

**I B.Tech. I Semester****BASIC ELECTRICAL SCIENCES**

(Common to EEE, ECE, CSE &amp; IT)

Time: 3Hrs

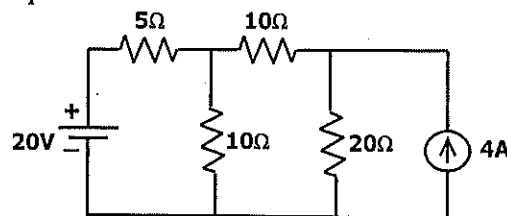
Max. Marks: 60

*Answer SIX Questions, Choosing ONE Question from each section**All Questions carry equal marks*

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**SECTION - I**

1. (a) Derive the equivalent DELTA expressions for given STAR.  
(b) Find the current flowing through each resistors of  $5\Omega$  and  $8\Omega$  connected in parallel to a current source of 12 A.
2. (a) State and explain kirchoff's voltage and current laws.  
(b) Find the value of current flowing through  $20\Omega$  resistor by using source transformation and network reduction techniques?

**SECTION - II**

3. (a) Define the terms Impedance, Susceptance and Admittance and also write the difference between resistance and impedance?  
(b) An alternating voltage is expressed as  $v = 14.14 \sin 314t$ . Determine rms voltage, frequency and instantaneous voltage at  $t = 20\text{ms}$ .
4. (a) Give the voltage - current phasor relations for Inductor and Capacitor.  
(b) Two impedances  $(20 + j40)$  and  $(2 - j5)$  are connected in series. Determine the equivalent impedance in both rectangular and polar forms.

**SECTION - III**

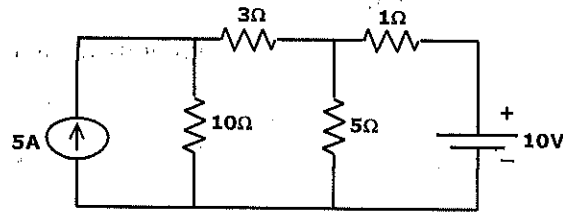
5. (a) Explain the response of series RC circuit for a sinusoidal voltage source and also draw its complex impedance triangle?  
(b) Prove that total active power consumed by pure inductor is zero?
6. (a) Derive the expression for active power.  
(b) A sinusoidal voltage  $v = 50 \sin \omega t$  is applied to a series RL circuit. The current in the circuit is given by  $i = 25 \sin (\omega t - 53^\circ)$ . Determine:  
(i) Active Power (ii) Reactive Power and (iii) Power Factor

**SECTION - IV**

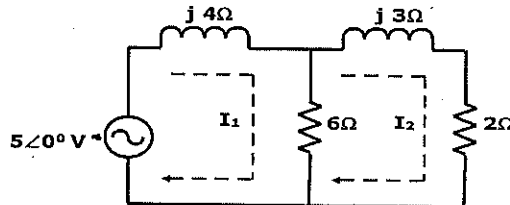
7. (a) Explain briefly about cut-set and tie-set with an example.  
(b) Write the properties of incidence matrix.



- 8 (a) Write the node voltage equations and determine the currents in each branch for the network shown in figure.



- (b) Write the mesh current equations in the circuit shown in figure, and determine the currents.

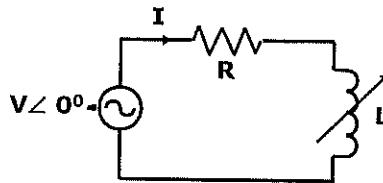


### SECTION - V

- 9 (a) What is coefficient of coupling? What is the range of variation of this quantity? In which type of circuits is it minimum and in which type of circuits is it maximum?  
 (b) Derive the expression for K, in two mutual inductive coils connected in parallel opposing manner?
- 10 (a) Compare the electric and Magnetic circuits.  
 (b) An iron ring of mean circumference 150cm with area of cross section of  $5 \text{ cm}^2$  is wound uniformly with 200 turns of wire. Find the current required to produce a flux of 0.3mwb in the iron. Assume the relative permeability of iron is 400.

