

No Preview  
Available

Total No. of Question : [4]

Registration No. : 

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**Programme Name : Bachelor of Civil Engineering**  
**Regular T.Y.B.Tech. ESE (A.Y. 2023-24) Sem.V Nov.2023**  
**V SEMESTER ( 2021 BATCH)**  
**201CEL301-Theory of Structures(TH)**

Duration : [ 11:00 AM - 01:00 PM ]

Date : 20 Nov, 2023

Day : Monday

Marks : 50

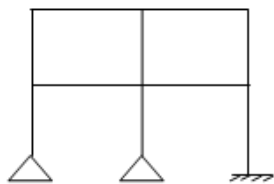
**Instructions :**

(Q1) Attempt all questions

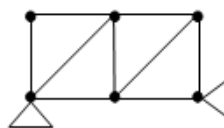
[20.0]

(1.1) Calculate Static and Kinematic indeterminacy of the structures.

[4.0]



(i)

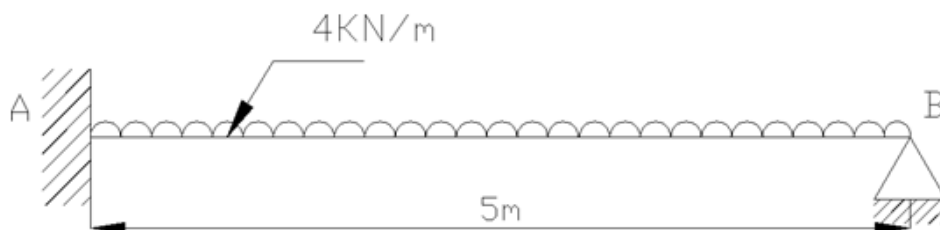


(ii)

**CO :- C301.1**

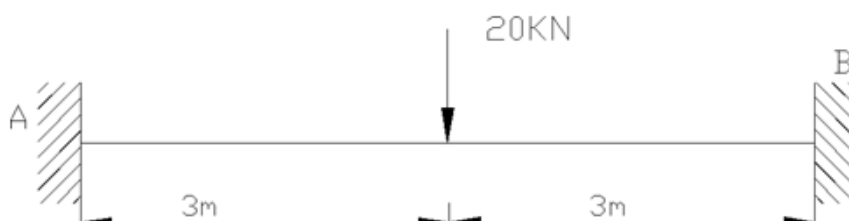
**Blooms Taxonomy :- Apply**

(1.2) Find out Prop reaction of a propped cantilever beam AB loaded as shown in the figure [6.0]  
by using Consistent deformation method.



OR

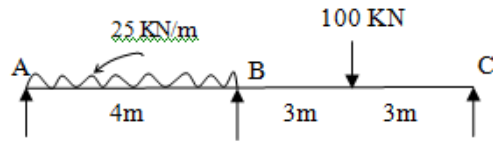
A fixed beam AB of span 6m is loaded as shown in figure. Take EI constant. Find fixed end moments.



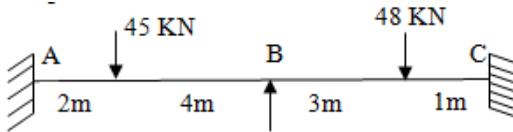
**CO :- C301.2**

**Blooms Taxonomy :- Analyze**

- (1.3) Using Clapeyron's Theorem of three moments calculate all support reactions of a beam as shown below and draw final BMD. [10.0]



