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3E1216

Roll No. _____ [Total No. of Pages : 3

3E1216

B.Tech. III-Sem. (Main/Back) Examination, January- 2025

Electrical Engg.

3EE2-01 Advance Mathematics

EE, EX

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory. **(10×2=20)**

1 For difference operators, show that $\Delta - \nabla \equiv \Delta\nabla$

2. Define divided difference.

3. Write simpson's 1/3rd rule for integration.

4. Write Regula - Falsi iteration formula.

5. Write formula for Laplace transform of integral.

6. Write inverse fourier sine transform formula.

7. Define Z-transform.

8. Write L[Jo (at)]

9. Define Analytic function.

10. Define magnification and contraction transformation.

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions. **(5×4=20)**

1. Show that $\Delta^2 x^{(n)} = n(n-1)h^2 x^{(n-2)}$

2. Find the missing term in the following table.

x:	1	2	3	4	5
$f(x)$:	2	5	7	?	32

3. By using Newton Raphson method, Find a real root of the equation x^4-x-10=0, corrected upto 4 decimal places.

4. Find the Z-transform of n^2, $n \geq 0$.

5. Find Laplace transform of $\sin\sqrt{t}$

6. Find the Fourier sine transform of $\frac{e^{-ax}}{x}$

7. If $u+v=\frac{\sin 2x}{\cosh 2y-\cos 2x}$, find the analytic function $\omega = f(z) = u+iv$.

PART - C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any Three questions. **(3×10=30)**

1. a) Find the value of $\log_e^2$ from $\int_0^1 \frac{x^2}{1+x^3}dx$ using simpson's $\frac{3}{8}^{th}$ rule, taking six equal intervals.

   b) Find the value of $f'(0.04)$ from the following table using Gauss forward interpolation formula:

x:	0.01	0.02	0.03	0.04	0.05	0.06
$f(x)$:	0.1023	0.1047	0.1071	0.1096	0.1122	0.1148

2. a) Given

θ:	0°	5°	10°	15°	20°	25°
Tanθ:	0	0.0875	0.1763	0.2679	0.3640	0.4663

Determine tan 16° by using stirling formula.

b) Using method of false position find a real root of the equation x^3-2x-5=0, corrected upto three places of decimals.

3. a) Find $L^{-1}\left[\frac{s}{s^4+4a^4}\right]$

b) Using second shifting property, find $L\left[t^2H(t-3)\right]$

4. a) Use z-transform to solve

$$6y_{n+2} - y_{n+1} + y_n = 0,\ y(0) = 0, y(1) = 1$$

b) Find the fourier cosine transform of $f(x)$, if $f(x) = \begin{cases} 1\ ;\ 0 < x < a \\ 0\ ;\ x \geq a \end{cases}$

What is the function whose fourier cosine transform is $\frac{\sin as}{s}$?

5. a) Show that the function f defined by $f(z) = e^{-z^{-4}}$, $z \neq 0$ and $f(0) = 0$

is not analytic at z=0, although C-R equations are satisfied at that point.

b) Find the bilinear transformation which transforms the points z = 2, i, -2 into the points ω = 1, i, - 1 respectively.

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3E1200

Roll No. _____ [Total No. of Pages : 2

3E1200

B.Tech. III-Sem. (Main/Back) Examination, January - 2025
Artificial Intelligence & Data Science
Managerial Economics and Financial Accounting
Common to All Branches

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used! calculated must be stated clearly. Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory.

(10×2=20)

1 Define the term economics.

2. What do you mean by profit and loss statement.

3. Differentiate between monopoly and monopolistic competition.

4. What do you mean by opportunity cost.

5. What does financial accounting mean.

6. Why do economic problems arise.

7. What do you mean by marginal product of an input. How is it calculated.

8. What are the determinants of supply.

9. What does liabilities mean.

10. What does the circular flour model dipicts.

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions. **(5×4=20)**

1. Explain the inductine and deductine methods of economic analysis.

2. Discuss the concept of kinked demand curve under oligopoly.

3. Write short notes on ratio analysis.

4. Explain the concept of demand and elasticity of demand.

5. Discuss the concept of least cost combination of inputs.

6. Discuss various concepts of National Income.

7. Explain the methods of demand forecasting.

PART - C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any Three questions. **(3×10=30)**