### SECTION - VI

- 11 (a) Derive the equation for resonance frequency of a parallel RLC circuit?  
 (b) In a series RLC circuit if the applied voltage is 10 V, and resonance frequency is 1KHz, and Q factor is 10, what is the maximum voltage across the inductance?
- 12 (a) What are Locus diagrams? Write the advantages of locus diagrams.  
 (b) Plot the locus of current vector when C is varied.



**R-17**

**Code : 17CS1105**

**B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, DECEMBER 2023**

**I B.Tech. I Semester**

**INTRODUCTION TO COMPUTING  
(Common to CE & ME)**

Time : 3Hrs

Max. Marks : 60

*Answer SIX Questions, Choosing ONE Question from each section  
All Questions carry equal marks*

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**SECTION - I**

1. (a) List out the various computers for organizations. Explain them briefly.  
(b) Why a network server so important for the organizations? Explain it briefly.
2. (a) Describe the information processing cycle with a neat diagram.  
(b) Write and explain the various essential components of computer system.

**SECTION - II**

3. (a) List out the various input devices. Give its clear explanation.  
(b) Explain the various categories of storage devices with examples.
4. (a) Explain how the data is stored and organized on disk.  
(b) Explain about various storage devices.

**SECTION - III**

5. (a) Discuss about Single User/Single Tasking operating system.  
(b) Describe various user interfaces. Explain them briefly.
6. (a) How the information is sharable? Explain it in detail.  
(b) Give the differences between Graphical user interfaces and Command Line Interfaces.

**SECTION - IV**

7. (a) Explain the brief history of c-language.  
(b) Define Variable. Explain various rules for defining variables with example.
8. (a) List out various datatypes. Explain each of them with an example.  
(b) What is expression? Explain about operator precedence and its associativity.

**SECTION - V**

9. (a) Explain about formatted functions with an example.  
(b) Define library function. Write a c program to reverse the given positive integer.
10. (a) What is a decision making? Write any C program to find whether a given number is even or odd.  
(b) Write C-program to illustrate goto statement.



## SECTION - VI

- 11 (a) Give the differences between while and do-while statements with an example.  
(b) Write C-Program to find the sum of even and odd numbers in the range of 1 to N.
- 12 (a) Define an Array? Write various characteristics of an array.  
(b) Explain runtime initialization of arrays with an example.

**I B.Tech. I Semester****NUMERICAL ANALYSIS**

(Common to All Branches)

Time : 3Hrs

Max. Marks : 60

*Answer SIX Questions, Choosing ONE Question from each section**All Questions carry equal marks*

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**SECTION - I**

1. a) Find a real root of the equation  $2x - \log x = 7$  by Regula - Falsi method.
- b) Find a real root of the equation  $x^3 - 6x - 4 = 0$  by bisection method.
2. a) Using the Newton-Raphson method, find the root of the equation  $f(x) = e^x - 3x$  that lies between 0 and 1.
- b) Evaluate  $\sqrt{10}$  to four decimal places by Newton's iterative method.

**SECTION - II**

3. a) Solve the system of equations  $3x + y - z = 3, 2x - 8y + z = -5, x - 2y + 9z = 8$  by using Gauss-elimination method.
- b) Solve the following equations by using Gauss-Jordan method  
 $x + 2y + z - w = -2, 2x + 3y - z + 2w = 7, x + y + 3z - 2w = -6,$   
 $x + y + z + w = 2.$
4. a) Solve the following system, by using triangularisation method  
 $2x - 3y + 10z = 3, -x + 4y + 2z = 20, 5x + 2y + z = -12.$
- b) Using Gauss -seidel iteration method solve the system of equations  
 $10x - 2y - z - w = 3, -2x + 10y - z - w = 15, -x - y + 10z - 2w = 27,$   
 $-x - y - 2z + 10w = -9.$

**SECTION - III**

5. a) Use Newton's forward interpolation formula, and the given table of values.
 

x	1.1	1.3	1.5	1.7	1.9
f(x)	0.21	0.69	1.25	1.89	2.61

 Obtain the value of f(x) when x = 1.4.
- b) Given values:
 

X	0	2	3	6
f(x)	-4	2	14	58

Find the value of f(4) by using Lagrange's interpolation formula.



