastic hinge (ii) Mechanism (iii) Load factor **(06 Marks)**

Module-2

3 a. Explain the various modes of failure of bolted connections with neat sketches. **(06 Marks)**
b. Describe briefly advantages and disadvantages of welded connections. **(06 Marks)**
c. A tie member in a truss girder is $250\text{mm} \times 14\text{mm}$ in size. It is welded to a 10 mm thick gusset plate by a fillet weld. The overlap of the member is 300 mm and the weld size is 6 mm. Determine the design strength of the joint, if the welding is done as shown in Fig. Q3 (c). What is the increase in strength of the joint, if welding is done allround. Assume shop welding. **(08 Marks)**

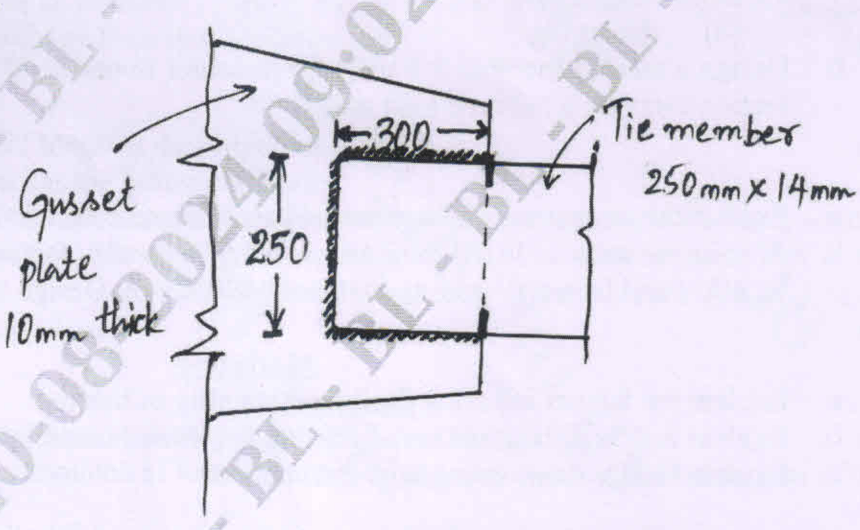

Fig. Q3 (c)

OR

4 a. What are the requirements of an ideal welded joint? **(06 Marks)**

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21CV63

Sixth Semester B.E. Degree Examination, June/July 2024
Design of Steel Structure

Time: 3 hrs. Max. Marks: 100

Note: **1.** ***Answer any FIVE full questions, choosing ONE full question from each module.***
2. ***Use of IS800-2007, Handbook SPC(Part-1), 1964 is permitted.***

Module-1

1 a. Describe briefly advantages and disadvantages of steel structures. **(06 Marks)**
b. State the upper bound, lower bound and uniqueness theorems. **(06 Marks)**
c. Explain the four classes of section as per IS 800:2007. **(08 Marks)**

OR

2 a. Explain the load combinations adopted in the design of steel structures. **(06 Marks)**
b. Determine the shape factor of a 'T' section having a flange width 100 mm and 10 mm thick with a web of 10 mm thick and 150 mm depth. **(08 Marks)**
c. Define : (i) Plastic hinge (ii) Mechanism (iii) Load factor **(06 Marks)**

Module-2

3 a. Explain the various modes of failure of bolted connections with neat sketches. **(06 Marks)**
b. Describe briefly advantages and disadvantages of welded connections. **(06 Marks)**
c. A tie member in a truss girder is 250mm×14mm in size. It is welded to a 10 mm thick gusset plate by a fillet weld. The overlap of the member is 300 mm and the weld size is 6 mm. Determine the design strength of the joint, if the welding is done as shown in Fig. Q3 (c). What is the increase in strength of the joint, if welding is done allround. Assume shop welding. **(08 Marks)**

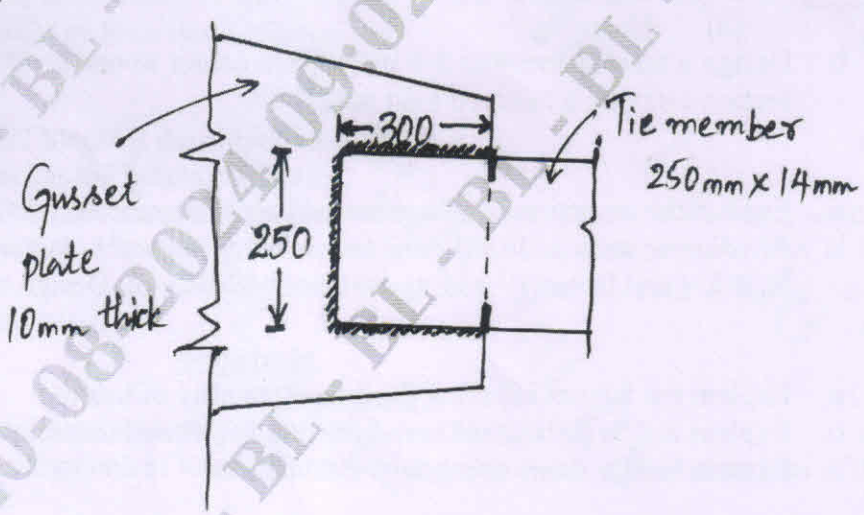

Fig. Q3 (c)

OR

4 a. What are the requirements of an ideal welded joint? **(06 Marks)**

b. Determine the safe load 'P' that can be carried by the joint shown in Fig.4 (b). The bolts used are 20 mm diameter of grade 4.6. The thickness of the flange of I-section is 9.1 mm and that of bracket plate 10 mm. **(14 Marks)**

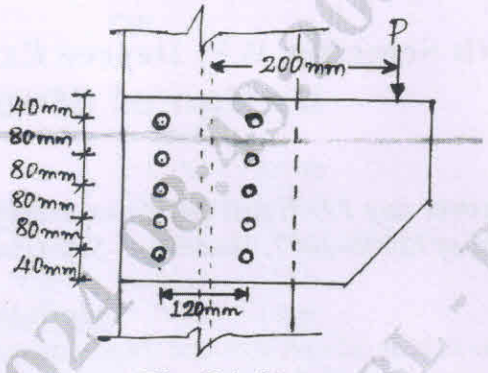

Fig. Q4 (b)

Module-3

5 a. Explain the factors affecting strength of a column. **(06 Marks)**

b. A column 5 m long has to support a factored load of 5000 kN. It is effectively held in position and direction at both ends. Design the column using ISHB400@0.806 kN/m and 20 mm cover plates. (Both the ends are fixed). **(14 Marks)**

OR

6 a. Mention design specifications for battened system as per IS800-2007. **(04 Marks)**

b. Explain the different failure modes of compression members. **(06 Marks)**

c. Design a rolled steel beam section column to carry an axial load of 1000 kN at service condition. The length of column is 4 m. Both ends are hinged. **(10 Marks)**

Module-4

7 a. Explain the following :

(i) Lug angles.

(ii) Shear lag. **(06 Marks)**

b. Design a tension member 3.4 m between center to center of intersection using double angle section carrying a factored load of 700 kN. **(14 Marks)**

OR

8 a. Explain the components of a gusseted base with neat sketch. **(06 Marks)**

b. A column section ISHB350@661.2 N/m carries a factored axial compressive load of 1650 kN and factored bending moment of 90 kN-m. Design the base plate. **(14 Marks)**

Module-5

9 a. Explain the factors affecting the lateral stability of beams. **(08 Marks)**

b. Explain web crippling and web buckling in flexural member with sketches. **(06 Marks)**

c. Explain briefly shear strength of steel beams. **(06 Marks)**

OR

10 a. Explain briefly lateral unsupported beams. **(04 Marks)**

b. A simply supported steel joist of 4.0 m effective span is laterally supported throughout. It carries a total uniformly distributed load of 40 kN. (Inclusive of self weight). Design a suitable steel section of grade Fe410. **(16 Marks)**

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Module-4

7 a. With a neat sketch explain the types of slope failures. **(06 Marks)**

b. What are the causes of slope failure? **(06 Marks)**

c. A 5m deep canal has side slopes of 1 : 1. The properties of soil are $C_u = 20kN/m^2$, $\phi_u = 10°$, $e = 0.8$, $G = 2.8$. If Taylor's stability number is 0.108, determine factor of safety with respect to cohesion when the canal runs full. Also find the same in the case of sudden drawdown if Taylor's stability number $S_n = 0.137$. **(08 Marks)**

OR

8 a. Explain graphical procedure of locating centre of critical slip circle by Fellenious method. **(08 Marks)**

b. An embankment of 6m height has slope of 1V : 2H. The material of the slope has $\phi = 30°$, $C = 5kN/m^2$, $\gamma = 19kN/m^3$. Trial slip circle has radius of 8.8m and its centre is at the same level at the top of the embankment. The slip circle passes through the toe. Find the factor of safety by using the method of slices. **(12 Marks)**

Module-5

9 a. Mention the assumptions of Boussinesq's theory. **(06 Marks)**

b. Define : i) Isobar ii) Pressure bulb. **(04 Marks)**

c. Point loads of 64kN, 15kN and 21kN are 1.5m apart in a straight line at the surface of soil loads on a horizontal plane. 1m below the surface and also half way between them. The vertical stress σ_z due to point load is given by $\sigma_z = \frac{a}{z^2}(I_B)$; where I_B is Boussinesq's influence factor. The value of I_B is as follows :

r/z	0	0.75	1.5	2.25	3
I_B	0.4775	0.1567	0.251	0.053	0.0015

(10 Marks)

OR

10 a. What are the difference between Boussinesq's theory and Westergaard's theory? **(06 Marks)**

b. A water tank is supported by ring foundation. The outer ring is of 10m dia. And the dia of the inter ring is 8m. The intensity of loading on the foundation is $150kN/m^2$. Find the vertical stress at a depth of 5m below the centre of foundation. **(06 Marks)**

c. Explain the procedure of calculatry vertical stress using Network's influence chart. **(08 Marks)**

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21CV653

Sixth Semester B.E. Degree Examination, June/July 2024
Occupational Health and Safety

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. Outline the history and development of OSHA. **(05 Marks)**
b. Write a brief note on National safety policy. **(07 Marks)**
c. Explain the causes of accident in industry. **(08 Marks)**

OR

2 a. Explain the supervisory role in accident investigation. **(10 Marks)**
b. Describe the laws governing OSHA and Right to know. **(10 Marks)**

Module-2

3 a. What is Ergonomics? Discuss the factors considered by Ergonomics to prevent hazard at work place. **(10 Marks)**
b. Discuss the Fault tree Analysis method with some Examples. **(10 Marks)**

OR

4 a. Write a short notes on :
i) Work place envelops
ii) Visual Ergonomics
iii) Ergonomics Standards
iv) Ergonomics programmes. **(10 Marks)**
b. Outline the process of emergency response plan and decision for action. **(10 Marks)**

Module-3

5 a. Define Fire and explain Fire Triangle and how Fire is classified. **(10 Marks)**
b. What are Fire extinguishers? List out various Fire extinguish Techniques and explain Any two methods. **(10 Marks)**

OR

6 a. Define product Safety. Explain the technical Requirements of product safety. **(10 Marks)**
b. Write short notes of the following :
i) Electrical Safety
ii) Early detection of Fire
iii) Fire development and its severity? **(10 Marks)**

Module-4

7 a. State and explain the various modes of transmission of diseases at work place. How preventive measure can be adopted. **(10 Marks)**
b. What are PPE (Personal Protective Equipment) explain the use of PPE for health and safety considerations. **(10 Marks)**

OR

8 a. Discuss the effects of exposure to solid, liquid and Gaseous waste from industries. **(10 Marks)**

b. What is Environment Management Plan (EMP)? Explain the process of EMP for any given project. **(10 Marks)**

Module-5

9 a. Explain the health and safety consideration to be followed in water and waste water treatment plant. **(10 Marks)**

b. Discuss the handling of chemicals in the chemical industry and laboratory. **(10 Marks)**

OR

10 a. Explain the common hazards and occupational health concerns in a R.M.C plants and what are safety precautions. **(10 Marks)**

b. Identify common hazards and occupational health concerns in construction materials manufacturing industries like cement **(10 Marks)**

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D. 18VII Sem. CV

CBCS SCHEME

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18CV71

Seventh Semester B.E. Degree Examination, June/July 2024
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 Prepare a detail estimate for a residential building shown in Fig.Q.1 for the following items of work:

i) Centre line calculations. **(05 Marks)**

ii) Earthwork in excavation for foundation at Rs.150/m^3. **(05 Marks)**

iii) Size stone masonry in C.M 1:6 for foundation and basement at Rs.3250/m^3. **(10 Marks)**

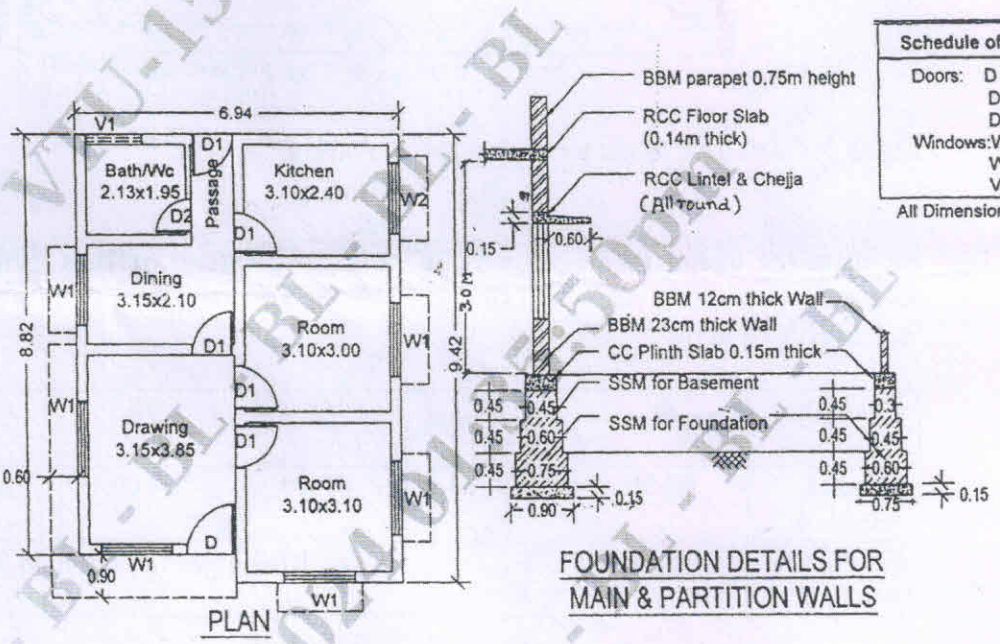

Fig.Q.1

OR

2 Estimate the cost of RCC roof slab in C.C $1:1\frac{1}{2}:3$ over a room of internal dimension 3.2m × 4.2m. Calculate the quantity of concrete and steel reinforcement. Given: Slab thickness = 150mm, Two-way slab steel reinforcement : Main steel = 10mm ϕ @ 150 MMC/C, secondary steel : 8mm ϕ @ 200 MMC/C. Alternate bars cranked at one end only. Cost of concrete = Rs.12000/m^3. Cost of steel bars = Rs.50/kg. **(20 Marks)**

Module-2

3 The details of septic tank is given in Fig.Q.3. Find its quantities of the following items:

i) Earthwork excavation for foundation in hard soil.
ii) P.C.C. 1:4:8 (Bed concrete)
iii) Construction of BBM in CM 1:4 for walls
iv) RCC 1:2:4 for cover slab.

