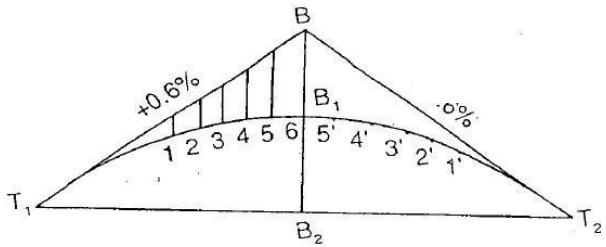


C)	Explain method of determination of latitude by meridian altitude of Sun or Star with neat labeled diagram	CO3	12
Q.4	Solve Any Two of the following. \		12
A)	Define Combined Curve. Explain elements of Combined curve with neat labeled diagram.	CO4	06
B)	What is Shift? Prove that a transition curve bisects a shift and that a shift bisects a Transition Curve.	CO4	06
C)	Calculate the RL of the various pegs on a vertical curve connecting two grades of +0.6% and -0.6%. The chainage and the RL of intersection point are 550 and 325.50 m respectively. The rate of change of grade is 0.1% per 30 m.	CO4	06
			
Q. 5	Solve Any One of the following.		12
A)	<p>a) A line AB measures 15cm on a photograph taken with a camera having focal length of 21.5cm. The same line measures 5 cm on a map drawn to a scale of 1/45000. If the average altitude is 450 m, Calculate the flying height of the aircraft.</p> <p>b) A line 3350 m long lying at an elevation of 500m measure 10.50 cm on a vertical photograph. The focal length of the camera is 10cm. If the elevation of a point is 1300m. Calculate the scale of photograph.</p>	CO4 CO4	06
B)	<p>a) Write down comparison between Map and Aerial Photograph</p> <p>b) Define: i) Forward overlap ii) Side overlap iii) Relief Displacement</p>	CO5 CO5	06
C)	<p>a) Write down applications of GPS and GIS.</p> <p>b) Explain key component of GIS</p>	CO6 CO6	06
	*** End ***		

The grid and the borders of the table will be hidden before final printing.

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE End Semester Examination – Summer Supplementary 2022 Course: B. Tech. Branch: Civil Engineering Semester: IV Subject Code & Name: <u>BTCVC403 Structural Mechanics – I (2017 Pattern)</u> Max Marks:60 Date: 12/01/2023 Duration: 3 Hrs. (Time 2:00 to 5:00)		
Instructions to the Students: 1. All the questions are compulsory. 2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in () in front of the question. 3. Use of non-programmable scientific calculators is allowed. 4. Assume suitable data wherever necessary and mention it clearly.		
		(Level/ CO)
		Marks
Q. 1	Solve Any Two of the following.	
A)	Determine static indeterminacy of the structure as shown in fig 3.1 (A) below. <div style="text-align: center;"> </div>	CO2
	Fig 3.1 (A)	
B)	Find the reaction of propped cantilever beam subjected UDL of '10' kN/m throughout its span '5 m' by using strain energy principles.	CO2
C)	A simply supported beam of span L, carries a concentrated load P at a distance 'a' left hand side support and at a distance of 'b' from right hand support. Using Castigliano's theorem determine the deflection under the load. Assume uniform flexural rigidity.	CO2
Q.2	Solve Any Two of the following.	
A)	Find the support moment for propped cantilever of span '5 m' subjected to clockwise moment '20 kN-m' at the prop end. Draw BMD?	CO2
B)	A fixed beam of span '10 m' subjected to an external clockwise moment '30 kN-m' at a distance '4 m' from one of its fixed supports and at a distance '6 m' from other end fixed support. Determine the end moments developed.	CO2

