Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)

Munshi Nagar, Andheri (West), Mumbai – 400058.

End Semester Examination

March - 2023

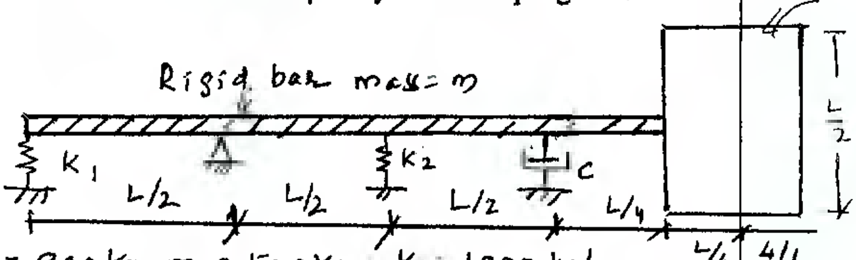
Max. Marks: 100 M.Tech Civil with Str. Engg - Sem I 3/3/23 Duration: 3 Hours

Class: M.Tech. Semester: I Program: Civil Engineering

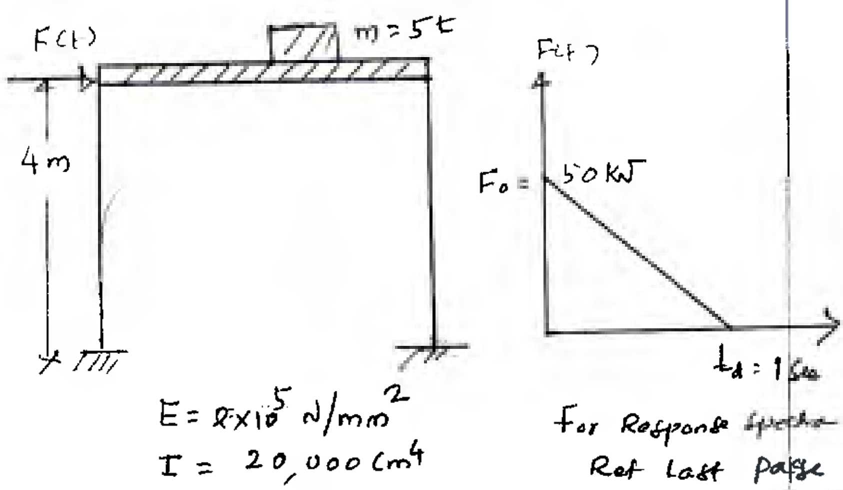
Name of the Course: Structural Dynamics Course Code : PC- MST 101

Instructions:

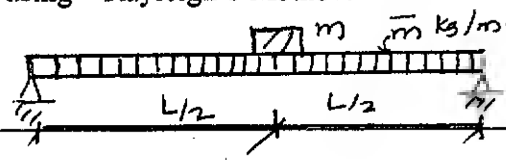
- Answer any five questions.
- Answers to all sub questions should be grouped together.
- Figures to the right indicate full marks.
- Assume suitable data if necessary and state the same clearly.

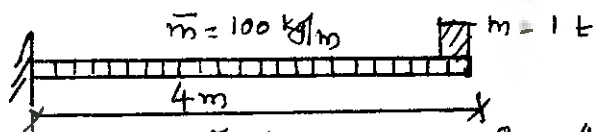
Question No		Points	CO	BL	Module No.
Q1 (a)	What is dynamic load? Briefly explain the classification of dynamic loads with suitable example.	3	1	1,2	1
Q1(b)	For the rigid body system shown in figure: (a) Formulate the equation of motion (b) Determine the natural frequency and damping ratio  m = 800 kg m1 = 500 kg k1 = 1000 kN/m	10	2 Rigid plat mass = m1	3	4
	k2 = 500 kN/m c = 1 kN-m/sec L = 2m				
Q1(c)	A platform weighing 1500 N is supported on four columns. The columns are identical and clamped at both ends. It has been determined experimentally that a force of 250 KN horizontally applied to platform produces a displacement of 3.0 mm. Damping is 5%. Determine the following :	7	2	3	2

	(i) Stiffness of structure (ii) Damped frequency (ii) Damping coefficient (iii) Logarithmic decrement (iv)Number of cycles and time required for the amplitude of motion to be reduced from initial of 3.0 mm to 0.3 mm.				
Q2 (a)	The frame shown in figure is subjected to a triangular pulse type load as shown in figure at girder level. Calculate the maximum horizontal displacement at girder level and maximum bending moment in column AB. The response spectra for this dynamic load are also shown in the figure.	8	2	3	2



Q2(b)	Derive the expression for Transmissibility Ratio and briefly explain how vibration isolation can be achieved.	8	2	3	2
Q2(c)	A machine weighing 25 KN exerts harmonic force 4000 N amplitude, at 10 Hz at its supports. After installing the machine on a spring damper type isolator, the force exerted on the support is reduced to 400 N. Determine the spring stiffness k. Take damping ratio as 10% .	4	2	3	2
Q3	A three storey single bay frame has storey height of **4 m**. The columns on ground and first story are **250 mm** wide **X 600 mm** deep while at 2^{nd} story the size a column is **250 mm** x **500 mm** & beams are very stiff. The mass on each and floor is **30 t. E = 20000 Mpa**. Calculate natural frequencies & mode shapes	20	2	4	5
Q4(a)	State and prove orthogonality principle. Also state the significance of orthogonality principle in dynamic analysis	5	2	3	5

<table>
<tr><td>Q4 (b)</td><td>A three story frame with free vibration characteristics as given below is subjected to a harmonic force with amplitude 100 Kn and at frequency of 10 rad/sec. at the 3rd floor level and 50 Kn amplitude with same frequency at 2nd floor. Calculate maximum displacements of each story. Take damping ratio =5%
<table>
<tr><td rowspan="2">Story No.</td><td rowspan="2">Mass No.</td><td rowspan="2">Mass (t)</td><td rowspan="2">ω rad/sec</td><td colspan="3">Mode shapes</td></tr>
<tr><td>Φ_{i1}</td><td>Φ_{i2}</td><td>Φ_{i3}</td></tr>
<tr><td>1</td><td>1</td><td>30</td><td>4.92</td><td>0.336</td><td>0.759</td><td>1.0</td></tr>
<tr><td>2</td><td>2</td><td>30</td><td>13.45</td><td>-2.46</td><td>-0.804</td><td>1.0</td></tr>
<tr><td>3</td><td>3</td><td>30</td><td>18.7</td><td>1.58</td><td>-1.157</td><td>2.58</td></tr>
</table></td><td>15</td><td>2</td><td>4</td><td>6</td></tr>
<tr><td>Q 5(a)</td><td>For the beam shown in figure calculate the fundamental frequency using Rayleigh's Method.


$\bar{m}$ = 200 kg/m
m = 1 t
EI = 10,000 kN-m²</td><td>8
kg/m
000 kN-m²</td><td>2
L=4 m.</td><td>3</td><td>7</td></tr>
<tr><td>Q 5(b)</td><td>A simply supported beam of 8m span, 300 mm wide 600 mm deep carries a suddenly applied force of 200 KN at mid span. Calculate the maximum displacement and bending moment responses under the load and shear force at left support. E= $2x10^4$ Mpa. and density of material = 2500 kg/m^3. Take contribution from the four lowest contributing modes</td><td>12</td><td>2</td><td>4</td><td>7</td></tr>
<tr><td>Q6(a)</td><td>For the cantilever beam shown in figure, calculate the natural frequencies and mode shapes.