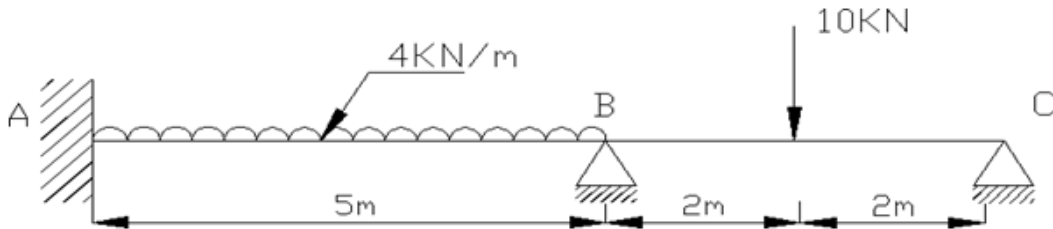
- (Q2) A continuous beam ABC is loaded as shown in figure calculate F.E.M.S by using Slope Deflection Method and draw final BMD only. Take EI constant. [12.0]



**CO :- C301.3**

**Blooms Taxonomy :- Analyze**

- (Q3) Find out F. E. M.s by using Moment distribution method. [12.0]



**CO :- C301.3**

**Blooms Taxonomy :- Analyze**

- (Q4) Write any two [6.0]
- i) Maxwell's Reciprocal Theorem
  - ii) Describe Castiglione's 1st Theorem
  - iii) Betti's Law
  - iv) Unit load Theorem

**CO :- C301.4**

**Blooms Taxonomy :- Apply**

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**Programme Name : Bachelor of Civil Engineering**  
**Regular S.Y.B.Tech. ESE ( A.Y. 2023-24) Sem. III Nov.2023**  
**III SEMESTER ( 2022 BATCH)**  
**201CEL201-Applied Mathematics (TH)**

Duration : [ 11:00 AM - 01:00 PM ]

Date : 21 Nov, 2023

Day : Tuesday

Marks : 50

**Instructions :**

(Q1) Attempt the following. [20.0]

(1.1) Solve :  $(D^2 - 4D + 4)y = \cos 2x + e^{2x} + x^3$  [7.0]

**CO :- CO201.1**

**Blooms Taxonomy :- Apply**

(1.2) If  $\phi = x^2 + y^2 + z^2$ ,  $\psi = x^2 y^2 + y^2 z^2 + z^2 x^2$ , Find  $\nabla \phi \cdot \nabla \psi$  [6.0]

**CO :- CO201.2**

**Blooms Taxonomy :- Understand**

(1.3) Fit a second degree curve to the following data. [7.0]

x	-2	-1	0	1	2
y	-3.150	-1.390	0.620	2.880	5.378

**CO :- CO201.3**

**Blooms Taxonomy :- Understand**

(Q2) Attempt any Two. [10.0]

(2.1) In a large consignment of electric bulbs 10% are defective. A random sample of 20 is taken for inspection .Find the probability that [5.0]

i) All are good bulbs

ii) At most there are 3 defective bulbs.

iii ) At least one defective bulb.

**CO :- CO201.4**

**Blooms Taxonomy :- Apply**

(2.2) If x is a Poisson variate such that  $P(x=1) = P(x=2)$ . Find  $E(x^2)$  [5.0]

**CO :- CO201.4**

**Blooms Taxonomy :-** Apply

- (2.3) If  $x$  is normally distributed with mean & standard deviation 4, find [5.0]  
i)  $P(5 \leq x \leq 10)$   
ii)  $P(x \geq 15)$   
[ Area under S.N.V  $z = 0$  to  $z = 1.5$  is 0.4332 ,  $z = 0$  to  $z = 0.25$  is 0.0987 ,  $z = 0$  to  $z = \infty$  is 0.5 &  $z = 0$  to  $z = 2.75$  is 0.4970 ]

**CO :-** CO201.4

**Blooms Taxonomy :-** Apply

(Q3) Attempt any Two. [10.0]

- (3.1) Find  $L\left\{\frac{1}{t}(e^{-t}\sin at)\right\}$  [5.0]

**CO :-** CO201.5

**Blooms Taxonomy :-** Apply

- (3.2) Find  $L^{-1}\left\{\frac{2s^2-6s+5}{s^3-6s^2+11s-6}\right\}$  [5.0]