1. Critically examine the methods of evaluating capital budgeting proposals.

2. Discuss the price and output determination under perfect competition.

3. Using suitable diagram, explain the law of variable proportions.

4. Explain with the help of curves, relationship between various cost concepts.

5. What do you mean by balance sheet. Discuss.

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3E1221

Roll No. _____ [Total No. of Pages : 3

3E1221

B.Tech. III-Sem. (Main/Back) Examination, January - 2025
Electrical Engg.
3EE3-04 Power Generation Process
EE,EX

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all Ten questions from Part A, five questions out of Seven questions from Part B and Three questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory. **(10×2=20)**

1. What do you understand by demand factor?
2. What is Tariff?
3. Define green-house effect.
4. What is flat demand rate?
5. Classify,' hydroelectric power plants.
6. Where shunt capacitors are used in power plant?
7. What do you understand by "off peak energy utilization"?
8. Why the kVA demand is constant for calculating economic power factor in power plants?

9. What is "state meter rate" with respect to tariffs?

10. Differentiate renewable and non-renewable energy sources.

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions. **(5×4=20)**

1. How the power factor can be improve by using synchronous condensers?

2. Explain two part tariff and three part tariff.

3. Explain the site selection criteria for power plants.

4. Discuss the impact of thermal and nuclear power stations on environment.

5. With help of reaction, explain how the nuclear fission and nuclear fusion take place.

6. Discuss basic plant scheme with boiling water reactor with the help of diagram.

7. Why the power factor needs to be improved? Write down the advantages of power factor improvement.

PART - C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any Three questions. **(3×10=30)**

1. How the cost of energy is minimized by applying co-generation and energy conservation? Explain.

2. With the help of suitable diagram, explain the electrical energy generation by wind and solar.

3. Define the following terms:

i) Chronological load curve

ii) Load duration curve

iii) Energy load curve

iv) Mass curve

4. With the help of appropriate diagram, explain open cycle and close cycle gas turbine plants.

5. The maximum demand of a power plant is 40 MW. The capacity factor is 0.5 and the utilization factor is 0.8.

Find

a) Load factor

b) Plant capacity

c) Reserve capacity

d) Annual energy production.

3E1218

Roll No. _____ [Total No. of Pages : 4

3E1218

B.Tech. III-Semester (Main/Back) Examination, January - 2025

Electrical Engg.

3EE4-05 Electrical Circuit Analysis

EE,EX

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly. Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory. **(10×2=20)**

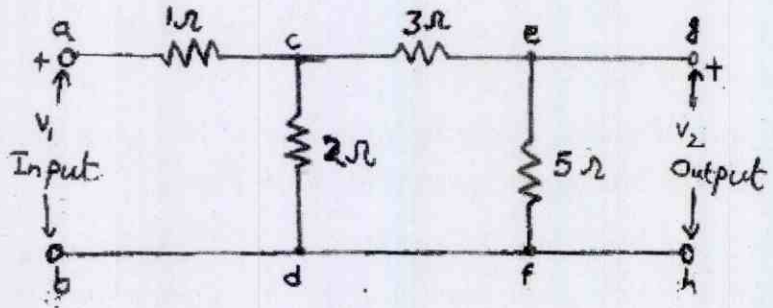
1. Write the Laplace transform of Sinh Φt.
2. State Reciprocity Theorem as applicable to AC circuits.
3. Name the various types of parameters in two-port networks.
4. What do you understand by parallel resonance in AC circuits?
5. What is forced and free response?
6. State Norton's theorem.
7. Define RMS and average value.
8. What is the use of dot convention in coupled circuits for steady state analysis?
9. List out four common functions in laplace transform.
10. Find the inverse laplace transform of the function given by $F(s)=\frac{50}{s^2+2s+2}$