6. a) Use Gauss Forward interpolation formula to find  $f(30)$  given that  $f(21) = 18.4708$ ,  $f(25) = 17.8144$ ,  $f(29) = 17.1070$ ,  $f(33) = 15.5154$ .
- b) Using Stirling's formula, find  $y(35)$

x	20	30	40	50
y	512	439	346	243

#### SECTION - IV

- 7 Find the first and second derivative of the function tabulated below at  $x = 0.6$ .
- |   |        |        |        |        |        |
|---|--------|--------|--------|--------|--------|
| x | 0.4    | 0.5    | 0.6    | 0.7    | 0.8    |
| y | 1.5836 | 1.7974 | 2.0442 | 2.3275 | 2.6511 |
- 8 a) Evaluate  $\int_0^2 e^{-x^2} dx$  using Simpson's 1/3 rule taking  $h = 0.25$ .
- b) Evaluate  $\int_0^1 \frac{1}{1+x} dx$  using the Trapezoidal rule.

#### SECTION - V

- 9 Using Runge - Kutta 4<sup>th</sup> order method, find  $y(0.2)$  for the equation  $\frac{dy}{dx} = \frac{y-x}{y+x}$ ,  $y(0) = 1$ . Take  $h = 0.2$ .
- 10 a) Using the Taylor's series method, solve  $\frac{dy}{dx} = 2y + 3e^x$ ,  $y(0) = 0$  at  $x = 0.1, 0.2$
- b) Compute  $y$  at  $x = 0.25$  by Euler's method given  $y' = 2xy$ ,  $y(0) = 1$ . And compare the result with exact solution.

#### SECTION - VI

- 11 (a) Find the curve of best fit of the type  $y = ae^{bx}$  to the following data by the method of least squares.
- |   |    |    |    |    |    |
|---|----|----|----|----|----|
| x | 1  | 5  | 7  | 9  | 12 |
| y | 10 | 15 | 12 | 15 | 21 |
- (b) From the following data obtain two regression equations.
- |    |   |    |    |   |   |
|----|---|----|----|---|---|
| X: | 6 | 2  | 10 | 4 | 8 |
| Y: | 9 | 11 | 5  | 8 | 7 |
- 12 (a) Fit a straight line to the data given below:
- |   |    |    |    |    |    |    |    |
|---|----|----|----|----|----|----|----|
| x | 0  | 5  | 10 | 15 | 20 | 25 | 30 |
| y | 10 | 14 | 19 | 25 | 31 | 36 | 39 |
- (b) Find the coefficient of correlation between X and Y.
- |    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|
| X: | 65 | 66 | 67 | 67 | 68 | 69 | 70 | 72 |
| Y: | 67 | 68 | 65 | 68 | 72 | 72 | 69 | 71 |

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, DECEMBER 2023

**III B.Tech I Semester**  
**STRUCTURAL ANALYSIS - II**  
**(Civil Engineering)**

Time : 3 hours

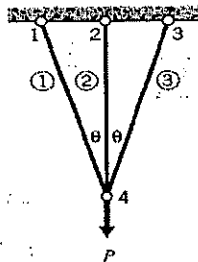
Max Marks: 60

*Answer SIX Questions, Choosing ONE Question from each section*  
*All questions carry equal marks*

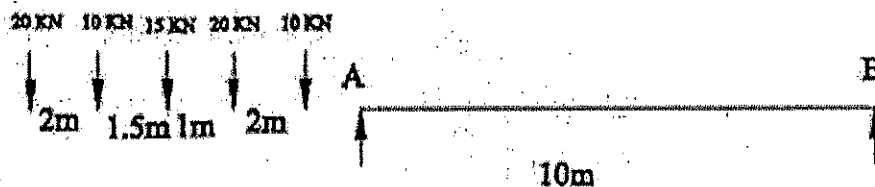
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**SECTION-I**

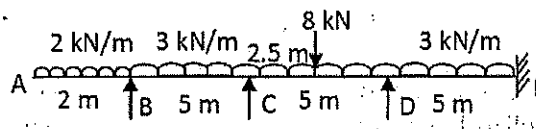
- 1 State and prove Castigliano's Second Theorem.
- 2 Determine forces in the given statically indeterminate structure, each member having same area and modulus but different lengths.

