

Name: Shubham Shalma

ID: 2HCS107

### MID-TERM EXAMINATION-I

March 2025, Even Semester 2024-25

B. Tech. (Sec. A/B/C/D), II Semester

2FY2-01 : Engineering Mathematics-II

**Max. Marks: 30**

**Time: 120 min.**

**Instructions:** \* Write your Name & Roll no. (Student ID) on top of question paper. Nothing else should be written on the question paper; otherwise it will be considered as unfair-means.

\* Assume missing data suitably, if any.

#### Section - A

(Short answer questions, Answer in 2-3 linesonly, Attempt all)

**5 x 1 = 5 Marks**

<input checked="" type="checkbox"/> A1.	Define Symmetric and Skew-symmetric matrix with an example.
<input checked="" type="checkbox"/> A2.	Define Rank- Nullity theorem.
<input checked="" type="checkbox"/> A3.	Discuss the consistency of homogeneous system of linear equations.
<input checked="" type="checkbox"/> A4.	Define orthogonal transformation.
<input checked="" type="checkbox"/> A5.	State Cayley- Hamilton theorem.

#### Section - B

(Analytical/Problem solving questions, Answer in 20-30 linesonly, Attempt any 4)

**4 x 4 = 16 Marks**

	Find rank of the following matrix:
B1.	$\begin{bmatrix} 1 & 2 & 3 & 2 \\ 2 & 3 & 5 & 1 \\ 1 & 3 & 4 & 5 \end{bmatrix}$
	Find the rank of the following matrix by reducing into normal form
B2.	$\begin{bmatrix} 2 & 3 & -1 & -1 \\ 1 & -1 & -2 & -4 \\ 3 & 1 & 3 & -2 \\ 6 & 3 & 0 & -7 \end{bmatrix}$
B3.	Test for consistency the following system of equations & if possible, solve $2x - 3y + 7z = 5, 3x + y - 3z = 13, 2x + 19y - 47z = 32$

B4.	Show that the equations $3x + 4y + 5z = a$ , $4x + 5y + 6z = b$ , $5x + 6y + 7z = c$ do not have a solution unless $a + c = 2b$
B5.	Solve the system of following linear equations $x + y + 2z + 3w = 0$ , $3x + 4y + 7z + 10w = 0$ , $5x + 7y + 11z + 17w = 0$ , $6x + 8y + 13z + 16w = 0$
B6.	Find the values of a and b so that the system of equations $x + y + z = 6$ , $x + 2y + 3z = 10$ , $x + 2y + az = b$ have i) no solution    ii) an unique solution    iii) infinite solutions

### Section - C

(Descriptive questions, Answer systematically using logic's & principles, Attempt any 2)

$2 \times 4.5 = 9$  Marks

C1.	Find eigen values and eigen vector for the matrix $\begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$
C2.	Find the matrix B which reduces the matrix $A = \begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$ to the diagonal form by the transformation $BAB^{-1}$
C3.	Verify the Cayley- Hamilton theorem for the following matrix and hence find $A^{-1}$ . $A = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{bmatrix}$

- Best of Luck -

~~2x3 = 6~~

$-1(-1) = 1$

$\therefore 1(-1) = -1$


**ANAND**  
 INTERNATIONAL COLLEGE OF ENGINEERING

Roll No. 24CS107

ID: 24CS107

**MID-TERM EXAMINATION-I**

March 2025, Even Semester 2024-25

B. Tech. (Sec. C/D), II Semester

2FY2-02 : Engineering Physics

Time: 120 min.

Max. Marks: 30

- Instructions:**
- \* Write your Name & Roll no. (Student ID) on top of question paper. Nothing else should be written on the question paper, otherwise it will be considered as unfair-means.
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**Section - A**

(Short answer questions. Answer in 2-3 linesonly, Attempt all)

5 x 1 = 5 Marks

A1.	Define laser. Give its two properties..
A2.	Define optical fiber?
A3.	Define acceptance angle and acceptance cone in case of Optical Fiber.
A4.	Define visibility.
A5.	Define core and cladding in case of fiber..