$E = 2\times10^5\ N/mm^2 \quad I = 2\times10^8\ mm^4$</td><td>10</td><td>2</td><td>4</td><td>5</td></tr>
<tr><td>Q6(b)</td><td>If the beam referred in Q6 (a) above, a suddenly applied constant load of 100 KN under second mass m_2, calculated the maximum reposes under each mass.</td><td>10</td><td>2</td><td>3</td><td>6</td></tr>
<tr><td>Q 7(a)</td><td>Starting from first principal, derive the expression for natural frequency and mode shape for a simply supported beam with uniformly distributed mass.</td><td>10</td><td>3</td><td>2</td><td>7</td></tr>
<tr><td>Q 7(b)</td><td>Represent the periodic load shown in figure in terms of Fourier Series.</td><td>10</td><td>2,3</td><td>3</td><td>3</td></tr>
</table>

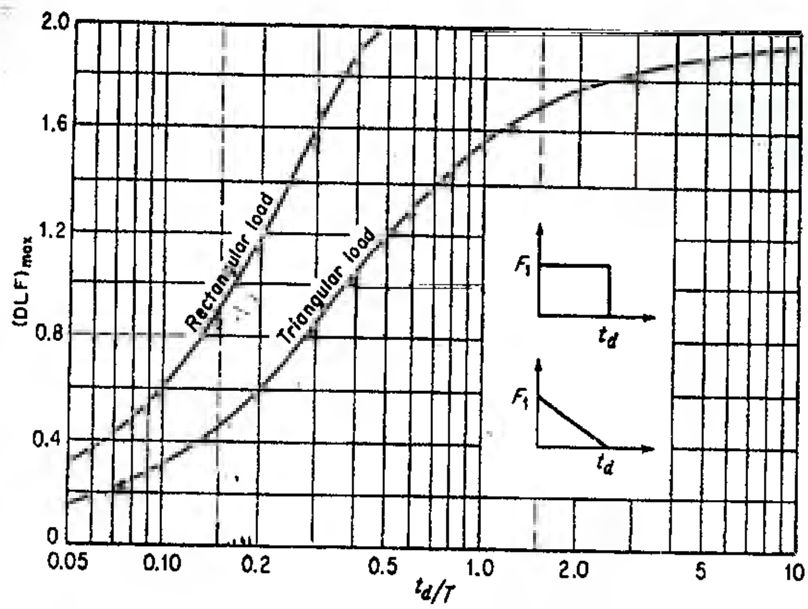


Figure for Q No. (a)

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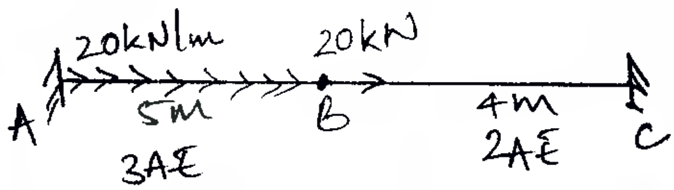
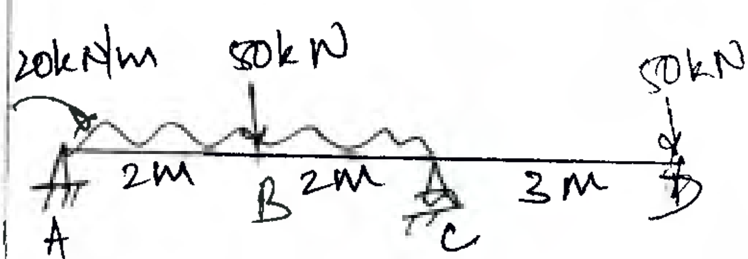
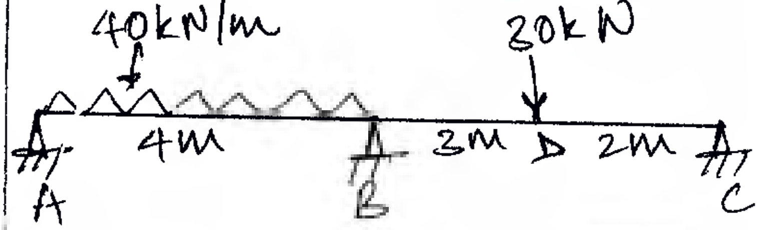
M.Tech Civil with Str. Engg. Sem I 1/3/23

End Sem March 2023

Program: M.Tech-Structures | **Duration: 3 Hrs**

Course Code: PC –MST 102 | **Maximum Points: 100**

Course Name: Advanced Structural Analysis | **Semester: I**

Q.No.	Questions	Points	CO	BL	Module No
Q1a	Analyze the following non-prismatic axially loaded structural system by stiffness method. Assume AE= 5000kN. Also support A and D slip 2mm and 1mm at right respectively.  	15	2	3	
b	Find slope at free end D. Assume EI=10000kN/m²  	05	1		
Q2	Analyze the following continuous beam using conventional stiffness method. Assume EI=80000kN-m2  	20	2	3	

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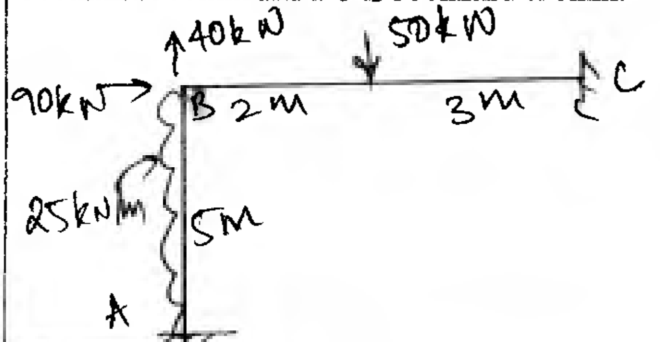
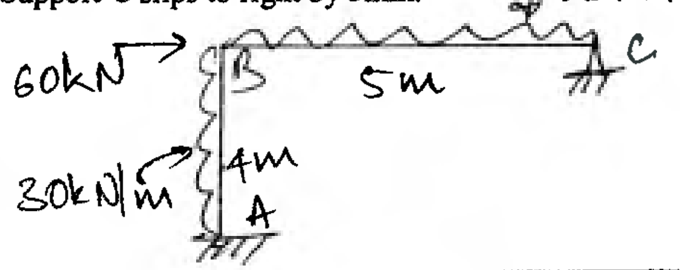
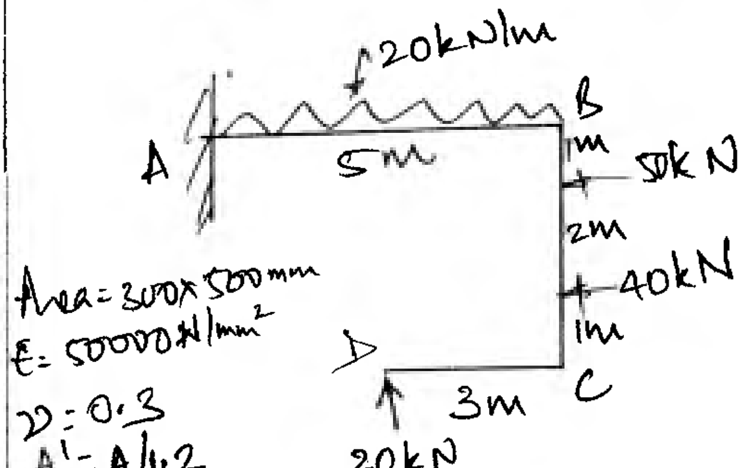
End Sem March 2023