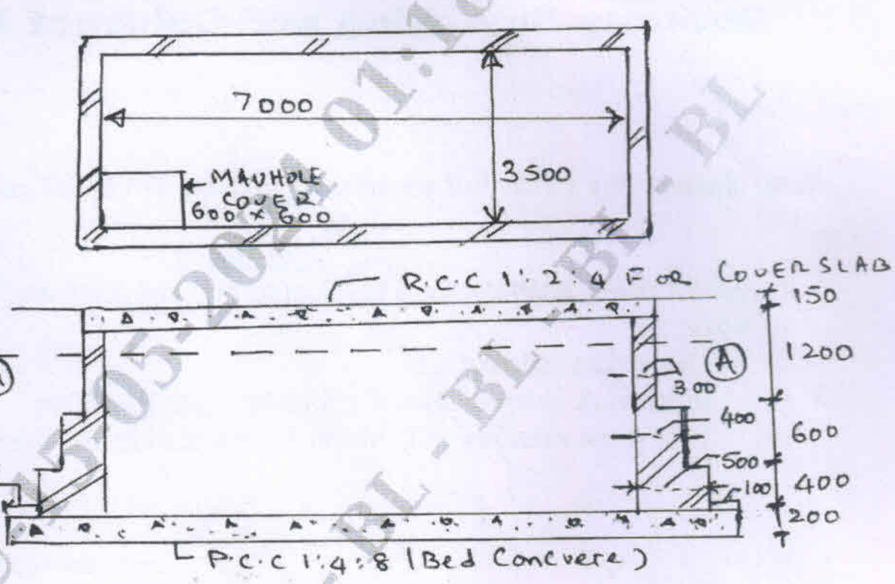

Fig.Q.3: Sketch of septic tank-plan and elevation. **(20 Marks)**

OR

4 Estimate the quantity of earthwork in cutting for a road of 10m formation width with the following data using mean sectional area method or trapezoidal formula method. Side slopes is 2:1 (H:V) and no cross slope.

Chainage (M) :	0	30	60	90	120	150
Ground level :	80.50	79.30	81.40	84.00	85.10	83.50
Formation level :	75.00	← Rising gradient of 1 in 30 →				

(20 Marks)

Module-3

5 a. Mention the objectives of writing specifications. **(05 Marks)**

b. Write the detailed specifications for any three of the following:

i) First class brickwork in super structure in CM 1:6
ii) 12mm thick plastering for inside walls in CM 1:6
iii) RCC work for beam in C.C $\left(1:1\frac{1}{2}:3\right)$
iv) Distempering two coats with a coat of primer. **(15 Marks)**

OR

6 a. Mention the factors affecting rate of item of work. (05 Marks)

b. Workout from first principles the rate per unit for any three of the following:

i) Earthwork excavation for foundation

ii) First class brickwork in super structure in CM 1:6

iii) RCC roof slab C.C $1:1\frac{1}{2}:3$ with 1% steel

iv) 12MM thick plastering for inside walls in CM 1:6. (15 Marks)

Module-4

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

OR

8 Explain the procedure of tendering and award of works in civil engineering projects. (20 Marks)

Module-5

9 Write a note on:

i) Tender notice

ii) Contract document

iii) Breach of contract

iv) Earnest money. (20 Marks)

OR

10 What is Valuation? Explain briefly methods of valuation buildings. (20 Marks)

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CBCS SCHEME

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18CV72

Seventh Semester B.E. Degree Examination, June/July 2024
Design of RCC and Steel Structures

Time: 3 hrs. Max. Marks:100

Note: *1. Answer any ONE full question each from Module-1 and Module-2.*
2. Use of IS – 456, IS – 800, SP – 16, SP(6) and steel tables is permitted.
3. Missing data, if any, may be suitably assumed and same must be stated clearly.

Module - 1

1 Design a cantilever Retaining wall to retain an earthen embankment 5m height above GL. Given Density of backfill = 18kN/m^3 ; Angle of internal friction = 30° : Co-efficient of friction between soil and slab = 0.5 and SBC of soil = 200kN/m^2. Adopt M_{20} grade concrete and Fe 415 steel. Draw a neat sketch of the designed reinforcement details. **(50 Marks)**

OR

2 Design a rectangular combined footing for supporting two columns 400mm × 400mm in size to carry a load of 1000kN each. Centre to centre distance between the columns is 3.5m. The projection of the footing on either side of the column with respect to centre is 1m. SBC = 190kN/m^2. Adopt M_{20} grade of concrete and Fe 415 steel. Draw a neat sketch of the designed reinforcement detail. **(50 Marks)**

Module – 2

3 The line diagram of a truss with loads and tabulation of factored member forces are shown in the Fig Q3. Design the various members of the roof truss along with their end connections with gusset plates by bolts. Assuming the thickness of supporting walls as 450mm, design the supports consisting the shoe angle bearing plate, base plate by considering support reaction and anchor bolts for an uplift force of 15kN at each support. The bearing pressure of concrete may be taken as 4N/mm^2. [Refer Fig. Q3 and Table Q3]

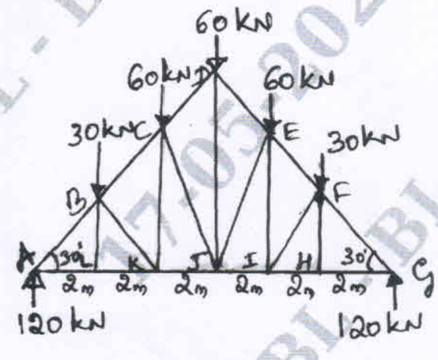

Fig Q3

Members	Length (m)	Force (kN)
AB, GF	2.31	-240
BC, FE	2.31	-210
CD, ED	2.31	-160.04
AL, GH	2	+207.84
LK, HI	2	+207.84
KJ, IJ	2	+181.32
BL, FH	1.154	0
BK, FI	2.31	-30
CK, EI	2.31	+15
CJ, EK	3.05	-66.05
DJ	3.46	-60

Table Q3

(50 Marks)

4. Design a simply supported welded plate girder with thick web without stiffness to carry a UDL of 50kN/m, over a span of 20m. Design the following :
   i) C/s of the girder @ mid span
   ii) Curtailment of flange plates
   iii) Connection details

   Draw a neat sketch of designed details. **(50 Marks)**

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CBCS SCHEME

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18CV732

Seventh Semester B.E. Degree Examination, June/July 2024
Air Pollution and Control

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. Define Air Pollution. Explain with examples the classification of Air Pollutants. **(10 Marks)**

b. Describe the effect of Air Pollution on Materials. **(10 Marks)**

OR

2 a. Explain in detail with specific pollutants and the effects of Air Pollution on Human health. **(08 Marks)**

b. Explain the following : i) Inversions ii) Photochemical Smog. **(12 Marks)**

Module-2

3 a. Define the terms : i) Lapse Rate ii) Stability and Wind velocity. **(10 Marks)**

b. Describe the Meteriological factors influencing Air Pollution. **(10 Marks)**

OR

4 a. Explain the following : i) Wind Rose diagram ii) Turbulence., **(10 Marks)**

b. Describe Plume behavior and estimation of Effective Stack - height. **(10 Marks)**

Module-3

5 a. Explain the Gaussian Model for predicting the concentrations of Air Pollutants originating from a point source. **(10 Marks)**

b. Explain the methods of Monitoring and Analysis of Air Pollutants. **(10 Marks)**

OR

6 a. With a neat sketch, explain the High – Volume Air sampler. **(10 Marks)**

b. A coal fired thermal power plant burns 6.25 tonnes of coal per hour and discharges the combustion products through a stack – having an effective height of 80 meter. The coal has a sulphur content of 4.7% and wind velocity of the top of stack is 8m/sec. Atmospheric conditions are moderately to slightly unstable. Determine the maximum ground level concentration of SO_2 and the distance from the stack at which this maximum occurs. **(10 Marks)**

Module-4

7 a. Sketch and explain Gravitational Settling chamber to control particulate matter. **(10 Marks)**

b. Explain with neat sketch of Electro – Static Precipitator (ESP). **(10 Marks)**

OR

8 a. Discuss the guidelines for locating an Industry with respect to Air Pollution control. **(10 Marks)**

b. A settling chamber is operating at Ambient conditions has a height 3 meter and width of a horizontal gas velocity of 1m/sec. Determine weather the air flow through the device is laminar or turbulent. Take $\mu = 1.86 \times 10^{-5} kg/m^3$ and $\rho_g = 1.18 kg/m$. **(10 Marks)**

Module-5

9 a. Describe the methods of Air pollution control in Automobiles. **(10 Marks)**

b. Explain i) Acid Rain ii) Green House effect. **(10 Marks)**

OR

10 a. Define Noise and list the important sources of Noise that have the potential to interfere with human life. **(10 Marks)**

b. Write brief note on :

i) Environmental laws.

ii) Environmental issues in India with a case study. **(10 Marks)**

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18CV745

Seventh Semester B.E. Degree Examination, June/July 2024
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 Urbanisation. What are the various causes of Urbanisation? **(10 Marks)**

b. With flow diagram, explain the concept of system approach to transport planning process. **(10 Marks)**

OR

2 a. Describe the details of BRTS. **(10 Marks)**

b. Explain the principles of Coordination **(10 Marks)**

Module-2

3 a. Define Zone. What are the factors to be considered for making study area into zones? **(10 Marks)**

b. List and explain the types of sampling methods. **(10 Marks)**

OR

4 a. Discuss the details of Home Interview method. **(10 Marks)**

b. Define Sampling. Explain i) Cluster sampling ii) Stratified sampling. **(10 Marks)**

Module-3

5 a. With assumptions discuss the details of category analysis. **(10 Marks)**

b. The trip rate (y) and the corresponding household sizes (x) from a sample are shown in table below. Compute the trip rate if average household size is 3.25.

	Household size (x)			
	1	2	3	4
Trips per day (y)	1	3	4	5
	3	4	5	8
	3	5	7	8

(10 Marks)

OR

6 a. Explain the details of multiple linear regression analysis. Give any two examples. **(10 Marks)**

b. Find the trip distribution between the zones using Average growth factor method. Refer the table data. **(10 Marks)**

O \ D	1	2	3	pi	Pi
1	60	100	200	360	360
2	100	20	300	420	1260
3	200	300	20	520	3120
aj	360	420	520	1300	
Aj	360	1260	3120		4740

Module-4

7 a. The total trips produced and attracted to the three zones A, B & C of a survey area in the design year are tabulated as :

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

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

b. Briefly explain the details of i) Tanner model ii) Intervening opportunity model. **(10 Marks)**

OR

8 a. List and explain the factors affecting on modal split. **(10 Marks)**

b. Briefly explain the details of :
i) Gravity model ii) Desire line diagram. **(10 Marks)**

Module-5

9 a. Discuss the details of diversion curves. **(10 Marks)**

b. Explain the general principles of traffic assignment. **(10 Marks)**

OR

10 Briefly discuss the details of :
a. All or nothing assignment.
b. Capacity restraint assignment.
c. Equilibrium assignment.
d. Land use planning models. **(20 Marks)**

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CBCS SCHEME

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18CV753

Seventh Semester B.E. Degree Examination, June/July 2024
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 Environmental Management. Discuss different system approach to Corporate Environmental Management. **(10 Marks)**

b. Explain classification of environmental impact reduction efforts. **(10 Marks)**

OR

2 a. Discuss business charter principles for sustainable production and consumption. **(10 Marks)**

b. Explain the corporate responsibility for environmental protection with environmental stewardship. **(10 Marks)**

Module-2

3 a. Define the Environmental Quality Objectives. **(10 Marks)**

b. Differentiate Effluent and Stream Standards. **(10 Marks)**

OR

4 a. Define environmental performance evaluation. **(10 Marks)**

b. Distinguish between Pollution Prevention and Pollution Control. **(10 Marks)**

Module-3

5 a. Explain EMAS, ISO: 14000 – EMS as per ISO:14001 with neat sketch. **(10 Marks)**

b. Overview of environmental policy and concept of continual improvement and pollution prevention. **(10 Marks)**

OR

6 a. Explain Environmental aspect and impact analysis with legal and other requirement. **(10 Marks)**

b. Define objectives and targets of environmental management programs. **(10 Marks)**

Module-4

7 a. Explain Environmental management system audits per ISO – 19011. **(10 Marks)**

b. Explain the Roles and Quantification of auditors. **(10 Marks)**

OR

8 a. Define Environmental performance indicators and their evaluation. **(10 Marks)**

b. Explain corrective and preventive actions of compliance audits, waste audits and waste minimization planning. **(10 Marks)**

Module-5

9 a. Explain the applications of EMS and waste audits in waste management. **(10 Marks)**

b. Explain disposes procedures of hazardous waste management. **(10 Marks)**

OR

10 a. Write a note on application of EMS in Tanning Industry. **(10 Marks)**

b. Explain Hazardous Wastes and classification characteristics treatment and disposal methods. **(10 Marks)**

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18 VIII Sem CV

CBCS SCHEME

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18CV81

Eighth Semester B.E. Degree Examination, June/July 2024
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. ***Assume and indicate missing data, if any.***

Module-1

1 a. Explain why high strength street and high strength concrete are used in pre-stressed concrete. **(10 Marks)**

b. Explain with a neat sketch, "Hoyer's line" system of pre-tensioning. **(10 Marks)**

OR

2 a. Explain pressure line concept. **(10 Marks)**

b. A beam of symmetrical I section spanning 12m has a flange width of 300mm and thickness 80mm. The web depth is 80mm. The overall depth of the beam is 800mm. The parabolic cable has an eccentricity of 300mm at the centre and zero eccentricity at the end and it carries an initial pre-stressing force of 150kN. The live load on the beam is 3.5kW/m Assuming a loss of 20% by strength concept, calculate the stress at the mid span section during the transfer of pre-stress and working load condition. Assume density of concrete as $25kN/m^3$. **(10 Marks)**

Module-2

3 a. List and explain the various losses in pre-stressed concrete. **(06 Marks)**

b. A pre-stressed concrete beam of size 200mm × 300mm is pre-stressed with $A_s = 160mm^2$ to an initial pre-stresses of $1000N/mm^2$ at a constant eccentricity of 50mm. The beam spans 10m. Calculate the percentage pre-stresses loss if the beam is post tensioned considering the wires simultaneously tensioned. $E_s = 210\ kN/mm^2$, $E_c = 35kN/mm^2$ relation of stress in steel is 5% of initial stress, Shrinkage of concerts is 200×10^{-6}, slip and deformation is 2.0, wobble co-efficient = 0.0015/m. **(14 Marks)**

OR

4 a. Discuss the various factors affecting affecting in pre-stressed concrete beams. **(08 Marks)**

b. A concrete beam with a cross sectional area of $32 \times 10^3 mm^3$ and radius of gyration of 72mm in pre-stressed by parabolic cable carrying an effective stressed by a $1000N/mm^2$. The span of the beam is 3m. The cable composed of 6 wires of 7mm diameter has an eccentricity of 650mm at the centre and zero at the supports neglecting all losses, find the central deflection of the beam for the following cases. Assume : $E_c = 38kN/mm^2$, Density = $24kN/m^3$.

i) Self weight + Pre-stresses

ii) Self weight + pre-stress + live load of 2kN/m. **(12 Marks)**

Module-3

5 a. List the different types of flexural failures in a PSC beam. Explain failure of over reinforced sections. **(06 Marks)**

b. A post tensioned bridge girder with unbounded tendons is of base section of overall dimensions 1200mm wide by 1800mm deep with wall thickness of 150mm. The high tensile steel has an area of $4000mm^2$ and its located at an effective depth of 1600mm. The effective pre-stress in steel after tosses is $1000N/mm^2$ and the effective span of the girder is 24m. If $f_{ck} = 40N/mm^2$ and $f_p = 1600N/mm^2$. Estimate the ultimate flexural strength of the section. **(14 Marks)**

OR

6 Design a symmetrical I section of span 16m to carry superimposed load of 18kN/m. Assume compressive stress of concrete as 15MPa at transfer and 12MPa at working load. The permissible tensile stress in concrete at both the stages of loading are 1MPa. Assume the loss of pre-stresses 20% and the initial pre-stress in steel shall not exceed 5000MPa. **(20 Marks)**

Module-4

7 a. Explain the different types of share failure cracks. **(06 Marks)**

b. A simply supported beam of span 6m is 120 × 300mm is section. It is pre-stressed with parabolic cable which carries an effective pre-stress of 200kN. The cable has a maximum eccentricity of 100mm at mid span section and minimum eccentricity of 50mm at the support section. Determine the principle tension at 20mm above the centriodal fibre in a section. Determine which lies at 0.6m from the left support. The beam carries an all inclusive load of 15kN/m. **(14 Marks)**

OR

8 a. Explain the following i) Diagonal Tension failure ii) Shear compression Failure. **(08 Marks)**

b. The support section of PSC beam 150mm × 300mm deep is required to support an ultimate shear force of 100kN. Compressive pre-stress at the centriodal axis is $5N/mm^2$. Adopt M40 grade concrete and cover to tension reinforce as 45mm. Design suitable reinforcements at the section using IS : 1343 recommendations. Use 8mm ϕ 2 legged vertical stirrups. Take $f_y = 250N/mm^2$. **(12 Marks)**

Module-5

9 a. Explain the stress distribution in end block of a post tensioned pre-stressed concrete member with neat sketch. **(06 Marks)**

b. The end block of a PSC girder is 200mm by 300mm. The beam is post-tensioned – tensioned by 2 anchorages each of 100mm diameter with their centers located at 75mm from the top and bottom of the beam. The force and design suitable reinforcements according to IS : B43 provision. Also sketch the arrangement of anchorage zone reinforcement use : 10# links yield stress. **(14 Marks)**

OR

10 a. Explain the factors effecting of End block stress distributions. **(06 Marks)**

b. The end block of a pre-stressed concrete girder is 200mm wide by 300mm deep. The beam is post tensioned by two Freyssient an charges each of 100mm diameter with their centers located at 75mm from the top and bottom of beam. The force transmitted by each anchorage being 2000kW. Compute the bursting force and design suitable reinforcements according to Indian standard IS1343 code provisions. Sketch the arrangement of anchorage zone reinforcement. **(14 Marks)**

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CBCS SCHEME

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18CV825

Eighth Semester B.E. Degree Examination, June/July 2024
Pavement Design

Time: 3 hrs. Max. Marks: 100

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

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.