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions. **(5×4=20)**

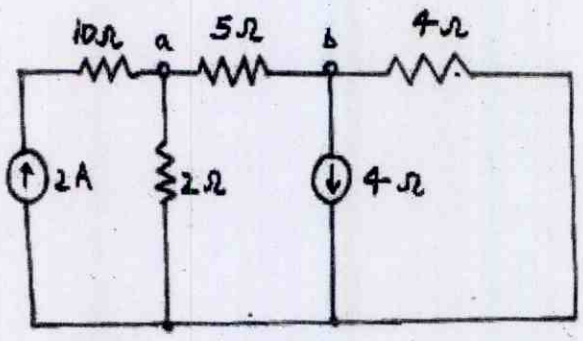
1. Find the Z parameters for the circuit shown in figure



2. Explain Thevenin's Theorem. Write the steps to apply Thevenin's Theorem in any circuit.

3. With the help of appropriate circuit diagram, discuss the initial conditions in resistor, inductor and capacitor.

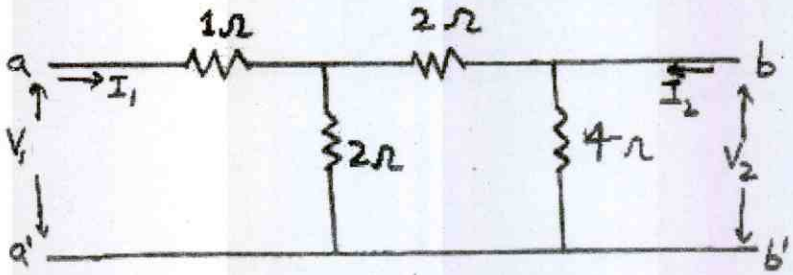
4. Find current through the 5Ω resistor in figure given below.



5. Explain the concept of poles and zeros in a network function and mention the restrictions on their location in driving point functions.

6. Show that, in an ideal transformer, the input impedance looking through the primary terminals is the square of turns ratio times the secondary impedance.

7. Find the Y-parameter of the network given.

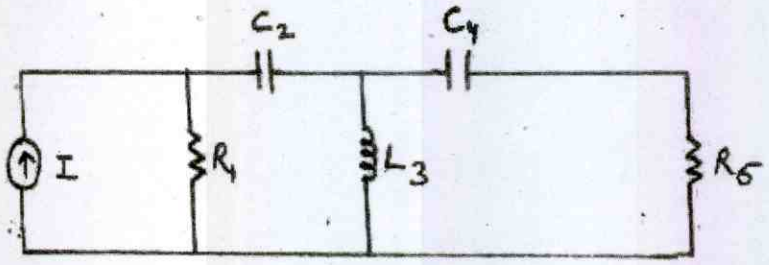


PART - C

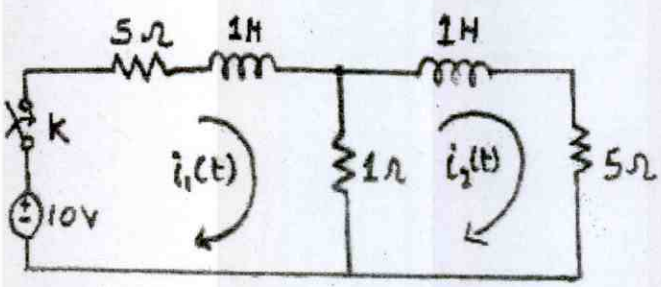
(Descriptive/Analytical/Problem Solving/Design question)

Attempt any Three questions. **(3×10=30)**

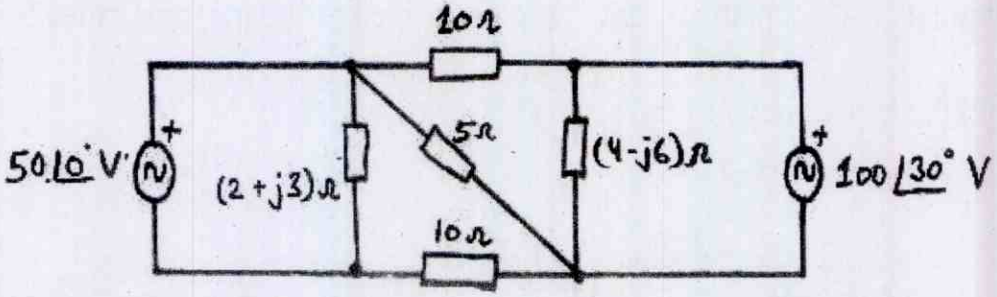
1. Prove that, the maximum power will be transferred from the source to load, if load impedance is complex conjugate of the Thevenin's internal impedance, using general notations.
2. Express Z-parameters in terms of ABCD parameters.
3. Explain the concept of 'Duality'. Draw the dual of the network given below



4. Using Laplace transformation technique, find i_2 (t) at t = 0+ following switching at t = 0 of switch K in given figure. Assume the network previously de-energized.