**Section - B**

(Analytical Problem solving questions, Answer in 20-30 linesonly, Attempt any 4)

4 x 4 = 16 Marks

B1.	Show that visibility is a measure of coherence. i.e. $V=C$ .
B2.	Write the applications of optical fiber in Science, Engineering and medical field with suitable diagrams.
B3.	Define V Number. A step index fiber in air has a NA of 0.16, a core refractive index of 1.45 and a core diameter of 60cm. Determine the V Number when light at wavelength of $69\mu m$ is transmitted.
B4.	Calculate the band width and frequency spread of a laser source whose coherence length is $50\mu m$ and wavelength is $6330 \text{ \AA}$ .
B5.	Calculate the numerical aperture, acceptance angle and the critical angle of an

B5. optical fiber having a refractive index of core 1.52 and refractive index of cladding 1.46?

B6. What is Einstein's coefficient? Obtain the relation between them.

### Section - C

(Descriptive questions, Answer systematically using logic's & principles, Attempt any 2)

2 x 4.5 = 9 Marks

C1. Define Coherence. Explain the Temporal and Spatial coherence.

C2. What do you mean by numerical aperture of an optical fiber? Find the expression for the numerical aperture, acceptance angle of a step index optical fiber?

C3. Explain Spontaneous and Stimulated Emission in case of Laser.

- Best of Luck -

B4. Given by: Wavelength ( $\lambda$ ) = 6330 Å  
 $= 6330 \times 10^{-10} \text{ m}$   
 $\boxed{\lambda = 6.33 \times 10^{-7} \text{ m}}$

$$\therefore \Delta t = \frac{L}{c} \Rightarrow \frac{500 \text{ m}}{3 \times 10^8 \text{ m/s}} = 1.67 \times 10^{-6} \text{ s}$$

$$\boxed{\Delta t = 1.67 \times 10^{-6} \text{ s}}$$

$$\text{Bandwidth } (\Delta V) = \frac{1}{\Delta t} \Rightarrow \Delta V = \frac{1}{1.67 \times 10^{-6}} = 6.0 \times 10^5$$

$$\boxed{\Delta V = 6.0 \times 10^5 \text{ Hz}}$$

$$\text{Frequency Spread } \left( \frac{\Delta V}{V} \right) = \frac{\Delta V}{(C/\lambda)} = \frac{\Delta V \times \lambda}{C}$$

$$\left( \frac{\Delta V}{V} \right) = \frac{6.0 \times 10^5 \text{ Hz} \times 6.33 \times 10^{-7} \text{ m}}{3 \times 10^8 \text{ m/s}}$$

$$\boxed{\left( \frac{\Delta V}{V} \right) = 2.5 \times 10^{-9}}$$


**ANAND**
**INTERNATIONAL COLLEGE OF ENGINEERING**
Name: Shubham SharmaID: 24CS107**MID-TERM EXAMINATION-I**

March 2025, Even Semester 2024-25

B. Tech. (Sec.C/D), II Semester

2FY3-06 : Programming for Problem Solving

Time: 120 min.

Max. Marks: 30

- Instructions:**
- \* Write your Name & Roll no. (Student ID) on top of question paper. Nothing else should be written on the question paper; otherwise it will be considered as unfair-means.
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**Section - A**

(Short answer questions, Answer in 2-3 linesonly, Attempt all)

**5 x 1 = 5 Marks**

A1.	What are the application areas of computer?
A2.	Explain secondary memory.
A3.	Define radix with example..
A4.	What is hard-disk?.
A5.	Difference between high level language and low level language.

**Section - B**

(Analytical/Problem solving questions, Answer in 20-30 linesonly, Attempt any 4)

**4 x 4 = 16 Marks**

B1.	Describe about primary memory? Explain the various types of primary memory with advantage and disadvantage?
B2.	What do you understand by number system? Explain the various types of number System with suitable example?
B3.	Classify the difference between interpreter and compiler?
B4.	Explain the difference between algorithm, pseudo code and program with example.
B5.	Perform the following operations . 1. Subtract $(01110101)_2$ from $(01111100)_2$

	2. Add $(11000001)_2$ and $(01101110)_2$
B6.	What do you understand by softwares and discuss its types.

### Section - C

(Descriptive questions, Answer systematically using logic's & principles, Attempt any2)

$2 \times 4.5 = 9$  Marks

C1.	Define flowchart and flow chart symbols? Draw flowchart to find the area of rectangle.
C2.	Convert the following 1. $(426.42)_8 = ()_2$ 2. $(10110.01.01)_2 = ()_{16}$ 3. $(63.21)_8 = ()_{10}$
C3.	What is the stored program concept and why it is important?