Module-1

1 a. Describe the desirable characteristics of pavements. **(10 Marks)**
b. Explain the five important design strategies of pavements. **(10 Marks)**

OR

2 a. Bring out a comparison between the important characteristics of flexible and rigid pavements. **(10 Marks)**
b. List the principles, assumptions and limitations of Boussinesq's theory. **(10 Marks)**

Module-2

3 a. Describe the significance of wheel load and tyre pressure in pavement design. **(10 Marks)**
b. Calculate the design repetitions for 20 years period for various wheel loads equivalent to 22.68 kN wheel load using the following survey data on a 4 lane road.

Wheel load (kN)	ADT, both directions	% of traffic volume
22.68	Traffic volume considering growth = 215	13.17
27.22		15.30
31.75		11.36
36.29		14.11
40.82		6.21
45.36		5.84

(10 Marks)

OR

4 a. Explain the principle and design steps of McLeod method of pavement design. **(10 Marks)**
b. Design a flexible pavement consisting of 80 mm thick bituminous surface with 100 N/mm^2, WBM base course of E value 40 N/mm^2 and 200 mm moorum sub-base course with E value 20 N/mm^2 by Kansas method using the following data:
Design wheel load = 60 kN
P = 0.7 N/mm^2
E value of subgrade = 9 N/mm^2
Traffic coefficient = 11/9
Rainfall coefficient = 0.9
(10 Marks)

Module-3

5 a. Describe the general causes of flexible pavement failures. **(10 Marks)**
b. Explain the following: (i) Alligator cracking (ii) Reflection cracking **(10 Marks)**

OR

6 a. Describe the step by step procedure of conducting Benkelman beam deflection studies for structural evaluation of flexible pavement and subsequent determination of overlay thickness. **(10 Marks)**
b. Describe the step-by-step procedure for falling weight deflectometer. **(10 Marks)**

Module-4

7 a. With a sketch, explain how warping stresses are developed in cc pavements. Indicate the Bradbury's equations used to determine warping stresses at the three critical locations. **(10 Marks)**

b. A cc pavement of 200 mm thickness has longitudinal joint at 3.5 m and transverse joint at 4.5 m spacing, modulus of subgrade reaction is 0.1 N/mm^3 and modulus of elasticity of cc is 3×10^4 N/mm^2. Find the wheel load stress at interior, edge and corner regions of the slab due to wheel load of 51 kN with radius of contact area 150 mm. Use Westergaard's equations. **(10 Marks)**

OR

8 a. What are the uses of tie bars in cc pavements? Indicate the steps in design of tie bars. **(10 Marks)**

b. The design thickness of a cc pavement is 260 mm considering a design axle load (98^{th} percentile load) of 120 kN on single axle and M40 concrete with characteristic compressive strength of 40 N/mm^2. The radius of relative stiffness is found to be 622 mm. If the elastic modulus of dowel bar steel is 2×10^5 N/mm^2 modulus of dowel concrete interaction is 415 N/mm^3 and joint width is 18 mm, design the dowel bars for 40% load transfer considering edge loading. **(10 Marks)**

Module-5

9 a. Explain the causes and maintenance of the following in rigid pavements:
(i) Cracks (ii) Joints **(10 Marks)**

b. Explain the common types of failures in rigid pavements. **(10 Marks)**

OR

10 a. Define joint. Explain the types of joints. **(10 Marks)**

b. Explain the functional evaluation of rigid pavement by visual inspection and unevenness measurements. **(10 Marks)**

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A1-III Sem CV

CBCS SCHEME

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21CV33

Third Semester B.E. Degree Examination, June/July 2024
Strength of Materials

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. With a neat sketch, define salient features of stress-strain curve for a tensile specimen for mild steel. **(06 Marks)**

b. Derive the expression for elongation of tapering circular bar due to an axial load P. **(06 Marks)**

c. A tension test was conducted on mild steel bar and the following data was obtained from the test:
Diameter of the bar = 18mm
Gauge length of the bar = 82mm
Load at proportional limit = 75kN
Extension at a load of 62kN = 0.113mm
Load at failure = 82kN
Final gauge length of the bar = 106mm
Diameter of the bar at failure = 14mm
Determine the Young's modulus, proportional limit, true breaking stress, % elongation and percentage reduction in cross sectional area. **(08 Marks)**

OR

2 a. Define the four elastic constants. **(04 Marks)**

b. Define principle of superposition and thermal stress. **(04 Marks)**

c. At a point in an elastic material, the stresses on two perpendicular planes are 80N/mm^2 (tensile) and 60N/mm^2 (compressive). There is also a shear stress of 40N/mm^2. Find the normal stress and shear stress on a plane making an angle of 30° with the plane on which the tensile stress acts. Also find the values of principal stresses and the location of principal planes (adopt analytical method). **(12 Marks)**

Module-2

3 a. Define:
i) Shear force
ii) Bending moment
iii) Point of contraflexure. **(06 Marks)**

b. Draw SFD and BMD for a simply supported beam subjected to a couple moment 'M' in clockwise direction acting at a distance of 'a' from left support and 'b' from right support. **(06 Marks)**

c. Sketch SFD and BMD for the beam shown in Fig.Q.3(c) indicating salient points. **(08 Marks)**

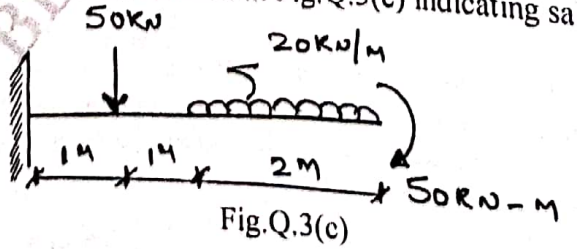


Fig.Q.3(c)

OR

4 a. Derive relationship between load intensity, shear force and bending moment. **(06 Marks)**

b. Draw BMD and SFD for the overhanging beam shown in Fig.Q.4(b). Clearly indicate the position of contra flexure. **(14 Marks)**

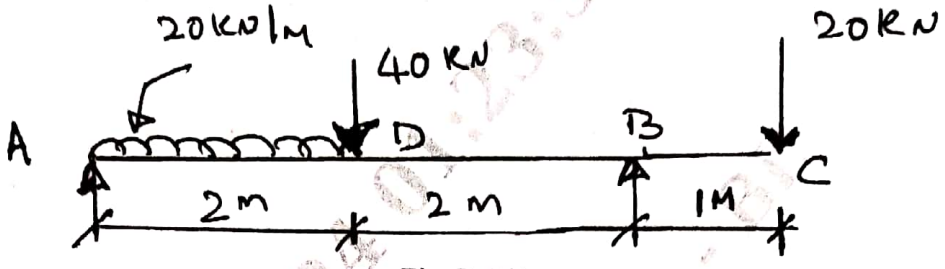


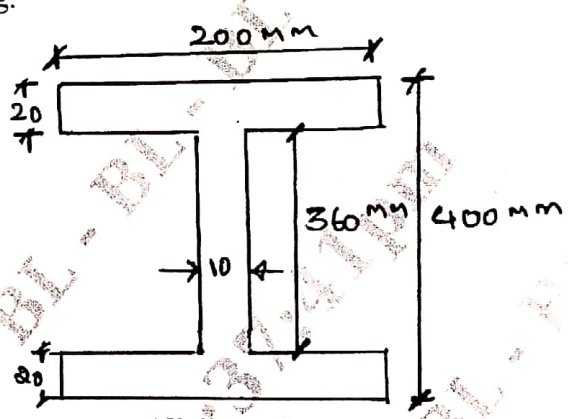
Fig.Q.4(b)

Module-3

5 a. List the assumptions in simple theory of bending. **(04 Marks)**

b. Derive the bending equation with usual notations. **(08 Marks)**

c. A rolled steel joist of I-section has the dimension as shown in Fig.Q.5(c). This beam of I-section carries a UDL of 40kN/m run on a span of 10m. Calculate the maximum stress produced due to bending. **(08 Marks)**



All dimensions in mm

Fig.Q.5(c)

OR

6 a. Define:

i) Section Modulus

ii) Modulus of rupture

iii) Moment of resistance. **(03 Marks)**

b. Prove that maximum shear stress in a rectangular section of width 'b' and depth 'd' is equal to 1.5 times of its average shear stress. **(05 Marks)**

c. A 'T' section of flange 120mm × 12mm and overall depth 200mm with 12mm web thickness is loaded such that at a section it has a bending moment of 20kNm and shear force of 120kN. Sketch the bending and shear stress distribution diagram marking the salient values. **(12 Marks)**

Module-4

7 a. Prove that a hollow circular shaft is stiffer and stronger than a solid circular shaft in torsion which have same material length and weight, by strength and stiffness criteria. **(10 Marks)**

b. Derive Lame's equation for the radial and hoop stress for thick cylinder subjected to internal and external fluid pressure. **(10 Marks)**

OR

8 a. Determine the maximum and minimum hoop stress across the section of a pipe of 400mm internal diameter and 100mm thick, when the pipe contains a fluid at a pressure of $8N/mm^2$. Also sketch the radial pressure distribution and hoop stress distribution. **(10 Marks)**

b. A shaft of hollow cross section rotates at 200rpm transmitting a power of 800kW with internal diameter = 0.8 times external diameter. Compute the diameters if the maximum shear stress is limited to $100N/mm^2$ and the angle of twist to 1° in a length of 4m. Assume that the maximum torque is 30% greater than the mean torque and G = 80GPa. **(10 Marks)**

Module-5

9 a. Derive an expression for slope and deflection in a simply supported beam subjected to UDL throughout. Calculate the maximum slope and deflection. **(06 Marks)**

b. Define: i) Buckling load ii) Effective length iii) Slenderness ratio. **(06 Marks)**

c. Compute the crippling loads using Euler's and Rankine's formula for a hollow circular column 200mm external diameter and 25mm thick. The length of the column is 4m with both ends hinged. Assume E = 200GPa, Rankines constants σ_c = 320MPa and a = 1/7500. **(08 Marks)**

OR

10 a. Derive an equation for buckling load in a long column with both ends hinged using Euler's column theory. **(08 Marks)**

b. State the assumptions made in Euler's theory. **(04 Marks)**

c. A simply supported beam of length 40m is subjected to a UDL of 30kN/m over the whole span and deflects 15mm at the centre. Determine the crippling loads when this beam is used as a column with the following conditions: i) One end fixed and other end hinged ii) Both ends pin jointed [Take length of beam l = 4000mm and UDL, W = 30kN/m, Deflection at centre = 15mm]. **(08 Marks)**

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CBCS SCHEME

21CV383

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Question Paper Version : A

Third Semester B.E./B.Tech. Degree Examination, June/July 2024
Personality Development and Soft Skills

Time: 1 hr.] [Max. Marks: 50

INSTRUCTIONS TO THE CANDIDATES

1. Answer all the **fifty** 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.

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1. Communication is basically ____
   a) Talking b) Writing c) Signaling d) All of these
2. Communication is a part of _____ skills.
   a) Soft b) Hard c) Rough d) Short
3. The person who transmits the message is called the ____
   a) Sender b) Giver c) Taker d) Receiver
4. Communication helps officials to _____ the Employees.
   a) Eliminate b) Motivate c) Threaten d) Apprise
5. _____ means checking whether the earlier stages of reading were followed promptly or not.
   a) Survey b) Questions c) Read d) Review
6. The document that is used to communication within the organization is called _____
   a) Letter b) Memo c) e - mail d) telex
7. Identify the adverb in the sentence 'I' work more on the product development side.
   a) I b) work c) more d) the
8. The _____ and _____ is also helpful for the listeners to understand the meaning
   a) Tone, behavior b) Pitch, tone c) Tone, attitude d) Tone, intensity
9. Personality is referred to as
   a) Behaviour b) Feelings c) Thoughts d) All of these

10. Body language , body posture and hand gestures are examples of _____ type of communication.
    a) Informal Communication
    b) Non – Verbal Communication
    c) Verbal Communication
    d) Formal Communication

11. Knowing yourself helps to
    a) Control emotions
    b) Realize your potential
    c) Reach better decisions
    d) All of these

12. The process of knowing oneself involves.
    a) Develop some hobbies and new interest
    b) Exercise and go for walk regularly
    c) Maintain personal dairy
    d) All of these

13. Interpersonal skills helps to
    a) Ability to work well with others
    b) Ability to have technical skills
    c) Improve knowledge
    d) Expose others mistakes

14. Team working is _____
    a) Individual achievement
    b) Address the gathering
    c) Application of individual ideas
    d) Collaborative effort of a group to achieve a common goal.

15. Time management refers to _____
    a) Relaxing while doing activity
    b) Working at last minute
    c) The right time allocated to the right activity
    d) Dedication towards finishing activity.