**CO :-** CO201.5

**Blooms Taxonomy :-** Apply

- (3.3) Solve using Laplace Transforms ,  $\frac{dy}{dt} + 3y = 2 + e^{-t}$  ,  $y(0) = 1$  [5.0]

**CO :-** CO201.5

**Blooms Taxonomy :-** Apply

(Q4) Attempt any Two. [10.0]

- (4.1) Apply Trapezoidal rule to find  $\int_0^1 e^x dx$  , taking 5 subintervals. [5.0]

**CO :-** CO201.6

**Blooms Taxonomy :-** Apply

- (4.2) Apply Simpson's three-eighth rule to find  $\int_0^6 e^x dx$  , taking 5 subintervals. [5.0]

**CO :-** CO201.6

**Blooms Taxonomy :-** Apply

- (4.3) Apply Weddle's rule to find  $\int_0^6 f(x) dx$  [5.0]

x	0	1	2	3	4	5	6
f(x)	6.9897	7.4036	7.7815	8.1291	8.4510	8.7506	9.0309

**CO :-** CO201.6

**Blooms Taxonomy :-** Apply

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**Programme Name : Bachelor of Civil Engineering**  
**Regular S.Y.B.Tech. ESE ( A.Y. 2023-24) Sem. III Nov.2023**  
**III SEMESTER ( 2022 BATCH)**  
**201CEL202-Mechanics of Structures (TH)**

Duration : [ 11:00 AM - 01:00 PM ]

Date : 23 Nov, 2023

Day : Thursday

Marks : 50

**Instructions :**

(Q1) Solve all Questions

[20.0]

**CO :- C202.1**

**Blooms Taxonomy :- Apply**

(a) Define Young's Modulus, Bulk Modulus and Modulus of Rigidity

[3.0]

(b) A composite bar made up of aluminum and steel is held between two supports. The bars are stress free at  $40^{\circ}\text{C}$ . What will be the stresses in the bars when the temp. drops to  $20^{\circ}\text{C}$ , If

[12.0]

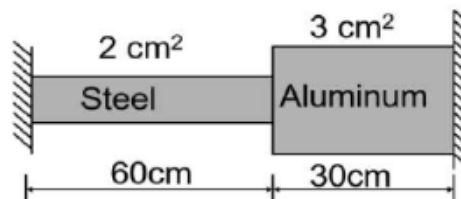
(a) the supports are unyielding

(b) the supports come nearer to each other by 0.1 mm.

Take  $E_{al} = 0.7 \times 10^5 \text{ N/mm}^2$ ;  $\alpha_{al} = 23.4 \times 10^{-6} / ^{\circ}\text{C}$

$E_s = 2.1 \times 10^5 \text{ N/mm}^2$        $\alpha_s = 11.7 \times 10^{-6} / ^{\circ}\text{C}$

$A_{al} = 3 \text{ cm}^2$      $A_s = 2 \text{ cm}^2$



(c) A hollow cast iron column has internal diameter 200mm. What should be external diameter of the column, so that it could carry a load of 1600 KN without the stress exceeding 90 MPa

[5.0]

OR

Determine the Poisson's ratio and bulk modulus of a material, for which Young's modulus is  $1.2 \times 10^5 \text{ N/mm}^2$  and modulus of rigidity is  $4.8 \times 10^4 \text{ N/mm}^2$ .