**SECTION-II**

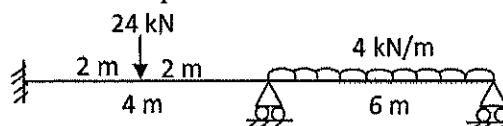
- 3 Determine the maximum shear force and maximum bending moment due to two concentrated loads of 10kN and 20kN which is 2m apart, at a distance of 3m from left support on a simply supported beam of length 10m. Draw the Influence lines
- 4 A system of concentrated load, roll on a beam from left to right, simply supported beam of span 10m and 10kN load leading. Find Absolute max. positive S.F, Absolute max. negative S.F and Absolute max. Bending Moment.

**SECTION-III**

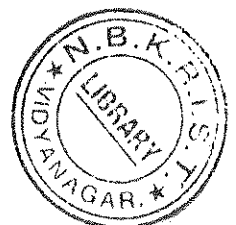
- 5 Analyse the given continuous beam by Slope-Deflection method.



- 6 (a) Analyse the continuous beam Slope-Deflection Method.

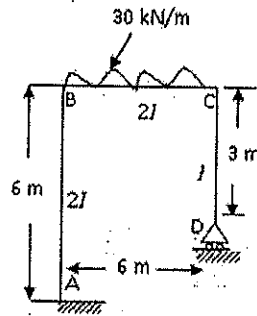


- (b) Derive the equation for Slope-Deflection method.



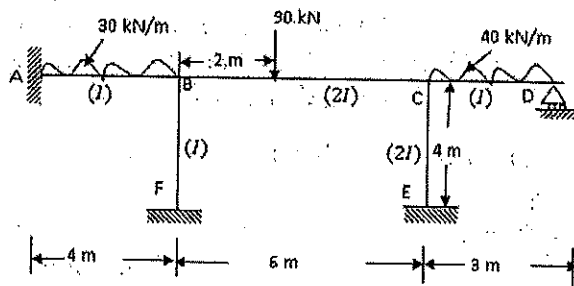
### SECTION-IV

- 7 A simply supported beam ABC is continuous over two spans AB and BC of 7m and 8m respectively. Span AB is carrying a uniformly distributed load of 5kN/m and span BC carries point load of 8 kN at midpoint of BC. Find the support moment at B, if EI of the beam is constant. Use moment distribution method.
- 8 Analyse the frame shown in figure by moment distribution method and drawn bending moment diagram.

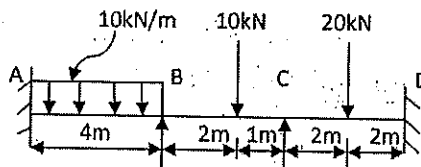


### SECTION-V

- 9 Analyse the continuous beam shown in figure given below by Kani's method.

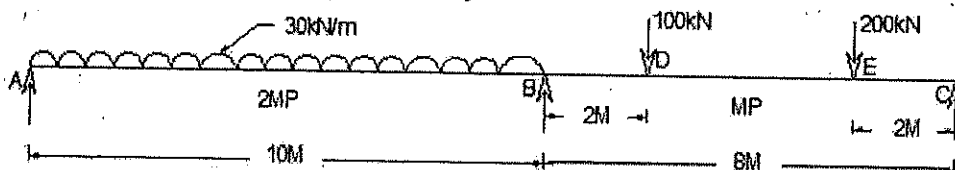


- 10 Analyse the beam shown in figure below using Kani's method. EI=Constant.