16. Relationship can develop
    a) In a group
    b) In an individual
    c) In a team
    d) All of these

17. Creative thinking is ability
    a) To come up with unique, original solution
    b) To come up with different types of solution
    c) To come up with similar solutions
    d) None of these

18. Problem solving technique leads to
    a) Analyse the problem
    b) Identification of problem
    c) Define problem
    d) Solution

19. Reading is a _____ process.
    a) Encoding
    b) Decoding
    c) Codification
    d) None of these

20. The fascinating areas of language learning is
    a) Reading
    b) Listening
    c) Writing
    d) Speaking

21. Common kinds of narrative skills are
    a) How to do something
    b) How something works
    c) Both (a) and (b)
    d) Arrange the information properly

22. Public speaking is the act of presenting an ideal to the
a) Individual b) Group c) Public d) Private

23. The forms of Oral communication is
a) Face to face b) By voice mail
c) Though an intercom and telephone d) All of these

24. Reading develop art of
a) Creativity b) Distraction c) Upset d) Interrupting

25. Group discussion is a type of discussion that involves
a) People sharing ideas b) People sharing activities
c) People sharing thoughts d) All of these

26. Pick up the pronoun from the sentence, 'She was quite good looking'.
a) She b) was c) Quite d) Good looking

27. In letter writing, _____ indicates to the reader of the letter what the _____ is about.
a) Salutation, letter b) Subject, notice c) Body, memo d) Subject, letter

28. _____ is the use of oral unwritten words and is an essential part of interacting with others.
a) Informal Communication b) Non verbal Communication
c) Verbal Communication d) Formal Communication

29. Body language, body posture and hand gesture are examples of _____ type of Communication.
a) Informal Communication b) Non verbal Communication
c) Verbal Communication d) Formal Communication

30. A resume is drafted with the objective to highlight your _____
a) Education& experience to the potential employer
b) Achievements
c) Qualification d) Skills

31. Mediation helps to reduce
a) Unhappiness b) Concentration c) Stress d) Anxiety

32. Stress is _____
a) Objective b) Subjective c) Both (a) & (b) d) None of these

33. Body language is the use of
a) Physical behaviour b) Attitude
c) Politeness d) None of these

34. Poor time management leads to
a) Good work flow b) Waste of time c) Good control d) Efficiency

35. Good time management leads to improved
a) Inefficiency b) Less productivity
c) More stress d) High productivity

36. Stress management is a wide spectrum of technique of
a) Physical activities b) Mental attitude c) Psychotherapies d) None of these

37. Reading develop art of
a) Creativity b) Distraction c) Upset d) Interrupting

38. Stress can be a
a) Short term issue b) Long term issue
c) Both short term and long term issue d) No issue at all

39. Soft skills are
a) People skills b) Social and communication skills
c) Emotional intelligence d) Values

40. Networking is the ability
a) To exchange information and ideas with individual and groups
b) To exchange information with individual
c) To exchange information with group d) To exchange idea with someone

41. Communication strengths _____ & ____ relationship in an Organization.
a) Employer - Father b) Employer – Employee
c) Mother - Employer d) Mother – Child

42. Which of the following is interpersonal skill training?
a) Soft skill b) Basic skill c) Intermediate skill d) Hard skill

43. Which method is not used to enhance life skills?
a) Case study b) Debate c) Stress d) Roleplay

44. These are defined as psychosocial abilities for adaptive and positive behavior.
a) Recreational skill b) Soft skill c) Life skill d) Vocational skill

45. These skills help us to relate in positive ways with people we interact.
a) Critical thinking b) Creative thinking c) Interpersonal skills d) Empathy

46. For decision making skill which one is helpful?
a) Active listening b) Writing c) Reading d) Verbalism

47. One among is not a core critical thinking skills.
a) Interpretation b) Analysis c) Self regulation d) Self esteem

48. Effective time management leads to ____
a) Increased productivity to achieve goals b) Decrease and manage stress
c) Better work balance d) All of these

49. Reading out presentation.
a) Not allowed b) Allowed c) Helpful d) dull

50. The key of success is
a) Practice b) Presentation c) Effective effort d) Both (a) & (b)

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CBCS SCHEME

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21CV34

Third Semester B.E. Degree Examination, June/July 2024
Earth Resources and Engineering

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. What is geology? Explain the importance of geology in the field of civil engineering. **(10 Marks)**

b. With a neat sketch, explain the details of internal dynamics of earth. **(04 Marks)**

c. What is seismogram? Explain the working principle of seismograph with neat labelled sketch. **(06 Marks)**

OR

2 a. What is an earthquake? Write a brief note on earthquake resisting structure. **(06 Marks)**

b. What are landslides? Mention factors responsible for landslides. Add a note on its preventive measures. **(08 Marks)**

c. Define volcano. Explain the causes of it. **(06 Marks)**

Module-2

3 a. Define mineral. Explain briefly rock forming and ore forming minerals. **(06 Marks)**

b. Explain Moh's scale of hardness. **(06 Marks)**

c. Describe the minerals with respect to their engineering properties :
i) Orthoclase ii) Calcite iii) Gypsum iv) Asbestos **(08 Marks)**

OR

4 a. Describe physical properties of minerals :
i) Form ii) Hardness iii) Fracture iv) Clearage. **(08 Marks)**

b. Explain the classification of metamorphic rocks with neat sketches based ion foliation structure. **(06 Marks)**

c. Write short notes on the following :
i) Railway Ballast
ii) Selection of rocks are material of construction. **(06 Marks)**

Module-3

5 a. Write a note on soil profile with neat sketch. **(06 Marks)**

b. What is weathering? Describe physical and chemical weathering. **(07 Marks)**

c. Write a note on selection of site for artificial recharge. **(07 Marks)**

OR

6 a. What is river morphology? Write the factors controlling channel development. **(05 Marks)**

b. Write short notes on morphemetric analyses of river basin. **(08 Marks)**

c. What is an idea behind interlinking of rivers? Add its benefits. **(07 Marks)**

Module-4

7 a. Three bore hole sunk at equilateral triangle whose sides are 480m each. P is west of Q, and R is north of midpoint PQ. The bore hole PQR reaches upper surface of rich coal seam at 100m, 220m and 260m respectively.
i) Determine the altitude
ii) Another bore hole is sunk at 'S' midpoint of QR. Determine at what depth the bore hole 'S' reaches the same coal seam. **(10 Marks)**

b. Define fold, with relevant sketch, explain its parts with types of folds. **(10 Marks)**

OR

8 a. Explain with neat sketch, ground water investigation by Electrical resistivity method. **(06 Marks)**

b. A bed of shale is dipping maximum of 32° along SE. Find its inclineaiton along S80°E and its strike direction. **(08 Marks)**

c. Write the difference between fault and joint. **(06 Marks)**

Module-5

9 a. Define topography and contour map. **(04 Marks)**

b. What is remote sensing? Write its principles on which it works. Write its applications in civil engineering. **(09 Marks)**

c. What is photogrammetry? Write its objectives. **(07 Marks)**

OR

10 a. Define GIS. Explain its components and application. **(10 Marks)**

b. Describe the application of GPS (Global Positioning System). **(05 Marks)**

c. A camera having focal length of 20cm is used to take a vertical photograph to a terrain having an average elevation of 1600m. What is height above MSL at which on air craft must fly in order to get photograph at a scale of 1 : 10000. **(05 Marks)**

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CBCS SCHEME

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21MAT31

Third Semester B.E. Degree Examination, June/July 2024
Transform Calculus, Fourier Series & Numerical Techniques

Time: 3 hrs. Max. Marks: 100

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

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.

Module-1

1 a. Find the Laplace Transform of, $\left(\frac{4t+5}{e^{2t}}\right)^2$. **(06 Marks)**

b. The square wave function f(t) with period 2a is defined by,
$f(t) = t\ ;\ 0 \le t \le a$
$= 2a - t\ ;\ a \le t \le 2a$
Find L[f(t)]. **(07 Marks)**

c. Evaluate $L^{-1}\left[\frac{s^2}{(s^2+a^2)^2}\right]$ by applying convolution theorem. **(07 Marks)**

OR

2 a. Find inverse Laplace transform $\frac{2s^2-6s+5}{s^3-6s^2+11s-6}$. **(06 Marks)**

b. Express the following function in terms of unit step function and hence find the Laplace transform.
$f(t) = 1\ ;\ 0 < t \le 1$
$= t\ ;\ 1 \le t \le 2$
$= t^2\ ;\ t > 2$. **(07 Marks)**

c. Applying Laplace transform, solve the differential equation,
$y''(t) + 4y'(t) + 4y(t) = e^{-t}$,
Subject to the condition $y(0) = y'(0) = 0$. **(07 Marks)**

Module-2

3 a. Obtain the Fourier series of $f(x) = x^2$ over the interval $[-\pi, \pi]$, hence deduce that $\frac{\pi^2}{12} = \frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \ldots\ldots + \infty$. **(06 Marks)**

b. Obtain the half range sine series of the function, $f(x) = x$ in the interval (0, 2). **(07 Marks)**

c. Obtain the constant term and co-efficient of first cosine and sine terms in the expansion of y from the following table :

x	0°	60°	120°	180°	240°	300°	360°
y	7.9	7.2	3.6	0.5	0.9	6.8	7.9

(07 Marks)

OR

4 a. Find the Fourier series of $f(x) = 2 - x\ ;\ 0 \le x \le 4$
$x - 6\ ;\ 4 \le x \le 8$ **(06 Marks)**

b. Obtain the half range sine series of the function, $f(x) = x^2$ over $(0, \pi)$. **(07 Marks)**

c. Obtain a_0, a_1, b_1 in the Fourier expansion of y using harmonic analysis for the data given,

x	0	1	2	3	4	5
y	9	18	24	28	26	20

(07 Marks)

Module-3

5 a. Find the Fourier sine and cosine transforms of $f(x) = e^{-\alpha x}$; $\alpha > 0$. **(06 Marks)**

b. Obtain the inverse z-transform of, $\frac{2z^2 + 3z}{(z^2 - 2z - 8)}$. **(07 Marks)**

c. Find the Fourier transform of,

$f(x) = x^2$; $|x| < a$

$= 0$; $|x| > a$

where a is +ve constant. **(07 Marks)**

OR

6 a. Find the Complex Fourier transform of the function,

$f(x) = 1$ for $|x| \le a$

$= 0$ for $|x| > a$

Hence deduce, evaluate $\int_0^\infty \frac{\sin x}{x} dx$. **(06 Marks)**

b. Evaluate $Z_T\left[2n + \sin\left(\frac{n\pi}{4}\right) + 1\right]$. **(07 Marks)**

c. Solve the difference equation, $y_{n+2} + 6y_{n+1} + 9y_n = 2^n$ with $y_0 = y_1 = 0$ using Z-Transform. **(07 Marks)**

Module-4

7 a. Classify the following partial differential equation,

(i) $\frac{\partial^2 u}{\partial x^2} + 4\frac{\partial^2 u}{\partial x \partial y} + 4\frac{\partial^2 u}{\partial y^2} - \frac{\partial u}{\partial x} + 2\frac{\partial u}{\partial y} = 0$.

(ii) $x^2 \frac{\partial^2 u}{\partial x^2} + (1 - y^2)\frac{\partial^2 u}{\partial y^2} = 0, -\infty < x < \infty, -1 < y < 1$.

(iii) $(1 + x^2)\frac{\partial^2 u}{\partial x^2} + (5 + 2x^2)\frac{\partial^2 u}{\partial x \partial t} + (4 + x^2)\frac{\partial^2 u}{\partial t^2} = 0$

(iv) $(x + 1)\frac{\partial^2 u}{\partial x^2} - 2(x + 2)\frac{\partial^2 u}{\partial x \partial y} + (x + 3)\frac{\partial^2 u}{\partial y^2} = 0$ **(10 Marks)**

b. Find the numerical solution of the parabolic equation $\frac{\partial^2 u}{\partial x^2} = 2\frac{\partial u}{\partial t}$, using Schmidt formula. Given $u(0, t) = 0 = u(4, t)$ and $u(x, 0) = x(4 - x)$ by taking h = 1 find the values upto t = 5. **(10 Marks)**

OR

8 a. Solve $u_{xx} + u_{yy} = 0$ in the following square region with the boundary conditions as indicated in the Fig. Q8 (a). **(10 Marks)**

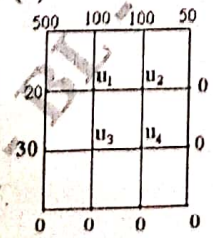

Fig. Q8 (a)

b. Solve numerically $u_{xx}=0.0625\,u_{tt}$, subject to the conditions u(0, t) = 0 = u(5, t), $u(x, 0) = x^2(x-5)$ and $u_t(x,0)=0$ by taking h = 1 for $0 \le t \le 1$. **(10 Marks)**

Module-5

9 a. Use Runge-Kutta method to find y(0.2) for the equation, $\frac{d^2y}{dx^2} - x\frac{dy}{dx} - y = 0$. Given that $y=1,\ y'=0$ when $x=0$. **(06 Marks)**

b. Find the curves on which the function, $\int_0^1 \{(y')^2 + 12xy\}dx$ with y(0) = 0 and y(1) = 1 can be extremised. **(07 Marks)**

c. Derive the Eulers equation in the form $\frac{\partial f}{\partial y} - \frac{d}{dx}\left(\frac{\partial f}{\partial y'}\right) = 0$ **(07 Marks)**

OR

10 a. Solve the differential equation $y'' + xy' + y = 0$ for x = 0.4, using Milne's predictor-corrector formula given that, **(06 Marks)**

x	0	0.1	0.2	0.3
y	1	0.995	0.9802	0.956
$\frac{dy}{dx}$	0	-0.0995	-0.196	-0.2863

b. Find the curve on which functional $\int_0^{\frac{\pi}{2}} [(y')^2 - y^2 + 2xy]dx$ with $y(0) = y\left(\frac{\pi}{2}\right) = 0$ can be extremized. **(07 Marks)**

c. Prove that shortest distance between two points in a plane is a straight line. **(07 Marks)**

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CBCS SCHEME

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21CV32

Third Semester B.E. Degree Examination, June/July 2024
Geodetic 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 Surveying. Discuss the classification of Surveying. **(04 Marks)**

b. Distinguish between :
i) True meridian and Magnetic Meridian.
ii) Whole circle bearing and Quadrantal bearing.
iii) Fore bearing and Back bearing.
iv) Dip and Declination. **(08 Marks)**

c. The following bearings were observed with a compass. Calculate the interior angles.

Line	AB	BC	CD	DA
Fore bearing	N 45° 30′ E	S 60° 0′ E	S 10° 30′ N	N 75° 45′ W

(08 Marks)

OR

2 a. Define Local Attraction and explain the procedure of Detection and Elimination methods. **(04 Marks)**

b. Describe briefly Radiation and Intersection method of plant tabeling. **(08 Marks)**

c. The following bearings were observed in running a closed traverse.

Line	AB	BC	CD	DE	EA
FB	75° 5′	115° 20′	165° 35′	224° 50′	304° 50′
BB	254° 20′	296° 35′	345° 35′	44° 05′	125° 05′

At what stations do you suspect local attraction? Determine the correct magnetic bearings. If declination was 5° 10′ E, what are the true bearings? **(08 Marks)**

Module-2

3 a. Define i) Back sight ii) Fore sight iii) Intermediate sight iv) Change point. **(04 Marks)**

b. Explain the procedure with sketch reciprocal levelling. **(08 Marks)**

c. Following readings were taken with a level and a 4m levelling staff on a continuously sloping ground
1.680 , 2.470 , 3.550 , 0.680 , 1.200 , 2.050 , 3.800 , 1.200 , 1.600 , 1.850 , 3.600 , 1.800 , 2.500 , 3.500.
Rule out a page of level book and find out RL of each point by Rise and Fall method. Taking the BM RL as 100.00m. Apply usual checks. **(08 Marks)**

OR

4 a. Discuss the methods of determining areas and volume. **(05 Marks)**

b. Explain the temporary adjustments and dumpy level. **(05 Marks)**

c. Calculate the volume of earthwork for a road having the following data :

Chainage (m)	Depth of cutting (m)	Transverse slope
0	1.50	1 in 8
40	2.50	1 in 4
80	1.80	1 in 10

If formation width = 10m and side slopes 1 : 1. **(10 Marks)**

Module-3

5 a. Explain the procedure of measuring horizontal angles by Repetition and Reiteration method. **(05 Marks)**

b. Briefly explain the Double plane method of finding the RL of an point. **(05 Marks)**

c. To determine the elevation of the top of aerial pole, the following observations were made :

Instrument station	Reading on BM	Angle of Elevation	Remarks
A	1.377	11° 53′	RL of BM = 30.150m
B	1.263	8° 5′	

Stations A & B & top of aerial pole are in the same vertical plane. Find the RL of top of aerial pole. If distance between A & B is 30.00m. **(10 Marks)**

OR

6 a. Explain the following terms :
i) Transiting ii) Changing face
iii) Swinging iv) Line of collimation. **(04 Marks)**

b. Derive the expression for distance and elevation for stadia tacheometry, when the staff held vertical to the line of sight, for both angle of elevation and angle of depression. **(06 Marks)**

c. The following observations were observed with a tacheometer fitted with anallactic lens and multiplyer constant being 100.