Q3	Analyze the following frame .Draw SFD and BMD. Assume E= 30000 N/mm2.Size of element AB is 300mmX 300mm and BC is 300mmX 450mm. 	20	1	3	
Q4	A hook carries a load of 7.5kN and the load line is at a distance of 20mm from the inner edge of section which is trapezoidal. The load line also passes through the centre of curvature of the hook. The dimensions of the central horizontal trapezoidal section are inner width=50mm ,outer width=25mm.Depth=40mm.Calculate the maximum and minimum stresses .Also plot the variation of stress across the section.	20	3	3	
Q5	Analyze the following frame section. EI= 80000 kN-m2.AE=5000kN Support C slips to right by 5mm. 20kN/m 	20	2	3	
Q6	Calculate total strain energy stored in following frame. 	20	1	3	

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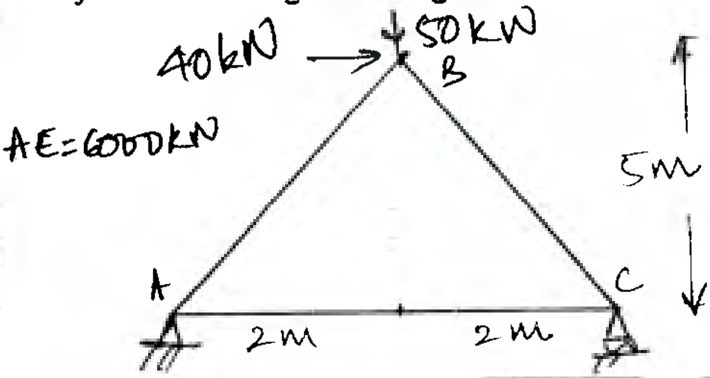
End Sem March 2023

Q7	Analyze the following truss using stiffness method 	20	2	3	

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End semester exam - March 2023

Sem I 8/3/23

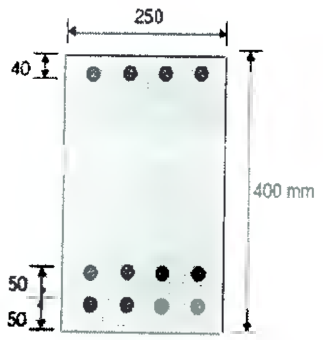
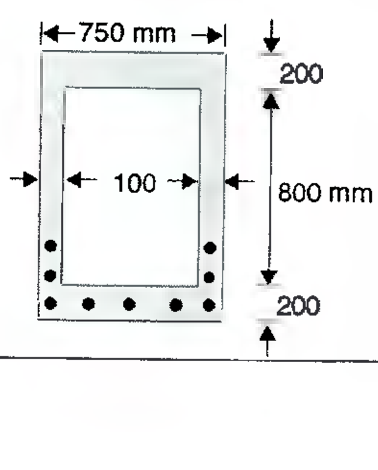
Program: M.Tech Civil Engineering - Structures | **Duration: 3 Hours**

Course Code: EC-MST 105 | **Maximum Points: 100**

Course Name: Design of Prestressed Concrete Structures | **Semester: 1**

Notes:

- **Attempt any 5 main questions. Draw neat sketches to illustrate your answers**
- **Assume suitable data if missing and state the same clearly.**
- **Use of IS 1343 is allowed**

Q.No.	Questions	Points	CO	BL	Module
1	a) Explain how pre-stressing affects deflection of beams. What are the factors affecting long term deflection?	05	1	2	01
	b) Explain : full pre-stressing, limited pre-stressing and partial pre-stressing.	05	1	2	01
	c) A 6m long simply supported pre-stressed concrete beam has the cross section and pre-stressing profile as shown below. Determine the stresses in extreme fibres at mid span and supports if the beam carries a superimposed load of 15kN/m on full span. 	10	1,3	3	02
2.a)	Determine the ultimate moment of resistance for a pre-stressed box section as shown below. The f_{ck} = 40 N/mm^2, f_{pu} = 1800 N/mm^2. The total cross-sectional area of the tendons is 1000 mm2 with the centroid at a distance of 100 mm from the bottom fibre. 	10	3	3,5	03

<table>
<tr><td>2.b)</td><td>Design the shear reinforcement at quarter span for a simply supported beam of rectangular cross section 350mmx750mm and span 11m. It carries a live load UDL of 9.5kN/m(unfactored). It is prestressed by a straight cable that is having eccentricity of 275mm
fck = 40MPa
Effective prestress in cable = 1200MPa
Characteristic strength of PT steel = 1600MPa
Use Fe415 grade steel for reinforcement.
Assume that the section is cracked.</td><td>10</td><td>3</td><td>3,5</td><td>03</td></tr>
<tr><td>3.a)</td><td>a) A simply supported post tensioned beam of span 20m with 2 cables having a cross section of 300mmX 1400mm is successively tensioned from a single end in the order of cables 1-2.
<table><tr><td></td><td>Profile</td><td>Eccentricity at midspan</td><td>Eccentricity at support</td></tr><tr><td>Cable 1</td><td>Parabolic</td><td>250mm (below N.A.)</td><td>0mm</td></tr><tr><td>Cable 2</td><td>Straight</td><td>450mm(below NA)</td><td>450mm(below NA)</td></tr></table>Each cable has a cross section area of 500mm² and an initial tension of 1250MPa. Co-efficient for friction = 0.5; co-efficient for wave effect = 0.0015/m. Age of concrete at transfer of prestress = 28days. Anchorage slip = 4mm. $E_s = 210kN/mm^2$, $E_c = 30kN/mm^2$.
Calculate the % losses due to elastic shortening, friction and anchorage slip</td><td>12</td><td>2</td><td>3,5</td><td>02</td></tr>
<tr><td>3.b)</td><td>Explain the effect of pre-stressing on shear resistance of a beam using the concept of principal stresses and Mohr circle</td><td>08</td><td>1,3</td><td>2</td><td>03</td></tr>
<tr><td>4.a)</td><td>Explain the various stages to be considered in design of pre-stressed sections and the IS code provisions for limiting stresses for pre-tensioned and post-tensioned members.</td><td>10</td><td>3,5</td><td>4</td><td>05</td></tr>
<tr><td>4.b)</td><td>Explain load-balancing concept.
Determine the equivalent loading and the camber induced for a simply supported beam having
i) Straight tendon profile at an eccentricity e
ii) parabolic profile concentric at supports and e at midspan
iii) Inclined cable with a kink at midspan having eccentricity e</td><td>10</td><td>1</td><td>2</td><td>02</td></tr>
<tr><td>5.</td><td>A 15m span simply supported composite beam consists of 350mmX600mm precast stem and a cast-in-situ flange of</td><td>20</td><td>4</td><td>3</td><td>06</td></tr>
</table>