5. Find the current through 5Ω resistor by using superposition theorem.



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3E1217

Roll No. _____ [Total No. of Pages : 4

3E1217

B.Tech. III-Semester (Main/Back) Examination, January - 2025
Electrical Engineering
3ECE4-06 Analog Electronics
EE, EX

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of Seven questions from Part B and Three questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory .

(10×2=20)

1. Define current controlled device and voltage controlled device.
2. Differentiate semi conductors, conductors and insulators and give example of each.
3. What are the four differential amplifier configurations?
4. What do you mean by operating points?
5. Explain clipper and clamper circuits.
6. Explain how the zener diode is different then normal p-n Junction diode?
7. Why collector is made larger then emitter and base in BJT?
8. What is integrator and what are the applications of Integrator?
9. Differentiate BJT with FET?
10. In an NPN silicon transistor $\alpha = 0.995$ $I_E = 10$ mA and leakage current $I_{CBO} = 0.5\mu A$ Determine I_{CEO}.

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions. **(5×4=20)**

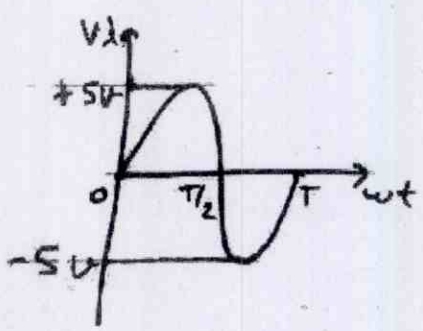
1. Draw the circuit diagram of full wave bridge rectifier and calculate average and RMS Value of output voltage.

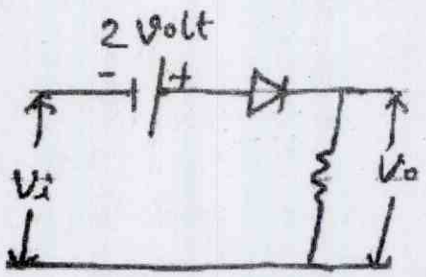
2. Explain the construction and characteristics of N-channel depletion type MOSFET?

3. Draw the v-I characteristics of P-N Junction diode and show how temperature changes affect the characteristics?

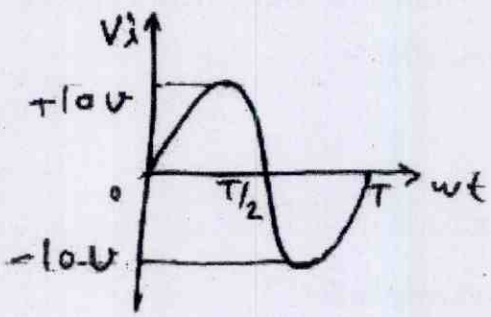
4. Draw the output waveform of the following circuits given in figure below, assume diode is ideal .

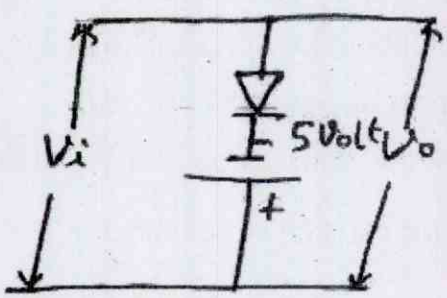
a)





b)





5. What is Analog to digital conversion. Explain any one of its conversion technique?

6. Draw the circuit diagram of wein bridge Oscillator using op-Amp and find frequency of Oscillation?

7. What are the different biasing techniques used in BJT. Explain anyone in brief?

PART - C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any Three questions **(3×10=30)**