Inst. Station	Staff Station	Height of axis	Vertical angle	Hair readings
P	BM	1.5	- 6° 12′	0.963, 1.515, 2.067
P	Q	1.5	7° 5′	0.819, 1.341, 1.863
Q	R	1.6	12° 23′	1.860, 2.445, 3.030

RL of BM is 460.500m, staff held vertically. Compute the RL of P, Q & R and the horizontal distances PQ & QR. **(10 Marks)**

Module-4

7 a. Explain the following along with a neat sketch :
i) Forward tangent ii) Point of curve
iii) Deflection angle iv) Long chord. **(04 Marks)**

b. What is the relation between degree and radius of a curve? **(06 Marks)**

c. Calculate the necessary data for setting out a curve by Rankine's method and prepare a curve table. Chainage of PI = 1192m , Deflection angle = 50° 30′ , Radius of curve = 300m , Peg interval = 20m , Theodolite least count 20″. **(10 Marks)**

OR

8 a. What are the requirements of a transition curve? **(04 Marks)**

b. With a neat sketch, explain the elements of a compound curve. **(06 Marks)**

c. Two parallel railway lines are to be connected by reverse curve, each section having the same radius. If the lines are 12m apart and the maximum distance between tangent points measured parallel to the straights is 48m, find the maximum allowable radius. If however, both the radius are to be different, calculate the radius of the second branch if that of the first branch is 60m. Also calculate the length of both the branches. **(10 Marks)**

Module-5

9 a. Derive an expression for relief displacement on vertical photograph. **(08 Marks)**

b. What are the advantages of LiDAR? **(04 Marks)**

c. Explain the components of GIS, with neat sketch. **(08 Marks)**

OR

10 a. What is an EDM? Explain the principle used by EDM for distance measurement. **(08 Marks)**

b. Explain in brief any two applications in Civil engineering of
i) Remote sensing ii) GPS. **(04 Marks)**

c. A vertical photograph was taken at an altitude of 1200m above MSL. Determine the scale of the photograph for terrain lying at elevations of 80m and 300m, if the focal length of the camera is 15cm. **(08 Marks)**

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21 IV Sem CV

CBCS SCHEME

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21CV42

Fourth Semester B.E. Degree Examination, June/July 2024
Fluid Mechanics and Hydraulics

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. Define the following fluid properties:
i) Density
ii) Specific weight
iii) Specific volume
iv) Specific gravity. **(04 Marks)**

b. Calculate the dynamic viscosity of an oil, which is used for lubrication between a square plate of size 0.8m × 0.8m and an inclined plane with angle of inclination 30° as shown in Fig.Q.1(b). The weight of the square plate is 300N and it slides down the inclined plane with a uniform velocity of 0.3m/s. The thickness of oil film is 1.5mm. **(08 Marks)**

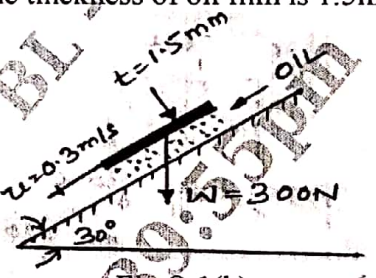

Fig.Q.1(b)

c. What are the gauge pressure and absolute pressure at a point 3m below the free surface of a liquid having a density of $1.53 \times 10^3 kg/m^3$ if the atmospheric pressure is equivalent to 750mm of mercury? The specific gravity of mercury is 13.6 and density of water = $1000kg/m^3$. **(08 Marks)**

OR

2 a. State and prove the Pascal's law. **(06 Marks)**

b. Derive an expression for total pressure and centre of pressure on an inclined plane surface submerged in the liquid. **(08 Marks)**

c. A circular plate of 3m diameter is immersed in water in such a way that its greatest and least depth below the free surface are 4m and 1.5m respectively. Determine the total pressure on the face of the plate and position of centre of pressure. **(06 Marks)**

Module-2

3 a. Derive continuity equation is Cartesian co-ordinates for a fluid in 3 dimensions. **(08 Marks)**

b. Distinguish between:
i) Steady and unsteady flow
ii) Uniform and non-uniform flow
iii) Laminar and turbulent flow. **(06 Marks)**

c. A 30cm diameter pipe, conveying water, branches into two pipes of diameters 20cm and 15cm respectively. If the average velocity in the 30cm diameter pipe is 2.5m/s, find the discharge in this pipe. Also determine the velocity in 15cm pipe if the average velocity in 20cm diameter pipe is 2m/s. **(06 Marks)**

OR

4 a. Derive the equation for discharge through venturimeter. **(08 Marks)**

b. The water is flowing through a pipe having diameters 20cm and 10cm at section (1) and (2) respectively. The rate of flow through pipe is 35 litres/s. The section (1) is 6m above datum and section (2) is 4m above datum. If the pressure at section (1) is 39.24N/cm^2, find the intensity of pressure at section (2). **(06 Marks)**

c. An orifice meter with orifice diameter 15cm is inserted in a pipe of 30cm diameter. The pressure difference measured by a mercury oil differential manometer on the two sides of the orifice meter gives a reading of 50cm of mercury. Find the rate of flow of oil specific gravity 0.9 when the coefficient of discharge of the orifice meter = 0.64. **(06 Marks)**

Module-3

5 a. Give classification of orifices and mouth pieces. **(06 Marks)**

b. Water discharge at the rate of 98.2 litres/s through a 120mm diameter vertical sharp edged orifice placed under a constant head of 10 meters. A point on the jet measured from the vena contracta of the jet has co-ordinates 4.5 meters horizontal and 0.54 meters vertical. Find the coefficient C_v, C_c and C_d of the orifice. **(06 Marks)**

c. Derive an expression for discharge through a v-notch. **(08 Marks)**

OR

6 a. Explain major and minor losses in a flow. Give an expression for head loss due to sudden expansion in pipe line. **(08 Marks)**

b. A main pipe divides into two parallel pipes which again forms one pipe. The length and diameter for the first parallel pipe are 2000m and 1m respectively, while the length and diameter of 2nd parallel pipe are 2000m and 0.8m. Find the rate of flow in each parallel pipe, if total flow in the main is 3m^3/s. The co-efficient of friction for each parallel pipe is same and equal to 0.005 **(06 Marks)**

c. Explain the phenomenon of water Hammer. List the factors upon which it depends. **(06 Marks)**

Module-4

7 a. Derive Chezy's equation for uniform rate of flow in a channel. Hence write Manning's equation. **(08 Marks)**

b. The rate of flow of water through a circular channel of diameter 0.6m is 150 litres/sec. Find the slope of the bed of the channel for maximum velocity. Take C = 60. **(06 Marks)**

c. Derive the conditions for the most economical rectangular channel. **(06 Marks)**

OR

8 a. Define hydraulic jump. List the applications of hydraulic jump. **(06 Marks)**

b. The discharge of water through a rectangular channel of width 8m, is 15m^3/s. When depth of flow of water is 1.2m. Calculate:

i) Specific energy of the flowing water.

ii) Critical depth and critical velocity.

iii) Value of minimum specific energy. **(06 Marks)**

c. Derive an expression for GVF in an open channel flow. **(08 Marks)**

Module-5

9 a. Derive an expression for force exerted by jet on moving curved vane in the direction of jet. **(08 Marks)**

b. Explain the neat sketch, the components of a pelton wheel (impulse) turbine. **(06 Marks)**

c. A jet of water of diameter 75mm moving with a velocity of 2.5m/s strikes a fixed plate in such a way that the angle between the jet and plate is 60°. Find the force exerted by the jet on the plate

i) In the direction normal to the plate and

ii) In the direction of the jet. **(06 Marks)**

OR

10 a. Explain with various components of a centrifugal pump. **(08 Marks)**

b. The internal and external diameters of the impeller of a centrifugal pump are 200mm and 400mm respectively. The pump is running at 1200 r.p.m. The vane angles of the impeller at inlet and outlet are 20° and 30° respectively. The water enters the impeller radially and velocity of flow is constant. Determine the work done by the impeller per unit weight of water. **(06 Marks)**

c. Write a note of multistage centrifugal pumps. **(06 Marks)**

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CBCS SCHEME

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21CV44

Fourth Semester B.E. Degree Examination, June/July 2024
Analysis of Structures

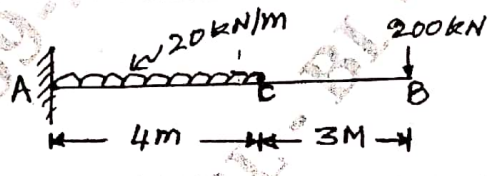
Time: 3 hrs. Max. Marks: 100

Note : 1. ***Answer any FIVE full questions, choosing ONE full question from each module.***
2. ***Any missing data assume suitably.***

Module-1

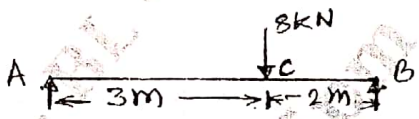
1 a. Determine the slope and deflection of the cantilever loaded beam shown in Fig. Q1(a) at the free end by Moment Area method. Take EI is constant. **(10 Marks)**

Fig. Q1(a)



b. Determine the slope at supports and deflection under point load for the beam shown in Fig. Q1(b) using Moment Area method. Take EI = Constant. **(10 Marks)**

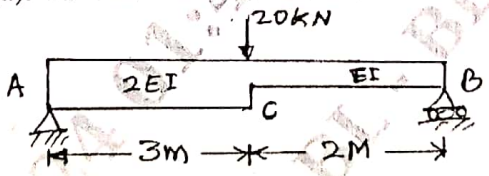
Fig. Q1(b)



OR

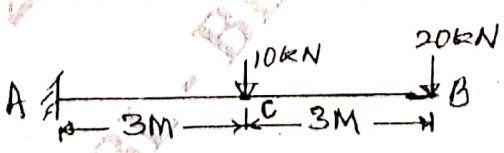
2 a. Determine the deflection under the point load and slope at A, using Conjugate Beam method for the shown in Fig. Q2(a). Take EI = 2×10^4 kN-m^2. **(10 Marks)**

Fig. Q2(a)



b. Determine the slope and deflection at the free end of a cantilever beam shown in Fig. Q2(b) by Conjugate Beam method. Take EI = 4×10^4 kN-m^2. **(10 Marks)**

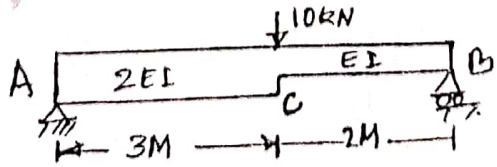
Fig. Q2(b)



Module-2

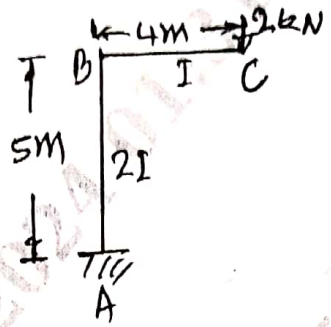
3 a. Determine the deflection for a simply supported beam shown in Fig. Q3(a) under the point load by Strain Energy method. Take EI = 5000 kN-m^2. **(10 Marks)**

Fig. Q3(a)



b. Determine the vertical deflection at 'C' in the frame shown in Fig. Q3(b) using Strain Energy method. Take EI = 6000 kN-m^2. **(10 Marks)**

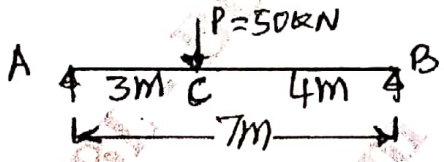
Fig. Q3(b)



OR

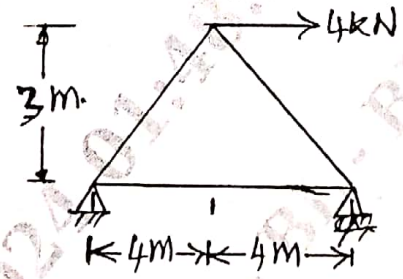
4 a. Find the deflection under point load for the beam shown in Fig. Q4(a) using Castigliano's First theorem. Take E = 2800 kN – m^2. **(10 Marks)**

Fig. Q4(a)



b. Determine the horizontal displacement of joint 'C' of the truss shown in Fig. Q4(b). The cross – sectional area of each member of the truss is A = 400mm^2 , E = 200kN/mm^2. Use Castigliano's theorem. **(10 Marks)**

Fig. Q4(b)



Module-3

5 a. A three hinged parabolic arch has a span of 20m and rise of 5m. It carries a UDL of 25kN/m over the left half of the span and a point load of 120kN at 5m from the right end. Find the BM , Normal thrust and Radial shear at a section 4m from the left end. **(10 Marks)**

b. A three hinged Segmental (circular) Arch of span 10m and central rise of 2.5m and supports a point load of 100kN at left Quarter span and Udl of 20kN/m over the right half of the span. Determine the reactions , Normal thrust and Radial shear at right quarter span. **(10 Marks)**

OR

6 a. A cable of span 20m and dip 4m carries a udl of 20kN/m over the entire span. Find the
i) Maximum and Minimum tension in the cable.
ii) Size and length of the cable. **(10 Marks)**

b. Determine the tension in the various segments of the cable as shown in Fig. Q6(b). Also determine the diameter of the cable required. If stress in the cable material is 150N/mm^2. **(10 Marks)**

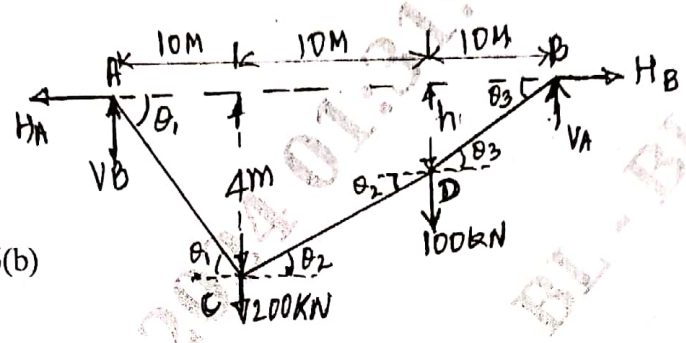


Fig. Q6(b)

Module-4

7 a. Analyse the two Span continuous beam as shown in Fig. Q7(a) by Slope deflection method and draw BMD. **(10 Marks)**

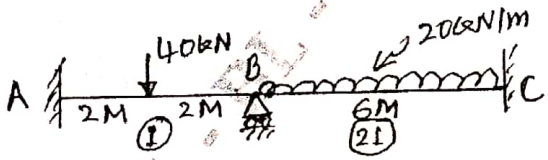


Fig. Q7(a)

b. Analyse the beam by Slope deflection method as shown in Fig. Q7(b). The support 'B' sinks by 5m. Take EI = 2.1 × 10^4 kN-m^2. Draw BMD. **(10 Marks)**

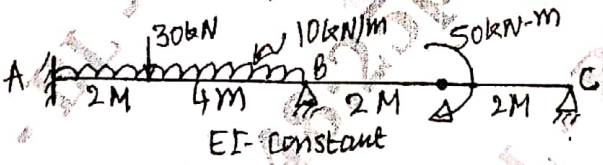


Fig. Q7(b)

OR

8 a. Anlayse the Rigid frame by the Slope deflection method as shown in Fig. Q8(a). **(10 Marks)**

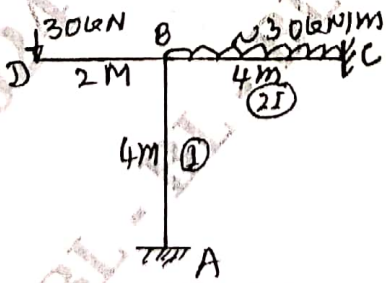


Fig. Q8(a)

b. Analyse the Portal frame shown in Fig. 8(b) by the Slope deflection method. **(10 Marks)**

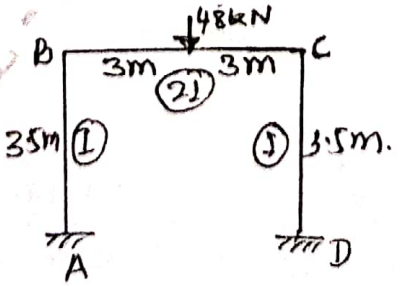
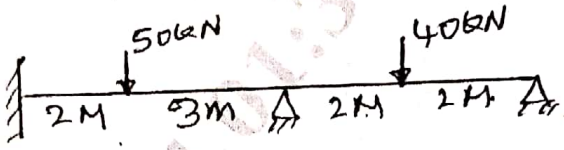