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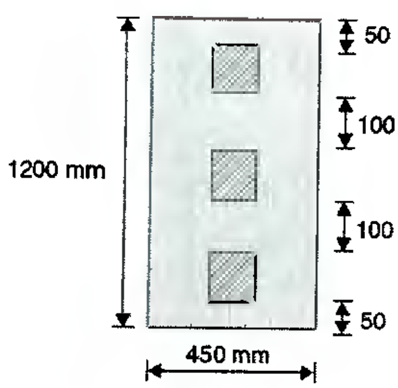
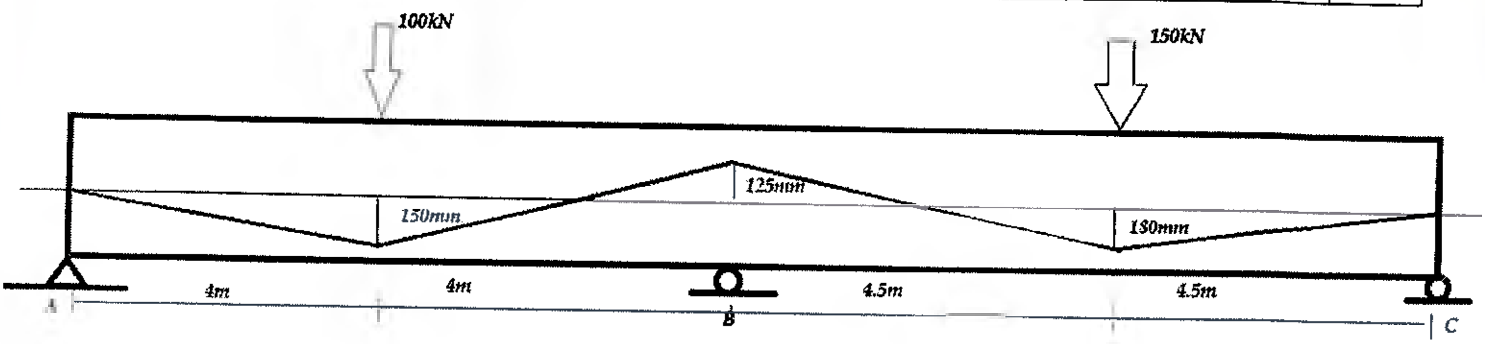
End semester exam - March 2023

	650mmX300mm. The stem is a post tensioned unit subjected to an effective prestressing force of 1000kN. The tendons are provided at 150mm from the soffit of stem. The beam has to support a live load of 12kN/m. Determine the resultant stress distribution in the beam if the beam is a) unpropped; b) propped Draw neat sketches to show the variations of stresses at each stage				
6.a)	Derive the expression for deflection due to prestress when the profile is parabolic having zero eccentricity at ends and "e" at mid span for a simply supported beam A simply supported pr-estressed beam of cross section 350mmX1200mm and span 15m has a straight profile of cable with eccentricity of 350mm below N.A. It carries a live load of 10kN/m. The area of cable is 500mm^2 and it is initially tensioned to 1250N/mm^2. % loss = 28% Calculate the : i) Instantaneous deflection due to dead load + prestressing force ii) Long term deflection if the creep coefficient is 1.6 Es=210kN/mm^2; Ec =35kN/mm^2	10	1	3	03
6.b)	The end block of a post-tensioned beam has three anchorages with 300 mm square bearing plates as shown in figure. An initial pre-stressing force of 700 kN is applied to each anchorage. Design the end zone reinforcement.  	10	3	3,5	04

7.	The cable profile for a two span continuous beam is as shown in figure below. The prestressing force is 1250kN. Calculate the stresses in extreme fibres at point B if cross section of beam is 300x900mm *(Calculate the effects only for the shown loads)*	20	4	3	07



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End Semester Examinations- March 2023

Civil with 10/3/23

Program: M.Tech. (Structural Engineering) Sem I **Duration: 3 Hours**

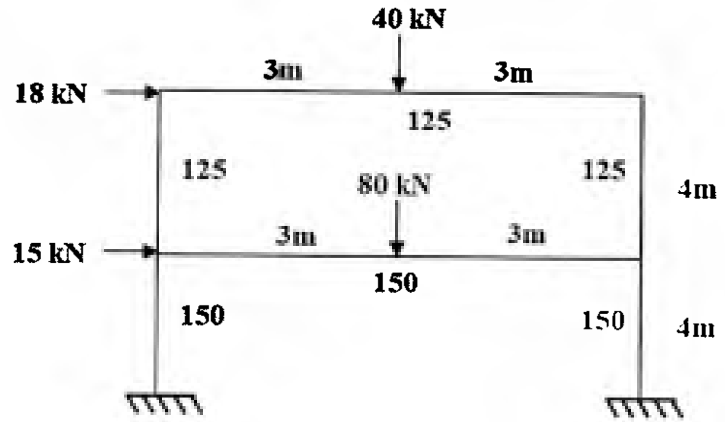
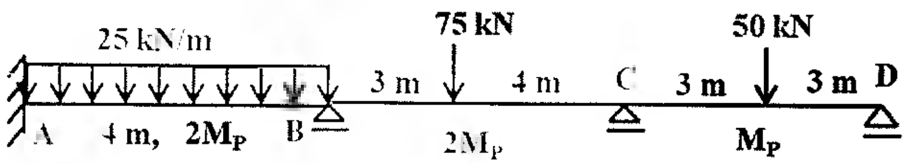
Course Code: EC-MST114 **Maximum Points: 100**

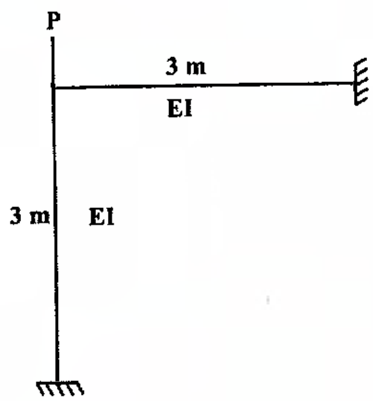
Course Name: Elective-II: Non Linear Analysis **Semester: I**

Instructions:

- Attempt any FIVE questions out of SEVEN questions.
- **Answers to all sub questions should be grouped together.**
- Figures to the right indicate full marks.
- Assume suitable data if necessary and state the same clearly.

Q.No	Questions	Points	CO	BL	PI
Q1(a)	State and explain upper bound theorem used in plastic analysis.	(05)	1	1,2	1.3.1 2.1.3
Q1(b)	Explain St. Venant's torsion and warping torsion.	(05)	4	2	1.3.1
Q1(c)	Write a note lateral buckling of beams	(05)	4	1,2	1.3.1 2.1.3
Q1(d)	What is a beam column? Explain	(05)	3	2	1.3.1
Q2(a)	A steel beam of rectangular section 75 mm wide and 150 mm deep is simply supported over a span of 4 m. If the beam carries a uniformly distributed load of 30 kN / m length on the entire span, find the depth of the elastic core at the mid-span. The yield stress of steel 250 N/mm^2.	(06)	1	3,4	2.1.2
Q2(b)	Find the shape factor of a circular cross section of external D	(04)	1	3,4	2.1.2
Q2(c)	Find the shape factor of an unsymmetrical I section with following details: Top flange width = 400 mm & thickness = 40 mm Bottom flange width = 300 mm & thickness = 30 mm Depth of web = 300 mm and thickness of web = 30 mm	(10)	1	3,4	2.1.3 2.2.3

Q3	For the frame shown in figure below, find the collapse load factor. Loads shown in the figure are working loads and the plastic moment capacity of each member in kN-m is also shown in the figure.	(20)	1	3,4	2.1.3 2.2.3
					