(Q2) Solve all Questions

[10.0]

**CO :- C202.2**

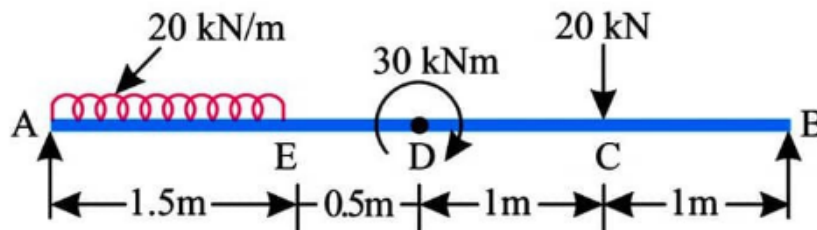
**Blooms Taxonomy :- Analyze**

(a) Draw Bending stress distribution for a rectangular section

[3.0]

(b) Draw SFD & BMD for the beam shown below

[7.0]



(Q3) Solve all Questions

[10.0]

CO :- C202.3, C202.4

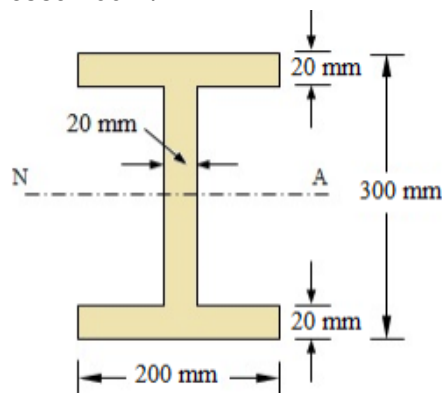
Blooms Taxonomy :- Evaluate

(a) What are the assumptions in pure bending theory?

[3.0]

(b) A beam of an I-section shown in Fig. below is simply supported over a span of 4 m. Find the uniformly distributed load the beam can carry if the bending stress is not to exceed  $100 \text{ N/mm}^2$

[7.0]



(Q4) Solve all Questions

[10.0]

CO :- C202.4

Blooms Taxonomy :- Evaluate

(a) Draw shear stress distribution diagram for Rectangular, Plus and Circular section  
OR

[3.0]

Explain following terms Principal stresses, Shear stress and location of plane?

(b) A T-section beam has a top flange of  $(150\text{mm} \times 20\text{mm})$  and the web of  $(20\text{mm} \times 150\text{mm})$ . The overall depth is  $170\text{mm}$ . It is subjected to a shear force of  $60\text{kN}$ . Draw the shear stress distribution diagram

[7.0]

OR

At a point in strained material there are two mutually perpendicular stresses of  $600\text{N/mm}^2$  and  $400\text{N/mm}^2$  both are tensile. They are accompanied by shear stress of  $100\text{N/mm}^2$ . Find principal stress and position of principal planes.

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**Programme Name : Bachelor of Civil Engineering**  
**Regular S.Y.B.Tech. ESE ( A.Y. 2023-24) Sem. III Nov.2023**  
**III SEMESTER ( 2022 BATCH)**  
**201CEL203-Concrete Technology (TH)**

Duration : [ 11:00 AM - 01:00 PM ]

Date : 28 Nov, 2023

Day : Tuesday

Marks : 50

**Instructions :**

(Q1) Attempt the following [20.0]

- (1.1) Explain following terms with respect to cement: [6.0]  
i)Bogue's compounds ii)Hydration

**CO :- C203.1**

**Blooms Taxonomy :- Understand**

- (1.2) List various stages in concrete manufacturing. Explain precautions to be taken during [7.0]  
mixing, transporting and placing of concrete.

**CO :- C203.2**

**Blooms Taxonomy :- Remember, Understand**

- (1.3) Enlist various tests on hardened concrete. Explain test for compressive strength of [7.0]  
concrete in detail.

OR

Enlist various NDT available for concrete and explain Ultrasonic Pulse Velocity test.

**CO :- C203.2**

**Blooms Taxonomy :- Remember, Understand**

(Q2) Attempt the following [10.0]

- (2.1) Explain procedure of mix design by IS code method using IS 10262-2019. [6.0]

OR

Explain procedure of mix design by ACI 211.1-1991 method.