### SECTION-VI

- 11 (a) Calculate the shape factors  
 i) Triangle with depth 5m and width 3m  
 ii) Square with one diagonal horizontal of side 2m  
 (b) Explain the lower and upper bound theorem.
- 12 Analyze the continuous beam shown in fig. below by plastic Analysis. All the loads are service loads, use partial safety factor of 1.5





**III B.Tech. I Semester****ELECTRONIC MEASUREMENTS  
(Electrical & Electronics Engineering)**

Time : 3 hours

Max. Marks :60

*Answer SIX Questions, Choosing ONE Question from each section  
All Questions carry equal marks*

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**SECTION - I**

- 1 (a) Explain the Vertical amplifier section of CRT along with Block diagram.  
(b) An electrically deflected CRT has a final Anode voltage of 2000V and parallel deflecting plates of 1.5cm long and 5mm apart. If the screen is 50cm from the centre of the deflecting plates, Find i) Beam speed ii) Deflection sensitivity of the tube and iii) Deflection factor of the tube.
- 2 Explain two key components in the block diagram of a Cathode Ray Oscilloscope (CRO). Briefly discuss their functions in the overall operation of the CRO.

**SECTION - II**

- 3 (a) Explain the principle of operation of a dual-beam Cathode Ray Oscilloscope (CRO)  
(b) Discuss the principle behind a dual-trace CRO. Explain how it differs from a dual-beam CRO

**SECTION - III**

- 5 (a) Explain the working principle of a Ramp-Type Digital Voltmeter. Discuss the advantages and limitations.  
(b) Discuss the principle of operation of a Dual-Slope Digital Voltmeter. Compare its accuracy and resolution to other DVM types.
- 6 Explain the digital tachometer with a block diagram.

**SECTION - IV**

- 7 (a) Explain the operation of Harmonic Distortion Analyzer.  
(b) What is Heterodyning and explain the use of Heterodyning in spectrum analyzer along with its circuit diagram.
- 8 (a) Discuss the basic principle of AF wave analyzer with neat diagram.  
(b) Explain the principle of operation of Potentiometric recorders.

**SECTION - V**

- 9 Describe the transducers classifications with neat diagrams.



- 10 (a) Explain the working of LVDT in detail.
- (b) An AC LVDT has the following data: Input=6.3V, output=5.2V, range  $\pm 0.5$ in. Determine (i) The output voltage vs core position for a core movement going from +0.45in to -0.30in (ii) The output voltage when the core is -0.25in from the center.

### SECTION - VI

- 11 Write short notes on
- i) Flow Measurement
  - ii) Liquid level Measurement
- 12 Explain the components and functions of a typical data acquisition system. Discuss the criteria for selecting appropriate sensors and signal conditioning methods in a data acquisition setup.

**III B.Tech. I Semester****MICROPROCESSORS AND MICROCONTROLLERS****(Electronics & Communication Engineering)**

Time : 3 hours

Max. Marks :60

*Answer SIX Questions, Choosing ONE Question from each section**All Questions carry equal marks***\*\*\*****SECTION - I**

- 1 With neat sketch explain the architecture of 8085 microprocessor.
- 2 Summarize the stack operation of 8085 microprocessor.

**SECTION - II**

- 3 (a) Develop an ALP for addition of two 16-bit numbers using 8085 microprocessor.
- (b) Develop an ALP for multiplication of two 8-bit numbers using 8085 microprocessor.
- 4 Show memory interfacing of 8085 microprocessor with necessary diagrams.

**SECTION - III**

- 5 Explain the architecture of 8086 microprocessor in detail.
- 6 Develop a program in 8086 microprocessor to identify the parity of a given 16-bit data.

**SECTION - IV**

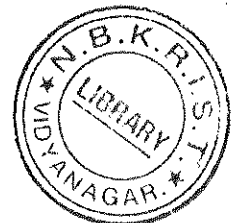
- 7 Explain the internal architecture of 8259 PIC with neat sketch.
- 8 Briefly explain the architecture of 8253 Programmable Interval Timer.

**SECTION - V**

- 9 Draw the architecture of 8255 PPI and explain.
- 10 Demonstrate the working principle of stepper motor in detail. Also develop a program for rotating in clockwise and anticlockwise direction.

**SECTION - VI**

- 11 Explain the architecture of 8051 microcontroller with neat sketch.
- 12 Explain the serial port operations of 8051 microcontroller.