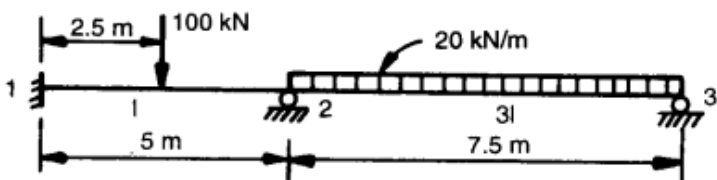
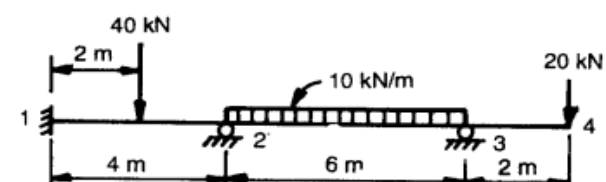
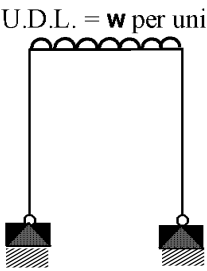
C)	A continuous beam ABC of span 10 m long (Span AB - 6 m and Span BC- 4 m rests on three supports A, B and C at the same level subjected to point load 3 kN at distance of 2 m from support A and UDL of 1 kN/m over a span of BC. Determine the moments over the beam and draw bending moment diagram. Also Calculate the reactions at the supports and draw the shear force diagram? Use theorem of three moments.	CO2	6 M
Q. 3 Solve Any Two of the following.			
A)	Define the following terms: I. Absolute and Relative stiffness of member II. Carry over factor (COF) III. Distribution Factor (DF)	CO 1	6 M
B)	A two-span fixed continuous beam ABC of span 12 m long having span AB - 6 m and span BC- 6 m rests on three supports A (fixed), B (hinged) and C (fixed) at the same level. Span AB is subjected to a UDL of 30 kN/m having MI as 3I and Span BC is subjected to 72 kN at distance of 2 m from support C. Analyze the two-span continuous beam by moment distribution method and draw bending moment and shear force diagrams. Also draw an Elastic curve.	CO 1	6 M
C)	A two-span fixed continuous beam ABC of span 12 m long having span AB - 8 m and span BC- 4 m rests on three supports A (fixed), B (hinged) and C (hinged) at the same level. Span AB is subjected to UDL of 20 kN/m having MI as 2I and Span BC is subjected to 60 kN at distance of 2 m from support C. Analyze the two-span continuous beam by moment distribution method and draw bending moment and shear force diagrams. Also draw an Elastic curve.	CO 1	6 M
Q.4 Solve Any Two of the following.			
A)	Determine the support moments for the continuous beam as shown in the below fig 4.1 (A) by slope deflection method. The relative values of moment of inertia are shown in the fig as below. E is constant.  <p style="text-align: center;">Fig No. 4.1 (A) – Two span continuous beam with loading</p>	CO 4	6 M
B)	A continuous beam is supported and loaded as shown in fig 4.2 (B) as below. During loading support 2 sinks by 10 mm. Analyze the beam for support moments and reactions. $E = 200 \times 10^6 \text{ kN/m}^2$ and $I = 100 \times 10^{-6} \text{ m}^4$ constant throughout. 	CO 4	6 M

	Fig No. 4.2 (B) – Two span continuous beam with overhang on one side having a sinking support		
C)	<p>Solve the frame shown below fig 4.3 (C) using slope deflection method and draw the BMD.</p> <p style="text-align: center;">U.D.L. = w per unit length</p>  <p style="text-align: right;">Length of members is 4 m each. Assume uniform EI for all members.</p> <p style="text-align: center;">Fig No. 4.3 (C) – Frame and loading</p>	CO 4	6 M
Q. 5	Solve Any Two of the following.		
A)	A suspension bridge is of 160 m span. The cable has a dip of 12 m. The cable is stiffened by a three hinged girder with hinges at either end and at center. The dead load of the girder is 15 kN/m. Find the greatest positive and negative bending moments in the girder when a single concentrated load of 340 kN passes through it. Also find the maximum tension in the cable.	CO 4	6 M
B)	A suspension cable of 75 m horizontal span and central dip of 6 m has a stiffening girder hinged at both ends. The dead load transmitted to the cable including its own weight is 1500 kN. The girder carries a live load 30 kN/m uniformly distributed over the left half of the span. Assuming the girder to be rigid, calculate the SF and BM in the girder at 20 m from left support. Also find the maximum tension in the cable.	CO 4	6 M
C)	A thin cylinder closed at both ends is subjected to an internal pressure of 2 MPa. Internal diameter is 1 m and the wall thickness is 10mm. What is the maximum shear stress in the cylinder material?	CO 4	6 M
	**** End ****		