Q4(a)	A continuous beam is subjected to working loads as shown in figure below. If $M_P = 80$ kN-m, calculate the (true) load factor for the beam.	(10)	1	3,4	2.1.3 2.2.3
					
Q4(b)	Write a note on effect of axial force on plastic moment capacity of a flexural member.	(10)	2	1,2, 3	1.3.1 2.1.3
Q5(a)	A column of length L and pinned at both the ends is under the action of an axial compressive load P. The flexural rigidity of the member varies uniformly from EI at either end (support) to 1.5EI at the centre. Find the critical load by finite difference method.	(10)	3	3,4	2.2.3 2.4.1
Q5(b)	Use energy method A column of length L and pinned at both the ends is under the action of an axial compressive load P. Find the critical load by energy method if the flexural stiffness of the member varies according to $EI(x) = EI_0 \quad 0 \le x \le L/5$ $= 2EI_0 \quad L/5 \le x \le 4L/5$ $= EI_0 \quad 4L/5 \le x \le L$	(10)	3	3,4	2.2.3 2.4.1

Q6(a)	Determine the critical load for the frame shown in figure.	(14)	3	3,4	2.2.3 2.4.1
					
Q6(b)	Explain in case of a thin walled open cross section subjected to axial load, what are the possible modes of buckling if the section is (i) symmetrical about two perpendicular axes (ii) symmetrical about one axis (iii) unsymmetrical	(06)	4	1,2	1.3.1 2.1.3
Q7(a)	Derive the governing differential equation for the torsional buckling of column with symmetrical cross- section.	(14)	4	1,2, 3	1.3.1 2.1.3
Q7(b)	In case of lateral buckling of rectangular beam in pure bending, write the expression for critical stress and explain the terms involved in the expression.	(06)	4	1,2	1.3.1 2.1.3

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TERM END EXAMINATION MARCH 2023

Program: M. TECH (STRUCTURES) Civil Engg. Sem I 13/3/23 **Duration: 3 HR**

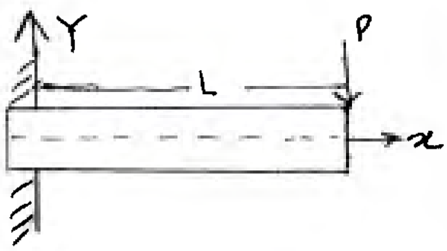
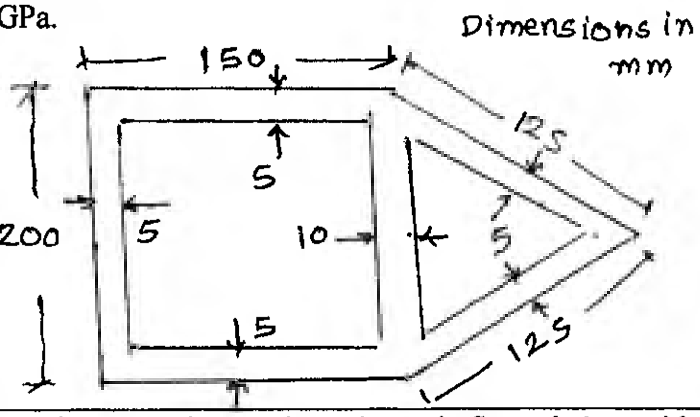
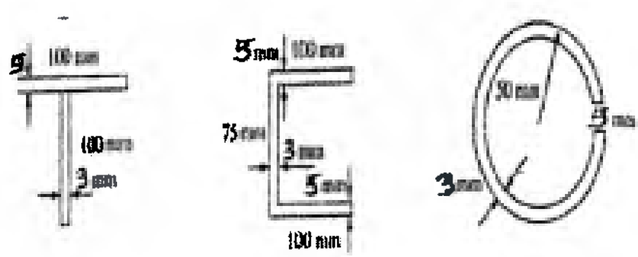
Course Code: EC-MST125 **Maximum Points: 100**

Course Name: Advanced solid Mechanics **Semester: I**

Notes: Question no. 1 is compulsory. Solve any 2 questions out of remaining questions

Q.No.	Questions	Points	CO	BL	PI
1 a	The state of strain at a point is given by $\varepsilon x = 0.001$, $\varepsilon y = -0.003$, $\varepsilon z = 0$, $\gamma xy = 0$, $\gamma yz = 0.001$, $\gamma zx = -0.004$. Determine the stress tensor at this point. Take $E = 210 \times 10^6$ kN/m ^{2} Poisson's ratio = 0.28. Also find Lame's constant.	10	1	4	1.1.1 1.1.3
1 b	State plane stress and plane strain. Discuss the plane stress and plane strain for two dimensional problems with illustrations.	10	1	4	1.1.1 1.1.3
2	The stress field at a point with respect to X, Y, Z coordinate system is given by the array in MPa as $\begin{bmatrix} 4 & 1 & 2 \\ 1 & 6 & 0 \\ 2 & 0 & 8 \end{bmatrix}$ Show that by transformation of axis by 45° about the Z axis in the anticlockwise direction, the stress invariants remain unchanged.	20	1	4	1.1.1 1.1.3
3	Show that for a simply supported beam, length 2L, depth 2a and unit width, loaded by a concentrated load W at the centre, the stress function satisfying the loading condition is $\phi = \frac{b}{6} xy^2 + C xy$ The positive direction of Y being upwards, and is at x = 0 at mid span. X axis is at centre of depth and towards right.	20	2	4	1.1.1 1.1.3

TERM END EXAMINATION MARCH 2023

4	For the beam shown determine the displacement field due to bending only. Consider the cross section of beam to be rectangular and thin so that deflections are not functions of z. The stiffness of the beam is EIz and poisson's ratio υ. 	20	2	4	1.1.1 1.1.3
5 a	Determine the shear stress and angle of twist of the multi-cell given in figure subjected to torque 12 kNm. G = 90 GPa. 	11	3	4	1.1.1 1.1.3
5 b	For the respective sections shown in figure below with shear stress restricted to 135 MPa and G as 70 GPa. Find the following (i) Torsional constant (ii) Torque (iii)Angle of twist 	09	3	4	1.1.1 1.1.3

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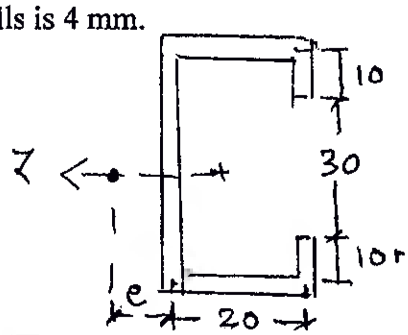
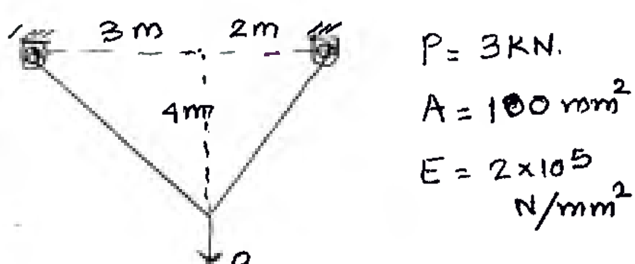
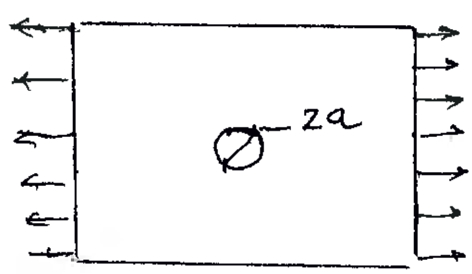
TERM END EXAMINATION MARCH 2023