- Best of Luck -

**ANAND  
INTERNATIONAL COLLEGE OF ENGINEERING**

Name:

Shubham Sharma

ID: QHCS107

**MID-TERM EXAMINATION-I****March 2025, Even Semester 2024-25****B. Tech. (Sec.C and D), II Semester****2FY1-05 : Human Values****Max. Marks: 30****Time: 120 min.**

- Instructions:**
- \* Write your Name & Roll no. (Student ID) on top of question paper. Nothing else should be written on the question paper, otherwise it will be considered as unfair-means.
  - \* Assume missing data suitably, if any.

**Section - A***(Short answer questions, Answer in 2-3 lines only, Attempt all)***5 x 1 = 5 Marks**

A1.	Define happiness.
A2.	What do the abbreviations SVDD, SSDD and SSSS signify?
A3.	What is the meaning of natural acceptance?
A4.	Write the four levels of living.
A5.	Define prosperity.

**Section - B***(Analytical/Problem solving questions, Answer in 20-30 lines only, Attempt any 4)***4 x 4 = 16 Marks**

B1.	Discuss the basic guidelines of value education.
B2.	How is animal consciousness different from human consciousness. Discuss.
B3.	Differentiate between wealth and prosperity.
B4.	Why is it important to study yourself? How does it help in your day-to day life?
B5.	Distinguish between needs of self and needs of body.
B6.	Is there any difference between moral education and value education? If yes, discuss the difference between moral education and value education.

**Section - C**

(Descriptive questions, Answer systematically using logic's & principles, Attempt any 2)

2 x 4.5 = 9 Marks

C1.	Explain fully the process of self -exploration with the help of diagram.
C2.	Discuss the need of value education in technical institutes.
C3.	What is basic human aspiration? What are the basic requirements to fulfill human aspirations? Indicate the correct priority.

- Best of Luck -

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**MID-TERM EXAMINATION-I**

March 2025, Even Semester 2024-25

B. Tech. (Sec. D), II Semester

1FY3-08: Basic Electrical Engineering

**Max. Marks: 30**

Time: 120 min.

- Instructions:**
- \* Write your Name & Roll no. (Student ID) on top of question paper. Nothing else should be written on the question paper, otherwise it will be considered as unfair-means.
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**Section - A**

(Short answer questions, Answer in 2-3 lines only, Attempt all)

**5 x 1 = 5 Marks**

A1.	State the relationship between phase and line quantities in the circuit of a 3-phase star connected system.
A2.	Define apparent power and power factor.
A3.	Define fuse and give the name of types of fuse.
A4.	Draw leading and lagging of AC with respect to alternating voltage $V = V_m \sin \omega t$ by an angle $\alpha$ and $\beta$ respectively.
A5.	Derive the condition for resonance in series circuit.

**Section - B**

(Analytical/Problem solving questions, Answer in 20-30 lines only, Attempt any 4)

**4 x 4 = 16 Marks**

B1.	Show that the current through the pure inductance lags behind the applied voltage by 90 degree. Also prove that pure inductance does not consume any power. Draw voltage, current, and power waveforms.
B2.	The load of the household consist of 8 lamps of 20 Watt each, 4 fan of 74W each, 1 T.V of 40W, 1 refrigerator of 150W, 1 A.C of 1500W, 1 heater of 1800W, and one washing machine of 900W. If the supply of 230 volt and fixed monthly meter charge is 150/- then for average loading of 50% throughout a day what will be the electric bill for 1 month? Assume the cost per unit for 1st 800 units be rs 4/- for next 500 units be rs 5/- and after that rs 6/-.
B3.	Determine the power factor of a series RLC circuit with $R=5$ ohm, $XL = 8$ ohms and $Xc = 12$ ohms.
B4.	An alternating voltage is given by $V = 230 \sin 314t$ . Calculate i) Frequency

	<p>ii) Maximum Value iii) Average Value</p> <p>RMS value.</p>
B5.	<p>Explain the power measurement by two wattmeter method for a balance star connected load.</p>
B6.	<p>A periodic voltage waveform has been shown in figure</p> <p>Determine (a) Frequency of the waveform (b) wave equation for <math>0 &lt; t &lt; 100</math> (c) RMS value. .</p>

### Section - C

(Descriptive questions, Answer systematically using logic's & principles, Attempt any2)

$2 \times 4.5 = 9$  Marks

C1.	Explain the switchgear and electrical Earthing.
C2.	State and derive the relationship between phase and line quantities in the circuit of a 3- phase Delta connected system.
C3.	If an AC power supply of 100 V, 50 Hz is connected across a load of impedance $4+j8$ ohms. Calculate the current flowing through the circuit, active power, reactive power, apparent power and power factor.