C)	Evaluate the integral $\int_0^1 \frac{x^2}{1+x^3} dx$ using Simpson's 1/3 rule. Compare the error with the exact value.	CO2													
Q.4 Solve Any Two of the following.															
A)	Calculate Mean and Standard Deviation for the data: <table border="1" style="margin-left: 20px;"> <tr> <td>x</td> <td>0-10</td> <td>10-20</td> <td>20-30</td> <td>30-40</td> <td>40-50</td> </tr> <tr> <td>(x)</td> <td>5</td> <td>7</td> <td>10</td> <td>16</td> <td>11</td> </tr> </table>	x	0-10	10-20	20-30	30-40	40-50	(x)	5	7	10	16	11	CO3	
x	0-10	10-20	20-30	30-40	40-50										
(x)	5	7	10	16	11										
B)	If P is the pull required to lift a load W by means of a pulley block, find a linear law of the form $P = mW + c$ connecting P and W , using the following data: <table border="1" style="margin-left: 20px;"> <tr> <td>P</td> <td>12</td> <td>15</td> <td>21</td> <td>25</td> </tr> <tr> <td>W</td> <td>50</td> <td>70</td> <td>100</td> <td>120</td> </tr> </table>	P	12	15	21	25	W	50	70	100	120	CO3			
P	12	15	21	25											
W	50	70	100	120											
C)	Fit a second degree parabola to the following data: <table border="1" style="margin-left: 20px;"> <tr> <td>x</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>Y</td> <td>1</td> <td>1.8</td> <td>1.3</td> <td>2</td> <td>6.3</td> </tr> </table>	x	0	1	2	3	4	Y	1	1.8	1.3	2	6.3	CO3	
x	0	1	2	3	4										
Y	1	1.8	1.3	2	6.3										
Q. 5 Solve Any One of the following.															
A)	Write the algorithm for Newton Raphson Method.	CO4													
B)	Write the algorithm for Euler's Method.	CO4													
C)	Write the algorithm for Trapezoidal Rule.	CO4													
*** End ***															

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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Supplementary Examination – Summer 2022

Course: B. Tech.

Branch: Civil Engineering

Semester : IV

Subject Code & Name: BTCVE404B Planning for Sustainable Development

Max Marks: 60

Date: 15/01/2023

Duration: 3 Hr.

Instructions to the Students:

1. *All the questions are compulsory.*
2. *Use of non-programmable scientific calculators is allowed.*
3. *Assume suitable data wherever necessary and mention it clearly.*

Marks

Q. 1 Solve Any Two of the following.

- | | |
|--|-----------|
| A) Define the concept of sustainable development. Why it is necessary? | 06 |
| B) Explain the principles of sustainable development. | 06 |
| C) Describe the evolution of ideas about sustainability | 06 |

Q.2 Solve Any Two of the following.

- | | |
|--|-----------|
| A) Explain the key Components in Sustainable Development. | 06 |
| B) What are the different strategies for promoting the sustainable development? | 06 |
| C) Write down the current environmental issues in India. What are the initiatives taken by government to tackle Environmental degradation? | 06 |

Q. 3 Solve Any two of the following.

- | | |
|---|-----------|
| A) Describe national innovation system. | 06 |
| B) Describe briefly: | 06 |
| a. Environmental Management System | |
| b. B Environmental Impact Assessment | |
| C) Write down the various Goals of Sustainable Development. | 06 |

Q.4 Solve the following.

- | | |
|---|-----------|
| A) Write a short note on Societal Theories and Institutional theory of Sustainable development. | 06 |
| B) What are the measures taken by India to implement Sustainable development? Also write down the challenges for attaining the Sustainable Development goals. | 06 |

Q. 5 Solve the following.

- | | |
|--|-----------|
| A) Write a short note on: (any two) | 08 |
| 1. Research in Sustainable Development | |
| 2. Sustainable transport | |

3. Policy Responses to Environmental Degradation
B) Explain briefly Governance for sustainable development

04

*** End ***