**CO :- C203.3**

**Blooms Taxonomy :- Remember, Understand, Apply**

- (2.2) List various methods of concrete mix design and explain objectives of mix design. [4.0]

**CO :- C203.3**

**Blooms Taxonomy :- Remember, Understand, Apply**



(Q3) Attempt the following

[10.0]

(3.1) Explain following admixtures in short:

[6.0]

i) Chemical admixtures ii) Mineral admixtures

**CO :-** C203.4

**Blooms Taxonomy :-** Remember, Understand

(3.2) Explain: Green Concrete.

[4.0]

OR

Explain: Self compacting concrete

**CO :-** C203.4

**Blooms Taxonomy :-** Remember, Understand

(Q4) Attempt the following

[10.0]

(4.1) Explain: Fiber Reinforced Concrete.

[6.0]

**CO :-** C203.4

**Blooms Taxonomy :-** Remember, Understand

(4.2) Explain: Chloride attack on concrete.

[4.0]

OR

Explain how permeability affects durability of concrete.

**CO :-** C203.4

**Blooms Taxonomy :-** Remember, Understand

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Total No. of Question : [4]

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**Programme Name : Bachelor of Civil Engineering**  
**Regular S.Y.B.Tech. ESE ( A.Y. 2023-24) Sem. III Nov.2023**  
**III SEMESTER ( 2022 BATCH)**  
**201CEL204-Fluid Mechanics (TH)**

Duration : [ 11:00 AM - 01:00 PM ]

Date : 30 Nov, 2023

Day : Thursday

Marks : 50

**Instructions :**

- (Q1) All questions are compulsory [20.0]
- (1.1) Define and give the practical applications of following fluid properties. [6.0]  
Specific weight , Surface tension , Compressibility , vapour pressure.  
State their SI units.
- (1.2) Explain the experimental procedure to determine metacentric height. [7.0]  
Draw illustrative sketch.
- (1.3) Analyse for total pressure force acting on a unit length of dam retaining water for total [7.0]  
depth 50 m out of which bottom 7 m is silt pocket. Take specific gravity of silt as 1.2
- (Q2) Attempt all the subquestions. [10.0]
- (2.1) Apply Bernoulli's theorem to a horizontal compound pipe in series of diameters 5 cm , [5.0]  
10cm , 20 cm of lengths 100 m, 200 m & 300 m carrying a real fluid ( take sections at  
the beginning and at the end of pipe ) and draw HGL and TEL ( not to scale ). Also  
explain the statement of theorem.
- OR**
- Draw a neat sketch of Venturimeter showing HGL , TEL and explain how it is used to  
measure the rate of flow in pipe.
- (2.2) In an inclined pipe  $45^\circ$  to horizontal of diameter 5 cm carrying oil ( 0.75), a [5.0]  
venturimeter is attached .A mercury manometer attached at inlet and throat reads 4  
cm . Choosing appropriate throat diameter, specific gravity of flowing liquid and  
Coefficient of discharge , calculate the rate of flow.
- (Q3) Attempt all the subquestions. [10.0]
- (3.1) What are different losses in pipe flow ? [5.0]  
Explain how to calculate these losses ?
- OR**
- Write a short note on Magnus effect.
- (3.2) Two reservoirs are connected with a pipe of diameter 10 cm having length 1000 m. [5.0]  
Friction factor is 0.02 . Considering minor losses calculate the discharge in pipes if  
water level difference in these two reservoirs is 10 m.

**CO :- C204.4**

**Blooms Taxonomy :- Apply**

- (Q4) Attempt any two questions of the following .Mention the practical significance and applications in the field [10.0]  
of Civil Engineering

(4.1) Syphone pipe flow and its applications [5.0]  
(explain with sketches)

**CO :-** C204.4

**Blooms Taxonomy :-** Apply

(4.2) Boundary layer separation and its control. [5.0]

**CO :-** C204.4

**Blooms Taxonomy :-** Apply

(4.3) Water hammer and its Controlling devices [5.0]

**CO :-** C204.4

**Blooms Taxonomy :-** Apply

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