- Best of Luck -


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**MID-TERM EXAMINATION-II**

May 2025, Even Semester 2024-25

B. Tech. (Sec. A/B/C/D), II Semester

2FY2-01 : Engineering Mathematics-II

Time: 120 min.

**Max. Marks: 30**

- Instructions:**
- \* Write your Name & Roll no. (Student ID) on top of question paper. Nothing else should be written on the question paper; otherwise it will be considered as unfair-means.
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**Section - A**

(Short answer questions. Answer in 2-3 lines only. Attempt all)

**5 x 1 = 5 Marks**

A1.	Find the order and degree of the differential equation $\frac{d^2y}{dx^2} + 2\frac{dy}{dx} + y = x \cos x$
A2.	Define Bernoulli's differential equations.
A3.	Give the condition so that the first order and first degree differential equation of the form $M dx + N dy = 0$ will be exact.
A4.	Give the condition of exactness for second order linear differential equation with variable coefficients.
A5.	For second order linear differential equation with variable coefficients, if $P + Q = 0$ , then one part of C.F. is?

**Section - B**

(Analytical/Problem solving questions, Answer in 20-30 lines only, Attempt any 4)

**4 x 4 = 16 Marks**

B1.	Solve the differential equation: $x^2 \frac{d^2y}{dx^2} - x \frac{dy}{dx} + 2y = x \log x$	Sab questions ke aage solve lika
B2.	Solve the differential equation: $y(2xy + e^x)dx - e^x dy = 0$	aa Jaye to peta kaise chalega ki ye question konse method se hoga.
B3.	Solve the differential equation: $(x + 2y^3) \frac{dy}{dx} = y$	
B4.	Solve the differential equation: $(D^2 + 1)y = x^2 \cos 2x$	

B5.

Solve the differential equation:  $(D^2 + a^2)y = \sec ax$

B6.

Solve the differential equation:  $\cos x \frac{d^2y}{dx^2} + \sin x \frac{dy}{dx} - 2y \cos^3 x = 2 \cos^5 x$

### Section - C

*(Descriptive questions, Answer systematically using logic's & principles, Attempt any2)*

**2 x 4.5 = 9 Marks**

C1.

Solve the differential equation:  $(D^3 + 2D^2 + D)y = e^{2x} + x^2 + \sin x$

C2.

Solve the differential equation:  $(x^4 y^4 + x^2 y^2 + xy)y dx + (x^4 y^4 - x^2 y^2 + xy)x dy = 0$

C3.

Solve the differential equation by using method of variation of parameters:

$$\frac{d^2y}{dx^2} - y = \frac{2}{1+e^x}$$

- Best of Luck -



# ANAND

## INTERNATIONAL COLLEGE OF ENGINEERING

Name:

ID:

### MID-TERM EXAMINATION-II

May 2025, Even Semester 2024-25

B. Tech. (Sec. C/D), II Semester

2FY2-02 : Engineering Physics

Time: 120 min.

Max. Marks: 30

- Instructions:**
- \* Write your Name & Roll no. (Student ID) on top of question paper. Nothing else should be written on the question paper, otherwise it will be considered as unfair-means.
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#### Section - A

(Short answer questions, Answer in 2-3 linesonly, Attempt all)

5 x 1 = 5 Marks

A1.	Define wave function?
A2.	Why Newton's Rings are circular in nature.
A3.	Define Diffraction. Give two basic conditions for Diffraction to occur.
A4.	Give two similarities between insulator and semiconductor..
A5.	Write the condition for the orthogonal wave functions.