## I B.TECH I SEM SUPPLEMENTARY EXAMINATION, DECEMBER 2023

**I B.Tech. I Semester****ENGINEERING PHYSICS**  
(Common to EEE, ECE & CSE)

Time: 3Hrs

Max. Marks: 60

*Answer SIX Questions, Choosing ONE Question from each section*  
*All Questions carry equal marks*

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**SECTION - I**

1. (a) Explain Crystal systems and their Bravais lattices with neat diagrams.  
(b) Sketch (1 1 1) and (1 1 0) planes in a cubic lattice.
2. (a) Explain crystal structure determination by Powder method.  
(b) Calculate the inter-planar spacing for (3 2 1) planes in a simple cubic crystal whose lattice constant is 4.2 A.U.

**SECTION - II**

3. (a) Explain Electronic, ionic and orientation Polarizations.  
(b) Deduce Clausius- Mossotti relation and give significance of it.
4. (a) Distinguish between Ferro, Para and diamagnetic materials.  
(b) A Circular loop of copper having a diameter of 10 cm carries a current of 500mA. Calculate the magnetic moment associated with the loop.

**SECTION - III**

5. (a) Explain the drift and diffusion currents in the semiconductor.  
(b) Write about direct and indirect bandgap semiconductors.
6. (a) Explain the formation of P-N junction and sketch its I-V characteristics.  
(b) Explain the working principle and advantages of light emitting diode (LED).

**SECTION - IV**

7. (a) Explain the communication system with the help of block diagram.  
(b) Describe basic steps involved in analog to digital conversion.
8. (a) What is meant by modulation? Write about different types of modulations.  
(b) Explain sampling theorem.



### **SECTION - V**

- 9 (a) Explain population inversion with energy level diagram.  
(b) Mention few applications of lasers in medicine.
- 10 (a) Derive the expression for acceptance angle and numerical aperture of an optical fiber.  
(b) List any four applications of optical fibers.

### **SECTION - VI**

- 11 (a) Distinguish type-I and type-II superconductors  
(b) State and explain Meissner effect. Hence show that susceptibility is negative in superconducting state.
- 12 (a) Explain physical and optical properties of nanomaterials.  
(b) Explain Ball mill method of production of nanomaterials.

R-17

Code : 17SH1103

B.TECH. DEGREE SUPPLEMENTARY EXAMINATION, DECEMBER 2023

**I B.Tech. I Semester**

**ENGINEERING CHEMISTRY**  
(Common to CE&ME)

Time : 3Hrs

Max. Marks : 60

Answer **SIX** Questions, Choosing **ONE** Question from each section

All Questions carry equal marks

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**SECTION - I**

1. (a) Explain the working of hydrogen gas electrode.  
(b) Explain the working principle of Li-ion batteries.
2. Explain the construction and working of  $H_2-O_2$  fuel cell. What are the advantages of it?

**SECTION - II**

3. (a) Explain electrochemical theory of corrosion.  
(b) Write a note on electroplating.
4. What is cathodic protection? Write short notes on Sacrificial anodic protection and Impressed current cathodic protection.

**SECTION - III**

5. What are electrical insulators? Describe the characteristics and engineering applications of these materials.
6. Explain thick film, thin film and extreme pressure lubrication.

**SECTION - IV**

7. (a) Explain the ultimate analysis of coal to ascertain its quality.  
(b) A Sample of coal was contain the following constituents: C=85%; O=3%; S=1%; H=12%; N=3% and ash=2%. Calculate the minimum amount of air required for the complete combustion of 1 Kg of coal (oxygen in air is 23% by weight).



- 8 (a) What are the characteristics of good fuel?  
(b) Discuss the proximate analysis of coal with significance.

**SECTION - V**

- 9 (a) How do estimate the hardness of water by EDTA method?  
(b) 0.28g of  $\text{CaCO}_3$  was dissolved in dil. Hcl and diluted to 1000ml. 100ml of this solution required 28ml of EDTA solution for titration. 100ml of sam sample on boiling, filtering etc., required 10ml of EDTA solution. Ca different kinds of hardness in Ppm.
- 10 (a) Explain zeolite process for the softening of water.  
(b) Discuss the carbonate and non-carbonate hardness of water.

**SECTION - VI**

- 11 What is polymerization?. Explain the preparation, properties and applications of Neoprene nd silicon rubbers.
- 12 Explain the preparation, properties and applications of PVC and nylons.