6a	Determine the location of shear centre "e" for the cross section shown. All dimensions are in mm and thickness of walls is 4 mm.  	12	3	4	1.1.1 1.1.3
6 b	For the given cable arrangement calculate deflection of point B in vertical and horizontal direction using complementary theorem  	08	3	4	1.1.1 1.1.3
7	For plate loaded in tension by force per unit area σ , is having circular hole at centre. Outer diameter of the plate is very large compared to diameter of hole 2a. Use  Derive equation for σr, σ and τ	20	3	4	1.1.1 1.1.3

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SARDAR PATEL COLLEGE OF ENGINEERING

(An Autonomous Institution Affiliated to University of Mumbai)

END SEMESTER EXAMINATION

M.Tech Str Engg Sem I 15/3/22

Programme	MTech Structural Engineering	MTech Construction Management
Course Code	MC-PG01	MC-PG01

Subject : Research Methodology and IPR
Total Marks :100
Class: MTech, Sem:I,

Duration : 3 Hours
15th March 2022

- **Question 1 is compulsory**
- **Solve Any Four Questions from the remaining**
- Answers to all sub questions **must be** grouped together
- Figures to the right indicate full marks
- Assume suitable data wherever necessary

SN	Question statement	Points	Module	CO
Q1A	Differentiate between Research Paper and Review paper. State the Guidelines to write the research article.	10	M2,M3	CO1, CO2
Q1B	State the difference between Copyright, Patent and Trademark. Draw the flow chart and explain the procedure to receive the patent.	10	M4, M5	CO2, CO3,
Q2A	Explain the following with suitable examples • Null Hypothesis and Alternate Hypothesis • Type 1 error and Type 2 error • Test Statistics • Confidence Level and p value • Limitations and advantages of Hypothesis Test • Rejection Region • Left Tail Test and Right Tail Test • One Tail Test and Two Tail Test	10	M1	CO1
Q2B	What are the research avenues in your branch of engineering? What may be research approach and methodology to deal with those? Explain how to conduct the literature survey in carrying out research? What is the difference between Invention, Discovery and Research?	10	M1, M2	CO1
Q3A	State the requirements of Good Research Problem. You are interested to submit the Research Proposal for Topic Approval. Prepare the list of contents of Research proposal and explain them	10	M1 M2,M4	CO3, CO1

Q3B	Explain the following points with respect to Chi Square test. • Purpose of using Chi Sq Tests • Chi Sq. Distribution • Chi Sq.Table • Observed frequencies • Estimated frequencies • Types of application of Chi Sq Test	**10**	**M1,M2**	**CO1, CO3**
Q4A	A population is divided into four strata so that N1 = 9500, N2 = 5500 and N3 = 7000, N4 = 11500 Respective standard deviations are: s1=11, s2=15, s3=10, s4=7. Costs in rupees to collect the strata are C1= 10000, C2=5000, C3=7000, C4= 11000. How should a sample of size n = 92 be allocated to the four strata, if we want optimum allocation using Cost Optimal Disproportionate sampling design?	**10**	**M3**	**CO2**
Q5A	Explain the following with suitable examples A. Statistical Hypothesis Test Procedures and the Criminal Trial Analogy B. Patent Rights Geographical indications	**10**	**M1,M5**	**CO3, CO1**
Q5B	The following are the number of departmental stores in 15 cities: 35, 17, 10, 32, 70, 28, 26, 19, 26, 66, 37, 44, 33, 29 and 28. If we want to select a sample of 25 stores, using cities as clusters and selecting within clusters proportional to size, how many stores from each city should be chosen?(Use a starting point of 5).	**10**	**M1,M2**	**CO1** **CO2**
Q6A	What are the prerequisites of data collection? Explore the factors affecting success of interview process. Differentiate the Structured interview, Semi-structured interview and unstructured interview process with suitable examples. Refer the following points • Knowledge of Interviewer • Time availability for both parties • Cost • Bias • Freedom of expression • Area of application • Quality of output • Noise factors • Knowledge of Interviewee • Efforts needed for conducting interview	**10**	**M1**	**CO1,** **CO2**
Q6B	Researcher conducted experimental investigations on concrete cubes, to study the influence of fly ash, GGBS and glass waste powder (GWP) individually, on the compressive strength of concrete. The cubes were casted for M30 grade of concrete and by random sampling method, tested after 28 days curing. For cubes in Group I, 30% fly ash was added, for Group II, 30% GGBS was added and in Group III, 30% GWP was added. The 28 days compressive strengths of cubes in N/mm^2	**10**	**M1, M5**	**CO2**

<table>
<tr><td></td><td>are given below. Check whether the mean compressive strength of the 3 different groups is same or not.
Group I – 34, 33, 29, 35, 28, 31
Group II – 32, 29, 35, 29, 35
Group III – 34, 32, 29, 35, 33, 29, 28</td><td></td><td></td><td></td></tr>
<tr><td>Q7A</td><td>A data of interview process of Administrative services is reviewed to know association between type of location from which the candidate applied and success in interview. The response by type of location is as follows.
<table>
<tr><td></td><td>Rural area</td><td>Urban area</td><td>Total</td></tr>
<tr><td>Successful in Interview</td><td>28</td><td>44</td><td>72</td></tr>
<tr><td>Not successful in interview</td><td>20</td><td>32</td><td>52</td></tr>
<tr><td>Total</td><td>48</td><td>76</td><td>124</td></tr>
</table>
At alpha =0.05 , 0.01 do these data suggest an association between Type of location of candidate and candidate's success in interview?</td><td>10</td><td>M1,
M5</td><td>CO2</td></tr>
<tr><td>Q7B</td><td>Manufacturer wants to test on the basis of sample size 35 determinations and at 0.05 and 0.01 levels of significance whether the thermal conductivity of a certain kind of plate is 0.34 units, as has been claimed. The mean of sample is 0.343. From the information gathered in similar studies , we can expect that the variability of such determinations is given by $\sigma = 0.01$. Assume any suitable data if necessary.</td><td>10</td><td>M1</td><td>CO1,
CO2</td></tr>
</table>

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Standard Normal Probabilities

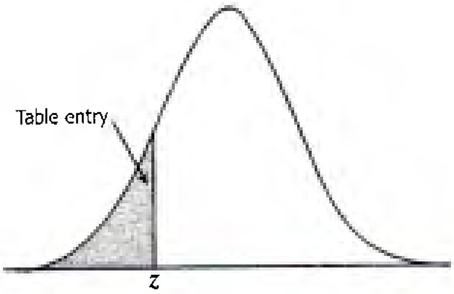
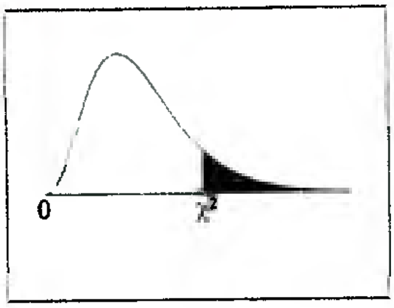


Table entry for z is the area under the standard normal curve to the left of z.