#### Section - B

(Analytical/Problem solving questions, Answer in 20-30 linesonly, Attempt any 4)

4 x 4 = 16 Marks

B1.	In Newton's Ring experiment the diameter of $n^{\text{th}}$ and $(n+1)^{\text{th}}$ rings are 4.2 mm and 7.0 mm. If the radius of curvature of lens is 2 m, Find the wavelength of light used.
B2.	Classify the elements as Conductors, Insulators and Semiconductors on the basis of Band theory of Solids.
B3.	A plane diffraction grating has 6000 lines per cm. How many order of spectra will it show for wavelength 5000 Å using normal incidence?
B4.	Derive Schrodinger's Time dependent wave equation.
B5.	Obtain the relation for the diameter in case of Newton's Ring for bright and dark fringes..
B6.	The Hall coefficient $R_H$ of a semiconductor is $3.22 \times 10^{-4} \text{ m}^3/\text{C}$ . It's resistivity is $9 \times 10^{-3} \text{ Ohm-m}$ . Calculate the mobility and Carrier concentration of the Charges.

### Section - C

(Descriptive questions, Answer systematically using logic's & principles, Attempt any 2)

$2 \times 4.5 = 9$  Marks

C1.	Explain the Hall effect. Mention the unit of Hall Coefficient..
C2.	Describe the construction and working of Michelson Interferometer. How would you use it to measure the wavelength of monochromatic light.
C3.	Derive the Schrodinger equation and solve it for the Eigen function and Eigen energy values for a particle in One-Dimensional Box.

- Best of Luck -

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**MID-TERM EXAMINATION-II**

May 2025, Even Semester 2024-25

B. Tech. (Sec.C/D), II Semester

2FY3-06 : Programming for Problem Solving

**Max. Marks:**

Time: 120 min.

**Instructions:** \* Write your Name & Roll no. (Student ID) on top of question paper. Nothing else should be written on the question paper; otherwise it will be considered as unfair-means.  
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**Section – A**

(Short answer questions, Answer in 2-3 linesonly, Attempt all)

**5 x 1 = 5 Marks**

A1.	Explain Keywords in C.
A2.	Explain Formatted input output functions.
A3.	Explain the difference between NULL and Void pointer with example..
A4.	Explain the go to, break and continue statements with example.
A5.	Write syntax of switch case conditional statement.

**Section – B**

(Analytical/Problem solving questions, Answer in 20-30 linesonly, Attempt any 4)

**4 x 4 = 16 Marks**

B1.	Explain the different types of data types in C language with example.
B2.	WAP to find out the given number is Armstrong or not ,if the length of the number is N.
B3.	WAP to find out greater among three numbers using nested if –else statements.
B4.	(1) Explain the concept and functionality of call by value and call by reference in C programming. (2) Define Structure and its basic structure..
B5.	WAP to exchange the two values by using functions.
B6.	Define and explain the use of pointers in C language.

## Section - C

Descriptive questions. Answer systematically using logic's & principles. Attempt any 2)

$2 \times 4.5 = 9$  Marks

(1) WAP to find out multiplication of two Matrices.

(2) What do you understand by precedence of operator available in C Language?

(1) Write a C program using function to display first n numbers of a Fibonacci series.

(2) Write a C program to reverse an inputted integer number.

C3.

Explain File Handling and also explain the working of Following functions in C:

a) fopen() and fclose()

b) sprintf() and fscanf()

c) fputc() and fgetc()

d) fgets() and fputs()



Name: Shubham Sharma

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### MID-TERM EXAMINATION-II

May 2025, Even Semester 2024-25

B. Tech. (Sec. C & D), II Semester

2FY1-05 : Human Values

**Max. Marks: 30**

**Time: 120 min.**

- Instructions:**
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#### **Section - A**

(Short answer questions, Answer in 2-3 lines only, Attempt all)

**5 x 1 = 5 Marks**

A1.	What are the four orders in nature?
A2.	What do you mean by holistic technology?
A3.	Define Ethics.
A4.	What is Existence?
A5.	Which value in family known complete value and why?

#### **Section - B**

(Analytical/Problem solving questions, Answer in 20-30 lines only, Attempt any 4)

**4 x 4 = 16 Marks**

B1.	There is recyclability and self-regulation in nature. Explain.
B2.	Critically examine the difference between units and space.
B3.	Explain the feeling of care, guidance, glory and gratitude.
B4.	How can you say that Right Understanding provides the basis for Ethical Human Conduct?
B5.	Define the term justice. What are the four elements of justice. Explain.
B6.	Existence= nature submerged in space. Explain.