Fig. Q8(b)

Module-5

9 Analyse the Continuous beam shown in Fig. Q9, by Matrix flexibility method and draw BMD & SFD. Take moments as redundant. (Use system approach). **(20 Marks)**

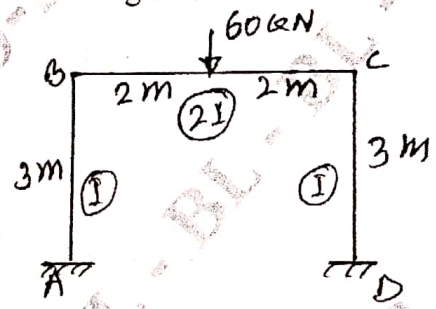
Fig. Q9



OR

10 Analyse the Symmetrical frame by the Stiffness method using system approach as shown in Fig. Q10. Draw the Bending moment diagram. **(20 Marks)**

Fig. Q10



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21C

CBCS SCHEME

21CV485

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Question Paper Version : A

Fourth Semester B.E./B.Tech. Degree Examination, June/July 2024
Green Buildings

Time: 1 hr.] [Max. Marks: 50

INSTRUCTIONS TO THE CANDIDATES

1. Answer all the **fifty** 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. Soil cement blocks help in reducing the amount of :
   a) Sand b) Cement c) Water d) Mortar

2. Stone blocks help in saving materials by reducing wall thickness from :
   a) 30 – 20mm b) 20 – 10 cm c) 20 – 10 mm d) 30 – 20 cm

3. FRP stands for
   a) Fibre reinforced polymer
   b) Fully reinforced polymer
   c) Fire resistant polymer
   d) Fibre reconditioned polymer

4. In _____ cement mortar is reinforced with wire meshes
   a) Fibre reinforced cement
   b) Wire reinforced cement
   c) Ferrocement
   d) Mesh mortar

5. Fibre Reinforced Concrete (FRC) is used in :
   a) Pavements b) Foundation c) Slab d) Beam

6. Concrete hollow bricks have the following characteristics :
   a) Less thermal insulation
   b) Costly
   c) Fast construction
   d) Decrease floor area

7. Which of the following is/are basic building materials?
   a) Wood b) Cement c) Brick d) All of these

8. Lime replaces the use of cement by 50% in lime based stone masonry.
   a) True b) False

9. Recycling steel reduces
   a) Energy use by 75%
   b) Energy use by 50%
   c) Energy use by 35%
   d) Energy use by 20%

10. Which of the below roofing materials is most effective?
    a) Asphalt b) Plastic c) Rubber d) Metal

11. In Rat_trap bond masonry course height is
    a) 110mm b) 75mm c) 230mm d) 190mm

12. By using filler slab technique :
    a) 20% saving of concrete is there
    b) Aesthetic ceiling is obtained
    c) Less comfort is there
    d) Load on foundation in creases

13. Economy can be achieved indoors, windows, ventilator by :
    a) No frame b) Less width c) Steel frames d) Less height

14. For sloping roofs, ferro cement roofing units can be used
    a) True b) False

15. Rat – trap bond masonry requires _____ less mortar
    a) 10% b) 50% c) 40% d) 20%

16. Which of the below is not a filler material in fillar slabs?
    a) Rubber pieces b) clay pots c) Burnt clay bricks d) Coconut shell

17. For natural and cost-effective ventilation, _____ can be used
a) Hollow bricks b) Wallopenings c) Skylight d) Brick Jali

18. COSTFORD full form
a) Centre of science and technology for rural development
b) Centre of science and technology for rural deployment
c) Centre of science and technology for rural department
d) Centre of science and technology for rural division

19. The agency which demonstrate the practical usage of cost effective technology and housing concepts through model houses
a) COSTFORD
b) NIRMITHI KENDRA
c) Habitat
d) All of these

20. The Nirmithi Kendras are established under the chairmanship of
a) Deputy Commissioner of District
b) Chief Executive Officer, Zilla Panchayat
c) District Commissioner
d) MP of District

21. Which one of the following cause global warming?
a) Carbon dioxide b) Oxygen c) Nitrogen d) Hydrogen

22. Which one of the following result takes place due to global warming?
a) Maintaining steady temperature
b) Changes in rainfall
c) Pleasant environment
d) Causing less pollution

23. Which one of the following cause global warming?
a) Radiative forcing
b) Earth gravitation force
c) Oxygen
d) Centripetal force

24. The concept of carbon foot print was developed by?
a) UNFCC
b) UNEP
c) William E. Rees and Mathis Wackernagel
d) Ernst Haeckel

25. According to carbon footprint challenge, India will slash its carbon emission by _____billion tons by the year 2030
a) 1 b) 2 c) 3 d) 4

26. You can help to decrease your carbon footprint by _____
a) Buying dally use stuff from online
b) By eating non-veg foods
c) Buying your needs from the local shop
d) Travelling a lots

27. Efforts taken in India to reduce global warming
a) Focus on renewable energy
b) Mobilisation of resources
c) International of Solar Alliance (ISA)
d) All of these

28. Embodied energy measured in buildings as
a) Initial embodied energy
b) Recurring embodied energy
c) Operational energy
d) All of these

29. The construction cost of green industrial manufacturing building is about _____ % higher than that of a conventional building
a) 18% b) 28% c) 38% d) 48%

30. The green building uses comparatively _____ % lower energy than
a) 11% b) 21% c) 31% d) 41%

31. Which of the following green rating systems are currently working in India?
a) LEED b) GRIHA c) both a and b d) none of these

32. LEED means _____
a) Leadership in energy and efficiency design
b) Leadership in energy and efficiency document
c) Leadership in energy and environmental design
d) Leadership in energy and Environmental document

33. LEED gives rating in form
a) 1star, 2 star, 3 star, 4 star, 5 star
b) Platinum, Gold and Sliver
c) both a and b
d) none of these

34. GRIHA means that m
a) Green Rating for Indian Habitat Assessment
b) Green Rating for Integrated Habitat Assessment
c) Green Rating for International Habitat Assessment
d) Green Rating for Information Habitat Assessment

35. When GRIHA was launched in India?
a) 2018 b) 2006 c) 2010 d) 2011

36. Sustainable planning considers, environmental, social, and _____ impacts of a buildings
a) Technological b) Economical c) Both a and b d) None of these

37. Which of the following options is not included in the sustainable development parameters?
a) Gender inequality and diversity
b) Intergenerational equality
c) Growing annually
d) None of these

38. What is the definition of sustainable development?
a) The growth that satisfies current demands without jeopardizing future generations ability to fulfill their own needs
b) Conserve mineral wealth and explore alternative energy sources while decreasing pollution and environmental impact
c) It is the process of creating land and building projects in such a way that they have environmental effect by enabling them to produce fuel efficient self sufficiency patterns
d) All of these

39. Sustainable building means that
a) Green building
b) Environmental building
c) Both "a" and "b"
d) none of these

40. Characteristics of Green buildings
a) location and transport
b) sustainable sites
c) efficient use of water
d) All of these

41. Solar energy knows as "_____"
a) power energy
b) green energy
c) electrical energy
d) all of these

42. Reasons use solar technologies for buildings
a) Increasing energy consumption
b) Environmental consciousness
c) Global climate change
d) All of these

43. Solar powered building improve that heating and cooling system's efficiency by _____ %
a) 30 b) 20 c) 10 d) 0

44. The key components of water efficiency in green building according to the USGBC are :
a) Reduce indoor potable water use
b) Reduce water consumption to save energy
c) Improve Environmental well being
d) All of these

45. The methods to water management are as follows
a) Rain water harvesting
b) Ground water recharge
c) Artificial ground water recharge
d) Drip irrigation

46. How many major sources of solids waste are there based on their origin?
a) 10 b) 5 c) 9 d) 6

47. The term ISWM refers to
a) International Solid Waste Management
b) Integrated Solid Waste Management
c) International Solid Waste Machine
d) integrated Solid Waste Machine

48. In how many stages the treatment of waste-water in STPs is carried out?
a) One b) Two c) Three d) Four

49. Green cover is a natural or planted vegetation covering a certain area of terrain, functioning as protection against soil erosion, protecting the fauna, and balancing the temperature
a) True b) False

50. Built environment can be defined as
a) human made surroundings that provide the setting for human activity
b) material, spatial and cultural product of human labor that combines physical elements and energy in forms of living working and playing
c) human made space in which people live, work and recreate on a day to day basis
d) All of these.

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CBCS SCHEME

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21MATCS41

Fourth Semester B.E. Degree Examination, June/July 2024
Mathematical Foundations for Computing, Probability and Statistics

Time: 3 hrs. Max. Marks: 100

Note: **1.** ***Answer any FIVE full questions, choosing ONE full question from each module.***
2. ***Provide data table book.***

Module-1

1 a. Define tautology. Show that the compound proposition $[p \rightarrow (q \rightarrow r)] \rightarrow [(p \rightarrow q) \rightarrow (p \rightarrow r)]$ is a tautology for any propositions p, q, r. **(06 Marks)**

b. Prove that (i) $p \vee [p \wedge (p \vee q)] \equiv p$ (ii) $[(\neg p \vee \neg q) \rightarrow (p \wedge q \wedge r)] \equiv p \wedge q$ using the laws of logic. **(07 Marks)**

c. Prove that for all integers k and ℓ is k and ℓ are both odd, then $k + \ell$ is even and $k\ell$ is odd. **(07 Marks)**

OR

2 a. Define: (i) Universal quantifiers (ii) Existential quantifiers, with an example. **(06 Marks)**

b. Test the validity of the following argument.
I will become famous or I will not become a musician.
I will become a musician.
Therefore I will become famous. **(07 Marks)**

c. Suppose the universe consist of integers. Consider the following open statements:
$p(x) : x \leq 3$, $q(x) : x + 1$ is odd $r(x) : x > 0$.
Write down the truth values of:
(i) p(2) (ii) $\vee$q (4) (iii) $p(-1) \wedge q(1)$ (iv) $\sim p(3) \vee r(0)$
(v) $p(0) \rightarrow q(0)$ (vi) $p(1) \leftrightarrow \sim q(2)$ (vii) $p(4) \vee (q(1) \wedge r(2))$ **(07 Marks)**

Module-2

3 a. Let A and B be finite sets with |A| = m and |B| = n. Find how many one to one functions are possible from A to B. If there are 60 1 – 1 functions from A to B and |A| = 3, what is |B|? **(06 Marks)**

b. Let A = {1, 2, 3, 4, 6, 12} and R be a relation on A defined by aRb if "a is a multiple of b". Write down the relation R, relation matrix M(R) and draw its digraph. **(07 Marks)**

c. Define: (i) Null graph (ii) Bipartite graph (iii) Euler circuit. Give an example for each. **(07 Marks)**

OR

4 a. Draw the Hasse diagram representing the positive divisors of 48. **(06 Marks)**

b. Consider the functions f and g defined by $f(x) = x^3$ and $g(x) = x^2 + 1 \ \forall \ x \in R$. Find gof, fog, f^2. **(07 Marks)**

c. Define isomorphism of graphs. Prove that 2 graphs below are isomorphic.

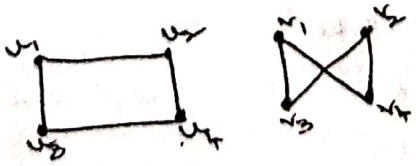

Fig.Q.4(c) **(07 Marks)**

Module-3

5 a. Find the correlation coefficient between the speed and the stopping distance and th equations of regression lines.

Speed, x	16	24	32	40	48	56
Stopping distance, y	0.39	0.75	1.23	1.91	2.77	3.81

(06 Marks)

b. Fit a best curve of the form $y = ax^b$ for the following data:

x	1	2	3	4	5
y	0.5	2	4.5	8	12.5

(07 Marks)

c. Fit a straight line by the method of least squares.

x	1	2	3	4	5
y	14	13	9	5	2

(07 Marks)

OR

6 a. The following are the percentage of marks in 2 subjects of 9 students. Find the rank correlation coefficient.

x	38	50	42	61	43	55	67	46	72
y	41	64	70	75	44	55	62	56	60

(06 Marks)

b. Fit a 2nd degree parabola $y = a + bx + cx^2$ for the data:

x	0	1	2	3	4	5
y	1	3	7	13	21	31

(07 Marks)

c. Given that $8x - 10y + 66 = 0$ and $40x - 18y = 214$ are the regression equations. Find the means of x and y and correlation coefficient. Find σ_y if $\sigma_x = 3$. **(07 Marks)**

Module-4

7 a. A random variable X has the following probability function:

x	–2	–1	0	1	2	3
P(x)	0.1	K	0.2	2K	0.3	K

Find: (i) K (ii) $P(X < 1)$ (iii) $P(X > -1)$ **(06 Marks)**

b. Find the mean and standard deviation of Poisson distribution. **(07 Marks)**

c. The mean weight of 500 students in a school is 50 kgs and the standard deviation is 6 kgs. Assuming that the weights are normally distributed, find the expected number of students weighing (i) between 40 and 50 kg (ii) more than 60 kg. Given that A(1.67) = 0.4525. **(07 Marks)**

OR

8 a. Find the constant K such that

$$f(x) = \begin{cases} Kx^2, & 0 \le x \le 3 \\ 0, & \text{elsewhere} \end{cases}$$

is a probability density function. Find the mean. **(06 Marks)**

b. When an honest coin is tossed 4 times, find the probability of getting:
(i) exactly one head (ii) atmost 3 heads (iii) at least 2 heads **(07 Marks)**

c. The probability that an individual suffers a bad reaction from a certain injection is 0.001. Using Poisson distribution, find the probability that out of 2000 individuals:
(i) exactly 3 (ii) more than 2 will suffer a bad reaction. **(07 Marks)**

Module-5

9 a. X and Y are independent random variables such that X takes 1, 5 with probabilities $\frac{1}{2}, \frac{1}{2}$ respectively. Y takes –4, 2, 7 with probabilities $\frac{3}{8}, \frac{3}{8}$ and $\frac{1}{4}$ respectively. Find the joint probability distribution of X and Y. Find Cov (X, Y). **(06 Marks)**

b. Find the student 't' for the following variables values in a sample of eight –4, –2, –2, 0, 2, 2, 3, 3 taking the mean of the universe to be zero. **(07 Marks)**

c. The following are the I.Q's of a randomly chosen sample of 10 boys: 70, 120, 110, 101, 88, 83, 95, 98, 107, 100. Does this data support the hypothesis that the population mean of I.Q's is 100 at 5% level of significance? **(07 Marks)**

OR

10 a. Explain the terms:
(i) Null hypothesis
(ii) Alternate hypothesis
(iii) Levels of significance
(iv) Type 1 and Type 2 errors **(06 Marks)**

b. A die is thrown 60 times and the frequency distribution for the number appearing on the face x is given by the following table:

x	1	2	3	4	5	6
Frequency	15	6	4	7	11	17

Test the hypothesis that the die is unbiased. Use Chisquare test at 5% level of significantly. **(07 Marks)**

c. The nine items of a sample have the following values 45, 47, 50, 52, 48, 47, 49, 53, 51. Does the mean of these differ significantly from the assumed mean of 47.5 ($t_{0.05} = 2.31$). **(07 Marks)**

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CBCS SCHEME

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21MAT41

Fourth Semester B.E. Degree Examination, June/July 2024
Complex Analysis, Probability and Statistical Methods

Time: 3 hrs. Max. Marks: 100

***Note:** 1. Answer any FIVE full questions, choosing ONE full question from each module.*
2. Use of Normal distribution tables can be permitted.
3. Use of Students distribution tables can be permitted.