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
−3.4	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0002
−3.3	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0004	.0003
−3.2	.0007	.0007	.0006	.0006	.0006	.0006	.0006	.0005	.0005	.0005
−3.1	.0010	.0009	.0009	.0009	.0008	.0008	.0008	.0008	.0007	.0007
−3.0	.0013	.0013	.0013	.0012	.0012	.0011	.0011	.0011	.0010	.0010
−2.9	.0019	.0018	.0018	.0017	.0016	.0016	.0015	.0015	.0014	.0014
−2.8	.0026	.0025	.0024	.0023	.0023	.0022	.0021	.0021	.0020	.0019
−2.7	.0035	.0034	.0033	.0032	.0031	.0030	.0029	.0028	.0027	.0026
−2.6	.0047	.0045	.0044	.0043	.0041	.0040	.0039	.0038	.0037	.0036
−2.5	.0062	.0060	.0059	.0057	.0055	.0054	.0052	.0051	.0049	.0048
−2.4	.0082	.0080	.0078	.0075	.0073	.0071	.0069	.0068	.0066	.0064
−2.3	.0107	.0104	.0102	.0099	.0096	.0094	.0091	.0089	.0087	.0084
−2.2	.0139	.0136	.0132	.0129	.0125	.0122	.0119	.0116	.0113	.0110
−2.1	.0179	.0174	.0170	.0166	.0162	.0158	.0154	.0150	.0146	.0143
−2.0	.0228	.0222	.0217	.0212	.0207	.0202	.0197	.0192	.0188	.0183
−1.9	.0287	.0281	.0274	.0268	.0262	.0256	.0250	.0244	.0239	.0233
−1.8	.0359	.0351	.0344	.0336	.0329	.0322	.0314	.0307	.0301	.0294
−1.7	.0446	.0436	.0427	.0418	.0409	.0401	.0392	.0384	.0375	.0367
−1.6	.0548	.0537	.0526	.0516	.0505	.0495	.0485	.0475	.0465	.0455
−1.5	.0668	.0655	.0643	.0630	.0618	.0606	.0594	.0582	.0571	.0559
−1.4	.0808	.0793	.0778	.0764	.0749	.0735	.0721	.0708	.0694	.0681
−1.3	.0968	.0951	.0934	.0918	.0901	.0885	.0869	.0853	.0838	.0823
−1.2	.1151	.1131	.1112	.1093	.1075	.1056	.1038	.1020	.1003	.0985
−1.1	.1357	.1335	.1314	.1292	.1271	.1251	.1230	.1210	.1190	.1170
−1.0	.1587	.1562	.1539	.1515	.1492	.1469	.1446	.1423	.1401	.1379
−0.9	.1841	.1814	.1788	.1762	.1736	.1711	.1685	.1660	.1635	.1611
−0.8	.2119	.2090	.2061	.2033	.2005	.1977	.1949	.1922	.1894	.1867
−0.7	.2420	.2389	.2358	.2327	.2296	.2266	.2236	.2206	.2177	.2148
−0.6	.2743	.2709	.2676	.2643	.2611	.2578	.2546	.2514	.2483	.2451
−0.5	.3085	.3050	.3015	.2981	.2946	.2912	.2877	.2843	.2810	.2776
−0.4	.3446	.3409	.3372	.3336	.3300	.3264	.3228	.3192	.3156	.3121
−0.3	.3821	.3783	.3745	.3707	.3669	.3632	.3594	.3557	.3520	.3483
−0.2	.4207	.4168	.4129	.4090	.4052	.4013	.3974	.3936	.3897	.3859
−0.1	.4602	.4562	.4522	.4483	.4443	.4404	.4364	.4325	.4286	.4247
−0.0	.5000	.4960	.4920	.4880	.4840	.4801	.4761	.4721	.4681	.4641

Chi-Square Distribution Table



The shaded area is equal to α for $\chi^2 = \chi^2_{\alpha}$.

df	$\chi^2_{.995}$	$\chi^2_{.990}$	$\chi^2_{.975}$	$\chi^2_{.950}$	$\chi^2_{.900}$	$\chi^2_{.100}$	$\chi^2_{.050}$	$\chi^2_{.025}$	$\chi^2_{.010}$	$\chi^2_{.005}$
1	0.000	0.000	0.001	0.004	0.016	2.706	3.841	5.024	6.635	7.879
2	0.010	0.020	0.051	0.103	0.211	4.605	5.991	7.378	9.210	10.597
3	0.072	0.115	0.216	0.352	0.584	6.251	7.815	9.348	11.345	12.838
4	0.207	0.297	0.484	0.711	1.064	7.779	9.488	11.143	13.277	14.860
5	0.412	0.554	0.831	1.145	1.610	9.236	11.070	12.833	15.086	16.750
6	0.676	0.872	1.237	1.635	2.204	10.645	12.592	14.449	16.812	18.548
7	0.989	1.239	1.690	2.167	2.833	12.017	14.067	16.013	18.475	20.278
8	1.344	1.646	2.180	2.733	3.490	13.362	15.507	17.535	20.090	21.955
9	1.735	2.088	2.700	3.325	4.168	14.684	16.919	19.023	21.666	23.589
10	2.156	2.558	3.247	3.940	4.865	15.987	18.307	20.483	23.209	25.188
11	2.603	3.053	3.816	4.575	5.578	17.275	19.675	21.920	24.725	26.757
12	3.074	3.571	4.404	5.226	6.304	18.549	21.026	23.337	26.217	28.300
13	3.565	4.107	5.009	5.892	7.042	19.812	22.362	24.736	27.688	29.819
14	4.075	4.660	5.629	6.571	7.790	21.064	23.685	26.119	29.141	31.319
15	4.601	5.229	6.262	7.261	8.547	22.307	24.996	27.488	30.578	32.801
16	5.142	5.812	6.908	7.962	9.312	23.542	26.296	28.845	32.000	34.267
17	5.697	6.408	7.564	8.672	10.085	24.769	27.587	30.191	33.409	35.718
18	6.265	7.015	8.231	9.390	10.865	25.989	28.869	31.526	34.805	37.156
19	6.844	7.633	8.907	10.117	11.651	27.204	30.144	32.852	36.191	38.582
20	7.434	8.260	9.591	10.851	12.443	28.412	31.410	34.170	37.566	39.997
21	8.034	8.897	10.283	11.591	13.240	29.615	32.671	35.479	38.932	41.401
22	8.643	9.542	10.982	12.338	14.041	30.813	33.924	36.781	40.289	42.796
23	9.260	10.196	11.689	13.091	14.848	32.007	35.172	38.076	41.638	44.181
24	9.886	10.856	12.401	13.848	15.659	33.196	36.415	39.364	42.980	45.559
25	10.520	11.524	13.120	14.611	16.473	34.382	37.652	40.646	44.314	46.928
26	11.160	12.198	13.844	15.379	17.292	35.563	38.885	41.923	45.642	48.290
27	11.808	12.879	14.573	16.151	18.114	36.741	40.113	43.195	46.963	49.645
28	12.461	13.565	15.308	16.928	18.939	37.916	41.337	44.461	48.278	50.993
29	13.121	14.256	16.047	17.708	19.768	39.087	42.557	45.722	49.588	52.336
30	13.787	14.953	16.791	18.493	20.599	40.256	43.773	46.979	50.892	53.672
40	20.707	22.164	24.433	26.509	29.051	51.805	55.758	59.342	63.691	66.766
50	27.991	29.707	32.357	34.764	37.689	63.167	67.505	71.420	76.154	79.490
60	35.534	37.485	40.482	43.188	46.459	74.397	79.082	83.298	88.379	91.952
70	43.275	45.442	48.758	51.739	55.329	85.527	90.531	95.023	100.425	104.215
80	51.172	53.540	57.153	60.391	64.278	96.578	101.879	106.629	112.329	116.321
90	59.196	61.754	65.647	69.126	73.291	107.565	113.145	118.136	124.116	128.299
100	67.328	70.065	74.222	77.929	82.358	118.498	124.342	129.561	135.807	140.169