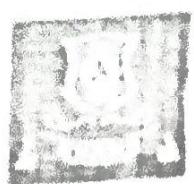
### Section - C

(Descriptive questions. Answer systematically using logic's & principles. Attempt any 2)

2 x 4.5 = 9 Marks

- |     |  |
|-----|--|
| C1. | What is comprehensive human goal? What are the five dimensions of human endeavors to achieve comprehensive human goal. |
| C2. | Discuss the broad holistic criteria for evaluation of technologies, production systems and management models.          |
| C3. | The four orders in nature are interconnected and mutually fulfilling. Discuss  |

- Best of Luck -



Name: Shubham Shagema

ID: 2HCS107

### MID-TERM EXAMINATION-II

May 2025, Even Semester 2024-25

B. Tech. (Sec. D), II Semester

1FY3-08 : Basic Electrical Engineering

Max. Marks: 30

Time: 120 min.

- Instructions:**
- \* Write your Name & Roll no. (Student ID) on top of question paper. Nothing else should be written on the question paper, otherwise it will be considered as unfair-means.
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#### Section - A

(Short answer questions, Answer in 2-3 linesonly, Attempt all)

**5 x 1 = 5 Marks**

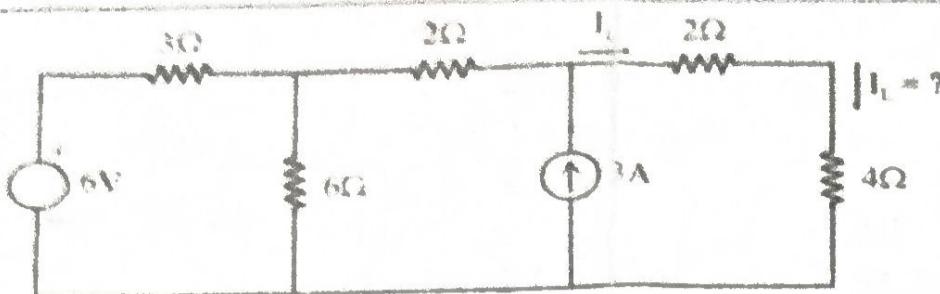
A1.	Define the Kirchhoff's voltage law and Kirchhoff's current law
A2.	Write name of various speed control method of three phase induction motor.
A3.	State the thevenin's theorem
A4.	Define the transformer and turn ratio in transformer
A5.	Write the properties of an ideal transformer

#### Section - B

(Analytical/Problem solving questions, Answer in 20-30 linesonly, Attempt any 4)

**4 x 4 = 16 Marks**

	Determine the equivalent resistance between A and B
B1.	
B2.	Determine the current through 4 ohm resistance using Node analysis



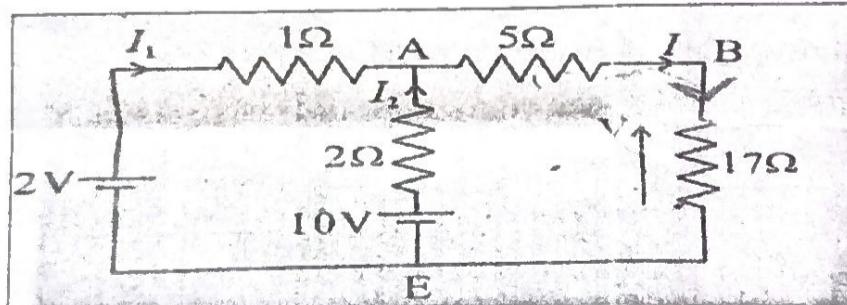
- B3.** State and prove the maximum power transfer theorem in DC circuit
- B4.** Derive the EMF equation for transformer
- B5.** State and explain the Norton theorem with suitable example
- B6.** With a neat circuit diagram, explain the construction and principle of operation of DC machine

### Section - C

(Descriptive questions, Answer systematically by using logic's & principles, Attempt any 2)

**2 x 4.5 = 9 Marks**

- C1.** Explain the concept of double revolving field theory for single phase induction motor
- C2.** Explain in details the construction and principle of working of a three phase induction motor. Also draw the slip vs speed and torque vs speed characteristics
- C3.** Define the superposition theorem and find the current I in 17 ohm resistor using superposition theorem



- Best of Luck -