

**Code: 19AC31T**

II B.Tech. I Semester Supplementary Examinations June 2024

**Partial Differential Equations and Complex Variables**

(Common to CE, EEE, ME &amp; ECE)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks )

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Marks CO BL

## UNIT-I

1. a) Find  $L\left\{\frac{e^{-at} - e^{-bt}}{t}\right\}$  7M CO1 L1  
b) Find  $L\left\{\frac{1 - e^{-t}}{t}\right\}$  7M CO1 L1

OR

2. a) Find the Laplace Transform of  $e^{2t} + 4t^3 - 2\sin 3t + 3\cos 3t$  7M CO1 L1  
b) Find the L.T of  $(t^2 + 1)^2$  7M CO1 L1

## UNIT-II

3. Using L.T, solve the differential equation  $\frac{d^2y}{dt^2} + 2\frac{dy}{dt} + 5y = e^{-t} \sin t$ , Given that  $Y(0) = 0, Y'(0) = 1$  14M CO2 L3

OR

4. a) Find  $L^{-1}\left\{\frac{3(s^2 - 2)^2}{2s^5}\right\}$  7M CO2 L1  
b) Find the inverse L.T of  $\frac{4}{(s+1)(s+2)}$  7M CO2 L1

## UNIT-III

5. Obtain the Fourier cosine series for  $f(x) = x \sin x, 0 < x < f$  and Show that  $\frac{1}{1.3} - \frac{1}{3.5} + \frac{1}{5.7} - \frac{1}{7.9} + \dots = \frac{f-2}{4}$ . 14M CO3 L3

OR

6. Express  $f(x) = x - f$  as Fourier series in the interval  $-f < x < f$  14M CO3 L2

## UNIT-IV

7. Solve  $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$  with  $u(0, y) = 0 = u(x, 0), u(l, y) = 0$  and  $u(x, a) = \sin\left(\frac{nf x}{l}\right)$  14M CO4 L3

OR

8. Solve by the method of separation of variables  $\frac{\partial^2 z}{\partial x^2} = \frac{\partial z}{\partial y} + 2z$  14M CO4 L3

## UNIT-V

9. Evaluate  $\int_C \frac{z^3 - \sin 3z}{\left(z - \frac{f}{2}\right)^3} dz$  with  $C: |z| = 2$  using Cauchy's integral formula. 14M CO5 L5

OR

10. Prove that  $\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right) |\text{Real } f(z)|^2 = 2|f'(z)|^2$  where  $w = f(z)$  is analytic. 14M CO5 L5

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Hall Ticket Number :

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**R-19**

**Code: 19A132T**

II B.Tech. I Semester Supplementary Examinations June 2024

**Surveying**  
(Civil Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

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**UNIT-I**

Marks

1. a) Distinguish between closed and open traverse. 7M  
b) What is closing error' in a traverse? 7M

**OR**

2. A line was shown to a magnetic bearing of  $38^{\circ}15'$  in an old map, when the declination was  $15^{\circ}45'$  E. to what bearing should it be set now if the present magnetic declination is  $6^{\circ}15'W$ . 14M

**UNIT-II**

3. The following consecutive readings were taken with a level and 4m leveling staff on a continuously sloping ground at common intervals of 30m.  
0.905(on A), 1.745, 2.345, 3.125, 3.725, 0.545, 1.390, 2.055, 2.955, 3.455, 0.595, 1.015, 1.850, 2.655, and 2.945 9(on B).  
The RL of A was 395.500. calculate the RLs of difference points and find the gradient of the line AB. 14M

**OR**

4. Define the following: datum surface, line of collimation, reduced level, bench mark, change point, and parallax. 14M

**UNIT-III**

5. a) How can the height of a tower be determined when it is inaccessible? 7M  
b) What are the methods of locating interior details in theodolite traversing? Describe the methods of checking the accuracy of close and open traverse. 7M

**OR**

6. a) How is the closing error in a traverse balanced? 7M  
b) Describe the process of measuring the horizontal angle. 7M

**UNIT-IV**

7. a) What is orientation? What are the methods of orientation? Describe the methods with a sketch. 7M  
b) Discuss the methods of tacheometry. 7M

**OR**

8. a) Explain the theory of stadia tacheometry. 7M  
b) Describe the procedure of setting up the plane table over a station. 7M

**UNIT-V**

9. Show with neat sketches, the different types of vertical curves possible. 14M

**OR**

10. a) Explain why super elevation is required in roads and railways. 7M  
b) Why and where transition curves are provided? 7M

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Important Note: 1. On completing your answers. Compulsorily draw diagonal cross line on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 32+8=40, will be treated as malpractice.

Hall Ticket Number :

**R-19**

**Code: 19A235T**

II B.Tech. I Semester Supplementary Examinations June 2024

**Basic Electronics, Electrical & Mechanical Technology**

( Civil Engineering )

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit ( 5 x 14 = 70 Marks )