Module-1

1 a. Derive the C-R equations in Polar form. **(06 Marks)**

b. Construct the analytic function whose real part is $\psi = x^2 - y^2 + \frac{x}{x^2+y^2}$. **(07 Marks)**

c. If f(z) is a regular function, prove that $\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right)|f(z)|^2 = 4|f'(z)|^2$. **(07 Marks)**

OR

2 a. State and prove the Cauchy's integral formula. **(06 Marks)**

b. Show that $f(z) = e^x(\cos y + i \sin y)$ is analytic and find its derivative. **(07 Marks)**

c. Evaluate $\int_C \frac{e^{2z}}{(z-1)(z-2)} dz$, where $C: |z| = 3$. **(07 Marks)**

Module-2

3 a. Prove that $J_{\frac{1}{2}}(x) = \sqrt{\frac{2}{\pi x}} \sin x$. **(06 Marks)**

b. Prove that $\int_0^1 x J_n(\alpha x) J_n(\beta x) dx = 0$, $\alpha \neq \beta$. **(07 Marks)**

c. Express $x^3 - 5x^2 + x + 2$ in terms of Legendre's polynomial. **(07 Marks)**

OR

4 a. Show that $J_{-n}(x) = (-1)^n . J_n(x)$. **(06 Marks)**

b. Prove that $P_4(x) = \frac{1}{8}(35x^4 - 30x^2 + 3)$. **(07 Marks)**

c. Show that $x^3 - 5x^2 + x + 2 = \frac{2}{5}P_3(x) - \frac{10}{3}P_2(x) + \frac{8}{5}P_1(x) + \frac{1}{6}P_0(x)$. **(07 Marks)**

Module-3

5 a. Find the regression line y on x and calculate y when x = > 0.

x:	71	68	66	67	70	71	70	73	72	65	66
y:	69	64	65	63	65	62	65	64	66	59	62

(06 Marks)

b. Ten participants in a contest are ranked by two judges as follows:

x:	1	6	5	10	3	2	4	9	7	8
y:	6	4	9	8	1	2	3	10	5	7

Calculate the rank co-efficient of correlation. **(07 Mark**

c. Fit a curve $y = ax^b$ from the following data :

x:	1	2	3	4	5
y:	0.5	2.0	4.5	8.0	12.5

(07 Marks)

OR

6 a. Given the equation of the lines $8x - 10y + 66 = 0$ and $40x - 18y = 214$. Compute the mean's of x and y, the coefficient of correlation and find σ_y if $\sigma_x = 3$. **(06 Marks)**

b. Fit a second degree parabola $y = ax^2 + bx + c$ in the least squares for the following data :

x :	1	2	3	4	5
y :	10	12	13	16	19

(07 Marks)

c. Find the lines of regression of the following data :

x :	1	2	3	4	5	6	7
y :	9	8	10	12	11	13	14

(07 Marks)

Module-4

7 a. A random variable X has the following probability density function :

X :	-2	-1	0	1	2	3
P(X) :	0.1	K	0.2	2K	0.3	K

Find the value of K, mean and variance. **(06 Marks)**

b. Derive the mean and variance of Binomial distribution. **(07 Marks)**

c. The marks of 1000 students in an examination follows a normal distribution with mean 70 and standard deviation 5. Find the number of students whose marks will be, (i) less than 65 (ii) more than 75 (iii) between 65 and 75. **(07 Marks)**

OR

8 a. A random variable X has the pdf $f(x) = \begin{cases} Kx^2, & -3 < x < 3 \\ 0, & \text{elsewhere} \end{cases}$

Evaluate K, find (i) $P(1 \le x \le 2)$ (ii) $P(x \le 2)$ (iii) $P(x > 1)$. **(06 Marks)**

b. If the probability of a bad reaction from a certain injection is 0.001, determine the chance that out of 2000 individuals more than two will get a bad reaction. **(07 Marks)**

c. In an examination 7% of students score less than 35 marks and 89% of students score less than 60 marks. Find the mean and standard deviation, if the marks are normally distributed. **(07 Marks)**

Module-5

9 a. The following joint probability distribution of the random variable X and Y as follows:

X \ Y	1	3	9
2	$\frac{1}{8}$	$\frac{1}{24}$	$\frac{1}{12}$
4	$\frac{1}{4}$	$\frac{1}{4}$	0
6	$\frac{1}{8}$	$\frac{1}{24}$	$\frac{1}{12}$

Determine the marginal distributions of X and Y. Find (i) E(X) and E(Y) (ii) COV(X, Y). **(06 Marks)**

(07 Marks)

b. A sample of 900 items has mean 3.4 and S.D 2.61. Can the sample be regarded from population with mean 3.25 at 5% LOS? **(07 Marks)**

c. The theory predicts the proportion be in the four groups G_1, G_2, G_3, G_4 should be in the ratio 9 : 3 : 3 : 1. In experiment with 1600 beans the numbers in the groups were 882, 313, 287 and 118. Do the experimental result support the theory. **(07 Marks)**

OR

10 a. Define the terms : (i) Type – I and Type – II errors (ii) Null hypothesis (iii) Level of significance. **(06 Marks)**

b. A machinist is making engine parts with axle diameter of 0.7 inch. A random sample of 10 parts shows mean diameter 0.742 inch with S.D. of 0.04 inch. On the basis of this sample would you say that the work is inferior? **(07 Marks)**

c. Fit a Poisson distribution to the following data is and test for its goodness of fit at 5% LOS.

x	0	1	2	3	4
y	419	352	154	56	19

(07 Marks)

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21BE45

Fourth Semester B.E. Degree Examination, June/July 2024
Biology for Engineers

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 classification of carbohydrates with examples. **(06 Marks)**

b. Explain the working of DNA finger printing for forensic applications. **(06 Marks)**

c. Discuss the benefits and uses of plant based proteins as alternatives to animal based proteins. **(08 Marks)**

OR

2 a. Discuss the key features of RNA vaccine for COVID-19 with examples. **(06 Marks)**

b. Elucidate the process of obtaining bio-diesel from lipids. Discuss any four advantages of bio-diesel? **(08 Marks)**

c. Explain the role of glucose-oxidase enzyme in biosensors and lignolytic enzyme in bio-bleaching. **(06 Marks)**

Module-2

3 a. Compare and list the salient features of human brain as CPU of a computer and discuss their architectures using suitable diagrams. **(08 Marks)**

b. Explain the term cataract giving reasons for its cause and symptoms? What is the solution to overcome the same? List any two lens materials in use? **(04 Marks)**

c. Using relevant diagram describe the electrical signaling of the human heart and it's monitoring in the ECG trace. **(08 Marks)**

OR

4 a. Compare and explain the similarities between the working of human eye with that of a camera, using suitable diagrams. **(08 Marks)**

b. Explain the term electro encephalography (EEG)? Discuss any four engineering solutions for Parkinson's disease. **(07 Marks)**

c. Discuss the design features of stent. **(05 Marks)**

Module-3

5 a. Using the architecture diagram, explain the mechanism of purification of air in lungs and the exchange of O_2 , CO_2 gases. **(08 Marks)**

b. Discuss the causes, symptoms and treatment options for chronic kidney disease (CKD). **(06 Marks)**

c. Using the architecture diagram, explain the working of skeletal muscle. **(06 Marks)**

OR

6 a. Describe the term Chronic Obstructive Pulmonary Disease (COPD). Give reasons for its cause and the possible medical treatment options. **(06 Marks)**

b. With neat architecture diagram, explain the mechanism of filtration of blood in kidneys and the formation of urine. **(08 Marks)**

c. Discuss any three bioengineering solutions for muscular dystrophy and osteoporosis. **(06 Marks)**

Module-4

7 a. Describe the working principle of ultrasonography. List any four uses of ultrasonography. **(08 Marks)**

b. Discuss any four technological applications of bionic leaf. **(04 Marks)**

c. Compare and discuss the bio mimicking facts about birds fly with that of aircraft technology. **(08 Marks)**

OR

8 a. Explain the lotus leaf effect and discuss any two applications of super hydrophobic and self cleaning surfaces. **(08 Marks)**

b. Discuss any five applications of Velcro technology. **(05 Marks)**

c. Discuss the basic requirements for human blood substitutes. Discuss any two advantages and haemoglobin based oxygen carries and perflourocarbons as human blood substitutes. **(07 Marks)**

Module-5

9 a. Describe the working of any one bioprinting technique using suitable diagram. Make a list of bioprinting materials. **(07 Marks)**

b. Discuss the concepts and technology behind the working of electrical tongue in food science. **(06 Marks)**

c. Explain the process of removing polluting heavy metals using bioremediation or biomining via microbial surface adsorption. Give examples of the microbes used for removing any two polluting heavy metals. **(07 Marks)**

OR

10 a. Discuss the importance of 3D printing in food industry. Give examples of 3D printed foods. **(06 Marks)**

b. Explain the term DNA origami and its technological importance. **(06 Marks)**

c. Discuss any four applications and limitations of artificial intelligence for disease diagnosis. **(08 Marks)**

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18 V Sem. CV

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CBCS SCHEME

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18CV51

Fifth Semester B.E. Degree Examination, June/July 2024
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. Briefly explain the characteristic of management. **(10 Marks)**

b. Define construction management. Briefly explain key concept of construction project management. **(10 Marks)**

OR

2 a. Briefly explain procedure for critical path method. Write its merits and demerits. **(10 Marks)**

b. Explain the purpose of planning. List the different types of plans. **(10 Marks)**

Module-2

3 a. What are the factor affecting the productivity. **(10 Marks)**

b. List out the various classification of construction equipment. Briefly explain estimation of productivity of earth moving equipment. **(10 Marks)**

OR

4 a. List out the points to be considered while selection of appropriate construction equipments. **(10 Marks)**

b. Explain : i) Needs of martial management ii) Types of inventories. **(10 Marks)**

Module-3

5 a. What is the need for engineering ethics. Enumerate in brief the factors considered for work ethics. **(10 Marks)**

b. Explain the safety measures during : i) Excavation work ii) Bituminous work. **(10 Marks)**

OR

6 a. Briefly explain : i) Bridle and gift ii) Whistle blowing. **(10 Marks)**

b. Briefly explain the elements of total quality management in construction process. **(10 Marks)**

Module-4

7 a. Briefly discuss the principles of engineering economy. **(10 Marks)**

b. Briefly explain : i) Break even analysis ii) Simple and compound interest. **(10 Marks)**

OR

8 a. Differentiate between micro and macro economics. **(10 Marks)**

b. Briefly explain : i) Deferred Annuity ii) Capitalized cost method. **(10 Marks)**

Module-5

9 a. Explain the stages in entrepreneurial process. **(10 Marks)**

b. Explain the different types of feasibility study. **(10 Marks)**

OR

10 a. What are the objectives and functions of : i) KIADB ii) DIC. **(10 Marks)**

b. what is business plan? Briefly discuss the objectives of a business plan. **(10 Marks)**

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CBCS SCHEME

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18CV52

Fifth Semester B.E. Degree Examination, June/July 2024
Analysis of Indeterminate Structures

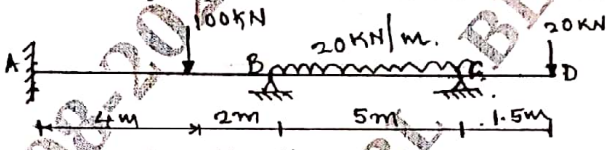
Time: 3 hrs. Max. Marks: 100

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

Module-1

1 Analyze continuous beam ABCD by slope deflection method. Construct SFD and BMD.

Fig.Q1

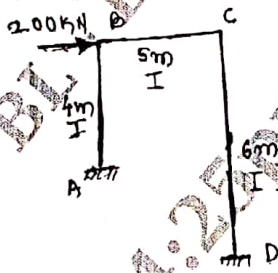


(20 Marks)

OR

2 Analyze the frame shown in Fig.Q2 by slope deflection method and draw BMD.

Fig.Q2



(20 Marks)

Module-2

3 Analyze the beam shown in Fig.Q.3 by moment distribution method. Draw BMD EI is constant. **(20 Marks)**

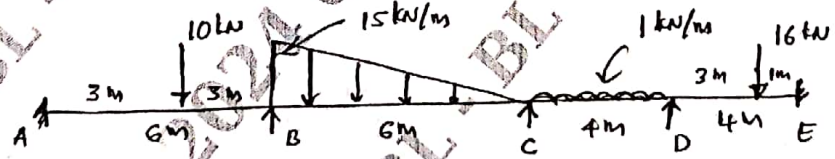
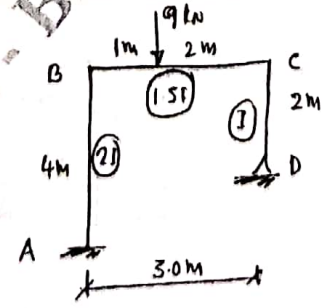


Fig.Q.3.

OR

4 Analyze the portal frame by moment-distribution method draw BMD. **(20 Marks)**

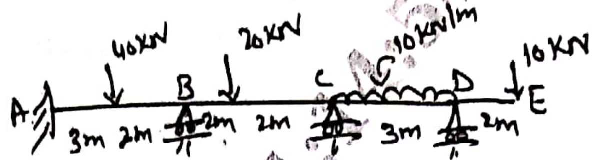
Fig. Q4.



Module-3

5 Analyse the continuous beam shown in Fig Q5 by moment distribution method and draw BMD.

Fig. Q5.

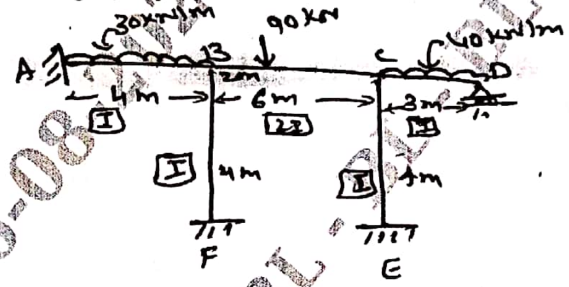


(20 Marks)

OR

6 Analyse the frame shown in Fig Q6 by moment distribution method and draw BMD and SFD.

Fig. Q6

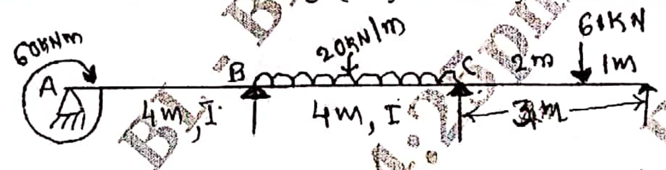


(20 Marks)

Module-4

7 Analyze the continuous beam shown in Fig.Q7 by flexibility method. Draw BMD. (20 Marks)

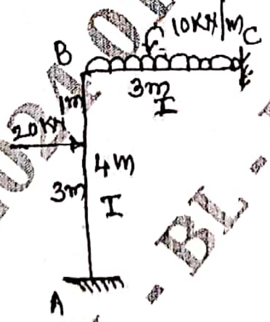
Fig.Q7



OR

8 Analyze frame shown in Fig.Q8 by flexibility matrix approach. Draw BMD. (20 Marks)

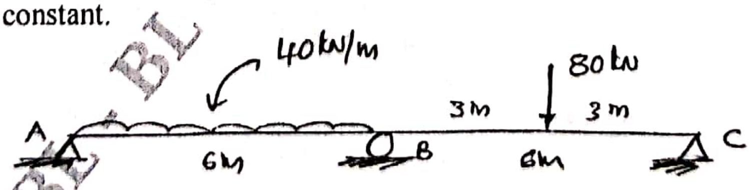
Fig.Q8



Module-5

9 Analyze the continuous beam by stiffness matrix method (system approach) shown in Fig.Q.9. Draw BMD EI is constant. (20 Marks)

Fig. Q9.



OR

10 Find the forces in the members of a joint 'O' shown in Fig.Q.10 by stiffness matrix method. (system approach). **(20 Marks)**

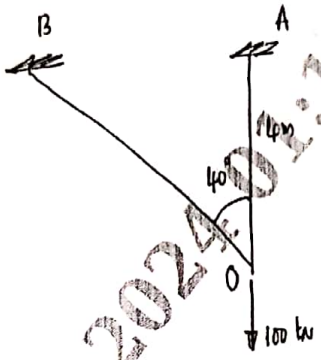


Fig. Q10.