Standard Normal Probabilities

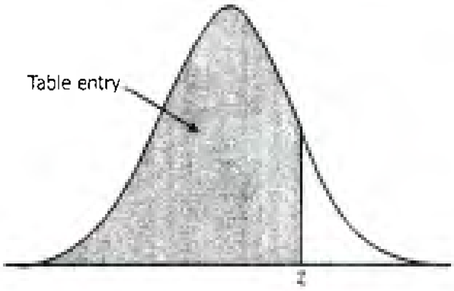


Table entry for z is the area under the standard normal curve to the left of z.

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.5000	.5040	.5080	.5120	.5160	.5199	.5239	.5279	.5319	.5359
0.1	.5398	.5438	.5478	.5517	.5557	.5596	.5636	.5675	.5714	.5753
0.2	.5793	.5832	.5871	.5910	.5948	.5987	.6026	.6064	.6103	.6141
0.3	.6179	.6217	.6255	.6293	.6331	.6368	.6406	.6443	.6480	.6517
0.4	.6554	.6591	.6628	.6664	.6700	.6736	.6772	.6808	.6844	.6879
0.5	.6915	.6950	.6985	.7019	.7054	.7088	.7123	.7157	.7190	.7224
0.6	.7257	.7291	.7324	.7357	.7389	.7422	.7454	.7486	.7517	.7549
0.7	.7580	.7611	.7642	.7673	.7704	.7734	.7764	.7794	.7823	.7852
0.8	.7881	.7910	.7939	.7967	.7995	.8023	.8051	.8078	.8106	.8133
0.9	.8159	.8186	.8212	.8238	.8264	.8289	.8315	.8340	.8365	.8389
1.0	.8413	.8438	.8461	.8485	.8508	.8531	.8554	.8577	.8599	.8621
1.1	.8643	.8665	.8686	.8708	.8729	.8749	.8770	.8790	.8810	.8830
1.2	.8849	.8869	.8888	.8907	.8925	.8944	.8962	.8980	.8997	.9015
1.3	.9032	.9049	.9066	.9082	.9099	.9115	.9131	.9147	.9162	.9177
1.4	.9192	.9207	.9222	.9236	.9251	.9265	.9279	.9292	.9306	.9319
1.5	.9332	.9345	.9357	.9370	.9382	.9394	.9406	.9418	.9429	.9441
1.6	.9452	.9463	.9474	.9484	.9495	.9505	.9515	.9525	.9535	.9545
1.7	.9554	.9564	.9573	.9582	.9591	.9599	.9608	.9616	.9625	.9633
1.8	.9641	.9649	.9656	.9664	.9671	.9678	.9686	.9693	.9699	.9706
1.9	.9713	.9719	.9726	.9732	.9738	.9744	.9750	.9756	.9761	.9767
2.0	.9772	.9778	.9783	.9788	.9793	.9798	.9803	.9808	.9812	.9817
2.1	.9821	.9826	.9830	.9834	.9838	.9842	.9846	.9850	.9854	.9857
2.2	.9861	.9864	.9868	.9871	.9875	.9878	.9881	.9884	.9887	.9890
2.3	.9893	.9896	.9898	.9901	.9904	.9906	.9909	.9911	.9913	.9916
2.4	.9918	.9920	.9922	.9925	.9927	.9929	.9931	.9932	.9934	.9936
2.5	.9938	.9940	.9941	.9943	.9945	.9946	.9948	.9949	.9951	.9952
2.6	.9953	.9955	.9956	.9957	.9959	.9960	.9961	.9962	.9963	.9964
2.7	.9965	.9966	.9967	.9968	.9969	.9970	.9971	.9972	.9973	.9974
2.8	.9974	.9975	.9976	.9977	.9977	.9978	.9979	.9979	.9980	.9981
2.9	.9981	.9982	.9982	.9983	.9984	.9984	.9985	.9985	.9986	.9986
3.0	.9987	.9987	.9987	.9988	.9988	.9989	.9989	.9989	.9990	.9990
3.1	.9990	.9991	.9991	.9991	.9992	.9992	.9992	.9992	.9993	.9993
3.2	.9993	.9993	.9994	.9994	.9994	.9994	.9994	.9995	.9995	.9995
3.3	.9995	.9995	.9995	.9996	.9996	.9996	.9996	.9996	.9996	.9997
3.4	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9998

Bharatiya Vidya Bhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)

Munshi Nagar, Andheri (W) Mumbai – 400058

END SEMESTER EXAMINATION MARCH 2023 Sem I 20/3/23

Program: F. Y. M. Tech Civil with Str. Engg **Duration: 3 Hours**

Course Code: AU-PG 01 **Maximum Points: 100**

Course Name: Project Planning and Management **Semester: I**

Notes:

1. **Answer any five questions.**
2. **All questions carry 20 points.**

Q.No.	Questions	Points	CO	BL	Module No.
1	1.1 Why is it important to issue a Civil, Structural, Architectural Design Basis for the project? List ten of the most important design requirements that should be contained in the Design Basis.	10	1	1	2
	1.2 List out at least ten steps, in sequence, for the preparation of Civil Structural, Architectural Tender specification.	10	2	2	2
2	2.1 Explain the three fundamental components in a computer model for structural analysis. Explain the three stages in the process of computer analysis highlighting Engineer's and computer's roles.	10	2	3	3
	2.2 List out at least ten steps, in sequence, in the designing of a complex plant steel structure.	10	2	2	4
3	3.1 Write a detailed note on reinforcement Bar Bending Schedules including contents, cutting length and users.	10	2	1	5
	3.2 Explain Building Information Modelling (BIM) along with its use in different stages of a construction project and its advantages.	10	2	3	4
4	4.1 Explain the key concepts for Project Resource Management and Project Risk Management.	10	1	2	2
	4.2 Explain any five top Emerging Trends which are impacting the Construction Industry today.	10	3	5	5

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END SEMESTER EXAMINATION MARCH 2023

Q.No.	Questions	Points	CO	BL	Module No.
5	5.1 Explain the change in approach towards Project Management in the seventh edition of the PMBOK Guide briefly defining project management principles and performance domains; list any three of each.	10	3	2	1
	5.2 List ten guidelines to be considered while developing a plot plan/layout for a process plant.	10	2	3	2
6	6.1 Write a brief note on i)Project and ii)Project Management	10	2	1	2
	6.2 Explain Quality and Grade. Explain Quality Assurance and Quality Control; which is preferred and why?	10	4	4	5
7	7.1 When a project commences, what are the early activities carried out by CSA discipline? On what activities does the CSA engineer spend a major portion of time?	10	4	2	1
	7.2 Write a note on Method statement in construction. What are the objectives of Constructability Reviews?	10	2	3	2