Use separate booklets for **Part-A & Part-B**

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**PART-A**

	Marks	CO	Blooms Level
<b>UNIT-I</b>			
1. a) State and explain the Ohm's Law?	7M	CO1	L1
b) Draw a neat sketches the construction of a Dc machine?	7M	CO1	L1
<b>OR</b>			
2. a) Explain the principle operation of DC generator?	7M	CO1	L1
b) Mention the applications of DC motor?	7M	CO1	L1
<b>UNIT-II</b>			
3. a) Explain the principle operation of single phase transformer?	7M	CO2	L3
b) Describe various losses in single phase transformer?	7M	CO2	L3
<b>OR</b>			
4. a) Define voltage regulation of a transformer?	7M	CO2	L3
b) Explain the principle operation of Alternators?	7M	CO2	L3
<b>UNIT-III</b>			
5. a) What are the applications of Diode?	7M	CO3	L3
b) Explain the operation of bridge rectifiers?	7M	CO3	L3
<b>OR</b>			
6. a) Draw the block diagram of CRO?	7M	CO3	L3
b) Explain the principle of CRT?	7M	CO3	L3
<b>PART-B</b>			
<b>UNIT-IV</b>			
7. a) Why is Coating required for welding electrodes? What are the ingredients of coating? Explain importance of each ingredient.	7M	CO4	L2
b) Contrast any seven differences between ARC and Gas Welding.	7M	CO4	L2
<b>OR</b>			
8. a) Define the terms Refrigeration and Air Conditioning. Differentiate between Refrigeration and Air Conditioning	7M	CO5	L2
b) Explain Vapour Absorption Refrigeration with neat sketch and also summarize the differences between Vapour compression and Vapour Absorption Refrigeration.	7M	CO5	L2
<b>UNIT-V</b>			
9. a) Explain the working principle of two stroke diesel engine	7M	CO4	L2
b) Why Two Stroke IC Engines deliver more power compared to Four Stroke Engines? Discuss.	7M	CO4	L2
<b>OR</b>			
10. a) Differentiate between pump and compressor. Where do we need compressed Air? Discuss.	7M	CO5	L2
b) Explain working principle of Air Compressor with neat sketch	7M	CO5	L2

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Hall Ticket Number :

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R-19

Code: 19A131T

II B.Tech. I Semester Supplementary Examinations June 2024

## Building Materials and Construction

(Civil Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks )

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Marks

### UNIT-I

1. List the methods of quarrying of stone and explain the method of quarrying of stone by blasting? 14M

OR

2. a) Explain the classification of lime. Compare fat lime and hydraulic lime. 7M  
b) Briefly explain different forms of bitumen. 7M

### UNIT-II

3. a) Describe about Glass, bitumen, alumina and its uses? 7M  
b) Classify the different types of gypsum and glass. 7M

OR

4. a) Elucidate the process of manufacture of tiles. 7M  
b) Briefly explain the constituents of lime stones. 7M

### UNIT-III

5. a) Give the defects in timber? 7M  
b) Describe the physical and mechanical properties of timber? 7M

OR

6. a) Sketch the cross section of the trunk of a tree and indicate the different parts of a log of wood. 7M  
b) Classify and describe knots found in timber based on size and quality? 7M

### UNIT-IV

7. a) Explain the essentials of a good foundation? 7M  
b) Differentiate between rubble and ashlar masonry? 7M

OR

8. a) Explain mat foundation and the situations where mat foundation is essential. 7M  
b) List the construction situations and choice of corresponding footings? 7M

### UNIT-V

9. a) Explain about different water proofing materials used? 7M  
b) Explain the causes of dampness in buildings? 7M

OR

10. Explain different types of Lintels, Arches and Stair cases and their purposes 14M

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Hall Ticket Number :

R-19

Code: 19A133T

II B.Tech. I Semester Supplementary Examinations June 2024

## Mechanics of Materials

(Civil Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks )

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Marks CO BL

### UNIT-I

1. A steel rod of 30mm diameter is enclosed by a copper tube of 50mm external diameter and 35mm internal diameter. The ends are closed by rigid metal plates. If the temperature of the assembly is raised by 60°C, find the stresses in the steel and copper rods and the combined expansion of the assembly. Take  $E_S = 2 \times 10^5 \text{N/mm}^2$  and  $E_C = 1 \times 10^5 \text{N/mm}^2$ ;  $S = 1.2 \times 10^{-5} \text{per } ^\circ\text{C}$  and  $C = 1.6 \times 10^{-5} \text{per } ^\circ\text{C}$

14M CO1 B3

OR

2. Formulate the relationship between shear modulus, bulk modulus and elastic modulus & Also Explain the stress strain relation for mild steel

14M CO1 B2

### UNIT-II

3. Draw the shear force & bending moment diagram for the simply supported beam carrying a central point load.

14M CO2 B4

OR

4. A simply supported beam AB of span 8 m is subjected to a uniformly distributed load of 30 KN/m over the left half of span and a concentrated moment of 48 KN-m acting at a distance of 6 m from left support A. Draw the shear force and bending moment diagrams. Also find the position and magnitude of maximum bending moment.

14M CO2 B4

### UNIT-III

5. A beam of rectangular cross section having width of 100 mm and height of 200 mm is subjected to a shear force of 25 KN. Find the value of maximum shear stress, and sketch the shear stress distribution along the depth of beam

14M CO3 B1

OR

6. Define section modulus. What is its value for a hollow pipe with external and internal diameters as 'D' and 'd'

14M CO3 B1

### UNIT-IV

7. Obtain an expression for normal and tangential stresses on an inclined plane when an element subjected to bi-axial direct stresses. Also obtain the expressions for resultant stress and their direction

14M CO4 B4

OR

8. Derive the expression for the maximum deflection of a simply supported beam loaded with a central point load using Mohr's theorem.

14M CO4 B1

### UNIT-V

9. According to the theory of maximum shear stress, determine the diameter of a bolt which is subjected to an axial pull of 9 kN together with a transverse shear force of 4.5 kN. Elastic limit in tension is 225 N/mm<sup>2</sup>, FOS = 3 and poisson's ratio = 0.3

14M CO5 B1

OR

10. State the significance and application of theories of failure. Derive an expression for distortion energy theory of failure.

14M CO5 B3

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