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18CV53

Fifth Semester B.E. Degree Examination, June/July 2024
Design of RC Structural Elements

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Use of IS456-2000, SP-16 id permitted.
3. Assume suitable additional data, if necessary.

Module-1

1 a. Explain the terms balanced section, under reinforced section and over reinforced sections in beams, subjected to flexure with neat sketches. **(12 Marks)**

b. What is limit state? Explain different limit states to be considered in the design of RC beams. **(08 Marks)**

OR

2 a. Explain the factors that affect short and long term deflections. **(10 Marks)**

b. Show that $\chi_{u\,max} = 0.46\,d$, for Fe500 steel. **(10 Marks)**

Module-2

3 a. A RC beam of section 230mm×500mm (overall) is reinforced with 4#16 with an effective cover of 40 mm of span 5 m. Find the central point load carrying capacity of the section excluding self-weight. Find the ultimate moment of resistance of the beam. Use M20 and Fe 415 steel. **(10 Marks)**

b. A rectangular beam is 200 mm wide and 500 mm deep. It is reinforced with 4 bars of 25 mm dia bars in compression with an effective cover of 50 mm. Determine the area of tension reinforcement needed to make the beam section fully effective, what then be the M_u? Use M20 concrete and Fe 250 steel. **(10 Marks)**

OR

4 a. Determine the flexural steel reinforcement at mid span for a simply supported beam of effective span of 5.25 m. The characteristic Dead and Live load shall be 15 KN/m and 20 KN/m respectively. The cross sectional dimensions are width 300 mm and effective depth 675 mm. Use M20 concrete and Fe 415 steel **(10 Marks)**

b. A T-Beam has flange dimensions of 1500×120 mm. The width of rib is 250 mm and rib depth is 350 mm. If the beam is reinforced with 1900 mm^2 of steel in tension zone with an effective cover of 40 mm, determine the max allowable UDL inclusive of self weight over a simply supported span of 6 m. Use M20 concrete and Fe415 steel. **(10 Marks)**

Module-3

5 A rectangular beam is to be simply supported on supports of 230 mm width. The clear span of the beam is 6 m. The beam is to have width of 300 mm. The characteristic super imposed load is 12 KN/m. Using M20 concrete and Fe415 steel, design the beam. Sketch the reinforcement details. **(20 Marks)**

OR

6 A T-Beam slab floor has 125 mm thick slab forming part of T-beams which are of 8 m clear span. The end bearing are 450 mm thick. Spacing of T-Beams is 3.5 m. The LL on the floor is 3 kN/m^2. Design one of the intermediate beams. Use M20 concrete and Fe415 steel. Sketch the reinforcement details. **(20 Marks)**

Module-4

7 Design a slab for a room of clear internal dimensions 3m×5m supported on walls of 300 mm thickness with corner held down. Two adjacent edges of the slab are continuous and other two discontinuous. LL = 3 kN/m^2 and FF = 1 kN/m^2. Use M20 concrete and Fe415 grade steel. Sketch the reinforcement details. **(20 Marks)**

OR

8 Design a dog-legged staircase for a public building, given the following data :
Clear dimensions of staircase hall is (3m×5m)
Height between the floors = 3.5 m
Rise = 150 mm ; Tread = 280 mm
Width of flight = landing width = 1.45 m
Assume the stairs to be supported on 230 mm thick masonry walls at the outer edges of the landings, parallel to risers. Use M20 concrete and Fe415 steel. Sketch the reinforcement details. **(20 Marks)**

Module-5

9 a. A 3m height column is effectively held in position at both ends and restrained against rotation at one end. Design the column to carry factored axial load of 3000 kN. Use M20 concrete and Fe415 steel. Sketch the reinforcement details. **(10 Marks)**

b. Design a RCC column (400×400) to carry an ultimate load of 1000 kN and eccentricity 160 mm. Use M25 grade concrete and Fe415 grade steel. Sketch the reinforcement details. **(10 Marks)**

OR

10 A square column 400 mm sides carries a load of 900 kN. Design a footing.
SBC of soil = 100 kN/m^2. Adopting M20 and Fe415, show the check for one way, two way shear and bond strength. **(20 Marks)**

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18CV54

Fifth Semester B.E. Degree Examination, June/July 2024
Basic Geo Technical 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 the following from the phase diagram :
i)Void ratio ii) porosity ii) degree of saturation iv) percent air voids v) air contact. **(05 Marks)**

b. Prove the following relationship from the phase diagram :

$$r_b = \left(\frac{G_S + S.e}{1+e}\right) r_w$$ **(07 Marks)**

c. The soil has porosity of 40% and specific gravity of 2.7. Then calculate void ratio, dry unit weight (r_d) and unit weight for 50% saturation and 100% saturation. **(08 Marks)**

OR

2 a. Classify the soil is well graded or poorly graded from the sieve analysis. **(07 Marks)**

b. Define the following indices :
i) Plasticity index
ii) Liquidity index
iii) Consistency index
iv) Toughness index
v) Density index. **(05 Marks)**

c. Write a note on ISCS for classification of soil and also explain the use of plasticity chart with an example. **(08 Marks)**

Module-2

3 a. Describe single grained, honey combed flocculent and dispersed structures. **(06 Marks)**

b. Write a note on diffuse double layer. **(06 Marks)**

c. Explain 3 different clay minerals with neat sketches. **(08 Marks)**

OR

4 a. Write a note on factors affecting compaction. **(05 Marks)**

b. How do you calculate placement water context by using protocol's needle method? **(07 Marks)**

c. Plot the compaction curve and determine OMC and maximum dry density, also determine the degree of saturator and percentage of air voids at maximum dry density. The SPCT values are as given below :

W.C%	5	10	14	20	25
Bulk density (kN/m^3)	17.6	19.8	21.0	21.7	21.5

(08 Marks)

Module-3

5 a. Write a note on confined pumping flow test for calculation of coefficient of permeability. **(06 Marks)**

b. How do you calculate the coefficient of permeability for horizontal flow in the case of stratified soils? **(06 Marks)**

c. A constant head permeability test was run as a sand sample of 16cm in length and 60cm^2 in c/s area. Porosity was $n_1 = 40\%$ under a constant head of 30cm, the discharge was found to be 45cm^3 in 18sec. Calculate the coefficient permeability. Also determine the discharge velocity and seepage velocity during the test. Estimate the permeability of the sand for a porosity of $n_2 = 35\%$. **(08 Marks)**

OR

6 a. Explain the characteristics of flow nets with a neat sketch. **(06 Marks)**

b. How do you locate the phreatic line in a day with filth by using a Casagrande's method? **(10 Marks)**

c. Write a note on quick sand phenomena. **(04 Marks)**

Module-4

7 a. Write a note on Mohr-coulomb failure criteria. **(08 Marks)**

b. List out the factors affecting the shear strength of soils. **(06 Marks)**

c. Write a note on sensitivity and thixotropy. **(06 Marks)**

OR

8 a. What are the advantages of triaxial test over direct shear test? **(06 Marks)**

b. Write a note on vane –shear test. **(06 Marks)**

c. A series of direct shear tests was conducted as a soil, each test was carried out till the sample failed. The results are as following. Determine the cohesion intercept and the angle of shearing resistance.

Sample no. 1	Normal stress (KPa)	Shear stress (KPa)
1	15	18
2	20	25
3	45	32

(08 Marks)

Module-5

9 a. What are the assumptions and limitations of Terzaghi's 1 – D consolidation theory? **(08 Marks)**

b. Define the following : i) C_C ii) C_V iii) a_v iv) m_v. **(06 Marks)**

c. Explain the Casagrande's method for data mining the pre-consolidation pressure. **(06 Marks)**

OR

10 a. Define normally consolidation over consolidate and under consolidated soils. **(06 Marks)**

b. Write a note on square root of time fitting method for calculation of coefficient of consolidation. **(08 Marks)**

c. In a consolidation test on a soil, the void ratio of the sample decreases from 1.242 to 1.12 when the pressure is increased from 20 to 40 tons/m^2. Calculate the coefficient of consolidation. Given that the coefficient of permeability of the soil during this pressure increases, $K = 8.5 \times 10 - 3$ cm/sec. **(06 Marks)**

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18CV55

Fifth Semester B.E. Degree Examination, June/July 2024
Muncipal Waste Water 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 methods of sewage disposal and systems of disposal. **(10 Marks)**

b. Define Dry and Wet weather flow and discuss the factors affecting dry and wet weather flow. **(10 Marks)**

OR

2 a. Explain man hole with sketch. **(10 Marks)**

b. With the neat sketch, explain the basic principles of house drainage works. **(10 Marks)**

Module-2

3 a. Explain Self cleaning , Non – scouring and regime velocity in sewage flow. **(10 Marks)**

b. The main sewer was designed for an area of 50km^2. Density of population of town is 200 persons/hectare. The average flow is 250 ℓpcd. The peak discharge is 1.5 times more than average flow. Rainfall equivalent of 8mm in 24 hours, all of which are runoff. Determine i) The capacity of sewer ii) Min. velocity and gradient required to transport sewage containing coarse sand of 1mm dia. through a sewer of 35cm dia, sp. Gr of particle is 2.65 and value of K = 0.06 , f = 0.03. **(10 Marks)**

OR

4 a. Explain the municipal waste water treatment process with flow diagram. **(10 Marks)**

b. What are the physical , chemical and biological characteristics of sewage? **(10 Marks)**

Module-3

5 a. Explain the importance of screens and types of screens in the sewage treatment process. **(10 Marks)**

b. Explain the i) Sewage forming ii) Grit chamber. **(10 Marks)**

OR

6 a. Explain Oxygen sag curve and zones of purification. **(10 Marks)**

b. Sewage flow of 100 cumec from a city is discharged in a perennial river which is fully saturated with oxygen and flows at a min rate of 1250 cumec with a min velocity of 0.15m/sec in the 5 day BOD of the sewage is 260mg/ℓ. Find out where the critical DO will occur in the river. Assume coefficient of purification of river as 4.0 , coefficient of DO as 0.11 , the ultimate BOD as 125% of the 5 day BOD of the mixure of sewage and river water, temp of 20°C for which DO is 9.17mg/ℓ and DO of effluent as zero. **(10 Marks)**

Module-4

7 a. Explain Activated Sludge processes. **(10 Marks)**

b. Design a set of two circular sedimentation tanks to treat 5 Mltrs of sewage per day. Assume detention period of 2 hours. **(10 Marks)**

OR

8 a. Explain sludge digestion areas with a neat sketch. **(10 Marks)**

b. Design a low rate filter to treat 6.00 MLD of sewage of BOD of 210 mg/ℓ. The final effluent should be 30mg/ℓ and organic loading rate is 320g/m^3/d. Assume 30% of BOD load removed in primary sedimentation. **(10 Marks)**

Module-5

9 a. Explain how cost treatment process of sewage. **(10 Marks)**

b. Explain principle and design of septic tank. **(10 Marks)**

OR

10 a. Explain Eco toilets and its process. **(10 Marks)**

b. Explain Soak pit with neat sketch. **(10 Marks)**

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18CV56

Fifth Semester B.E. Degree Examination, June/July 2024
Highway Engineering

Time: 3 hrs. Max. Marks: 100

Note: *1. Answer any FIVE full questions, choosing ONE full question from each module.*
2. HRB/PRA soil classification table is allowed.

Module-1

1 a. Explain the role of transportation in social and economic development of the country. **(06 Marks)**

b. Explain the recommendations of Jayaker–Committee. List the implementation of Jayakar – Committee. **(06 Marks)**

c. The area of a certain district in India is 82,000km^2 and here are 85 towns as per 1981 census. Determine the lengths of different categories of roads to be provided in third twenty year road development plan. [Density and road 82km/100km^2 area]. **(08 Marks)**

OR

2 a. Draw a neat sketch :
i) Radial or star and circular
ii) Radial or star and grid pattern. **(06 Marks)**

b. Explain with sketches the various factors controlling the alignment of roads. **(08 Marks)**

c. There are five alternate proposals of road plans for a backward district. The details are given below. Utility units of 0.5, 1, 2, 4 and 8 for the live population ranges and 1 and 5 per 1000A of agricultural and industrial products served.

Proposal	Road length km	Number of town and villages served population					Productivity	In 10001
		< 2000	2001 – 5000	5001 – 10,000	10001 – 20000	>20,000	Agricultural	Industrial
P	500	100	150	40	20	3	150	20
Q	600	200	250	68	28	3	220	25
R	700	270	350	82	36	4	300	35
S	800	280	410	91	41	4	400	42
T	900	290	430	96	44	4	430	45

(06 Marks)

Module-2

3 a. Define camber. What are the objects of camber? Discuss the factors on which the amount of camber to be provided depends. Specify the recommended ranges of camber for different types of pavement surfaces. **(10 Marks)**

b. The speed of overtaking and overtaken vehicles are 70kmph and 40kmph respectively on a two – way traffic road. If the acceleration of overtaking vehicle is 0.99m/sec^2.
i) Calculate safe overtaking distance
ii) Mention the minimum length of overtaking zone
iii) Draw a neat sketch of the overtaking zone and show the positions of the sign posts. **(10 Marks)**

OR

4 a. Explain PIEV theory. **(04 Marks)**

b. Derive an equation for finding the super elevation required if the design co-efficient of lateral friction is 'f'. **(10 Marks)**

c. A vertical summit curve is formed at the intersection of two gradients, +3 and – 5.0%. Design the length of summit curve to provide a stopping sight distance for a design speed of 80kmph. Assume other data. **(06 Marks)**

Module-3

5 a. List and explain desirable properties of an aggregates to be used in pavement construction. **(06 Marks)**

b. List and explain desirable properties of subgrade soil. **(06 Marks)**

c. The properties of subgrade soil are given below passing 0.074mm sieve = 55%, LL = 50%, PL = 41%.

i) Classify the soil by revised PRA/HRB system.

ii) Discuss the suitability of the soil as a subgrade material. **(08 Marks)**

OR

6 a. Differentiate between Bitumen and Tar. **(06 Marks)**

b. With a neat sketch explain the ESWL in pavement design. **(06 Marks)**

c. A load penetration values DBR tests conducted on a specimen of a soil sample are given below. Determine the CBR value of soil, if 100 division of load represents 190kg and in calibration chart of providing ring.

Penetration of plunger in mm	Load Dial Readings (Divisions)
0	0
0.5	0.5
1.0	1.5
1.5	2.5
2.0	6.0
2.5	13
3.0	20
4.0	30
5.0	38
7.5	50
10.0	58
12.5	63

(08 Marks)

Module-4

7 a. Explain Rothfutch's method used in design of soil aggregate mix. **(10 Marks)**

b. Explain the construction steps for cement concrete pavement slab. **(10 Marks)**

OR

8 a. Explain the construction steps for water bound Macadam roads. **(10 Marks)**

b. Write short notes on the following :

i) Bituminous Macadam

ii) Prime coat

iii) Tack coat

iv) Bituminous concrete. **(10 Marks)**

Module-5

9 a. What are the requirements of highway drainage system? (04 Marks)

b. Explain with sketch how the subsurface drainage system is provided to lower the water table and control seepage flow. (10 Marks)

c. Briefly explain the types of cross-drainage structures. (06 Marks)

OR

10 a. Explain the various highway user benefits of highway improvements. (06 Marks)

b. Describe the various methods of economic analysis of a highway. (04 Marks)

c. Compare the annual costs of two types of pavement structures :

i) WBM with thin bituminous surface at total cost of Rs. 2.2 lakhs per km, life of 5 years, interest at 10%, salvage value of Rs. 0.9 lakhs after 5 years. Annual average maintenance cost of Rs. 0.35 lakhs per km and

ii) Bituminous macadam base and bituminous concrete surface, total cost of Rs. 4.2 lakhs life of 15 years interest at 8%, salvage value of 2 lakhs at the end of 15 years, annual average maintenance cost Rs. 0.25 lakhs per km. (10 Marks)

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