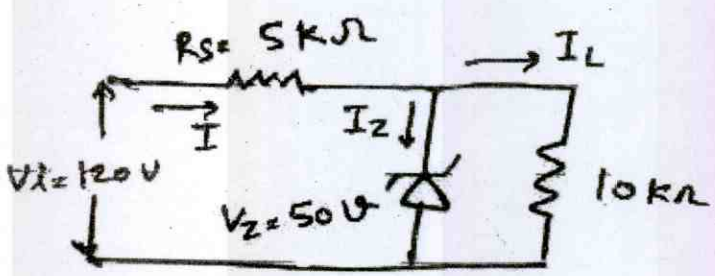
1. a) Draw the output characteristics of BJT in CE configuration and explain each and every region of it?

   b) The hybrid parameters for a common emitter amplifier circuit are $h_{11} = 800\,\Omega$, $h_{21} = 47$, $h_{12} = 5.4 \times 10^{-4}$, $h_{22} = 80\mu$ mho and load resistance $R_L = 200\ k\Omega$, find voltage gain?

2. Define following electrical parameters of op-Amp.
   a) Input bias current
   b) Input offset voltage
   c) Slew rate
   d) CMRR

3. a) Draw and explain the small signal model of FET?

   b) For the zener diode circuit given in fig, below find
      i) Output voltage
      ii) Current through zener diode.



4. a) Give the classification of power Amplifier?

   b) Draw the circuit of op-AMP integrator and derive the output expression.

5. Write short notes on any **Two.**

a) Differential Amplifier

b) Early effect

c) Zero crossing detector

d) Ideal Op-AMP characteristics

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3E1219

Roll No. _____ [Total No. of Pages : 3

3E1219

B.Tech. III-Semester(Main/Back) Examination, January- 2025

Electrical Engg.

3EE4-07 Electrical Machine - I

EE,EX

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory. **(10×2=20)**

1. Define magnetic flux and MMF. Write the SI units of magnetic flux and reluctance.
2. What is the difference between a magnetic circuit and an electric circuit?
3. What does the B-H curve represent in a magnetic material? Define saturation point in the B-H curve.
4. Write the formula for energy stored in a magnetic circuit.
5. Define back EMF in a DC machine.
6. What is armature reaction?
7. Write the torque equation for a DC machine.
8. What is the significance of back-to-back test in DC machines?

9. Classify different types of losses in a DC machine.

10. Write the voltage equation for a DC generator.

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions. **(5×4=20)**

1. State and explain Ampere's Law with its applications.

2. Derive the expression for magnetic field intensity due to a bar magnet using Biot-Savart Law.

3. Explain the flux-linkage vs. Current characteristics of a magnetic circuit.

4. Derive the expression for energy stored in a magnetic circuit.

5. Compare lap winding and wave winding in DC machines.

6. What are the different components of a magnetic structure in a DC machine? Explain their roles briefly.

7. Explain speed control of a DC motor using armature voltage.

PART - C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any Three questions. **(3×10=30)**

1. Explain the influence of highly permeable materials on the magnetic flux lines in a magnetic circuit.

2. Explain the B-H curve of magnetic materials and its significance in the operation of magnetic circuits.

3. a) Describe the construction and working of a DC machine.

   b) A 4-pole, dc machine has a wave wound winding has 51 slots, each slot containing 20 conductors. Calculate the generated emf when the flux per pole is 7.0 MWb and the speed is 1500 rpm.

4. Derive the armature circuit equation for a DC motor and explain the types of field excitations.

5. Compare the V-I characteristics and torque-speed characteristics of separately excited, shunt, and series motors.

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3E1220

Roll No. _____ [Total No. of Pages : 2

3E1220

B.Tech. III-Sem. (Main/Back) Examination, January - 2025

Electrical Engg.

3EE4-08 Electromagnetic Fields

EE,EX

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all Ten questions from Part A, five questions out of Seven questions from Part B and Three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory. **(10×2=20)**

1. Write all four maxwell's equation for time varying field
2. Define Poynting vector.
3. Write the statement for biot-savert law.
4. State amperes law.
5. What do you mean by electromagnetic?
6. If A = 2ax-3ay+az and B = -4ax-2ay+5az then find AXB
7. Find the gradient of the following:- U = $\rho 2z\cos 2\Phi$.
8. What is the energy density in magnetic field?
9. What is the use of divergence and curl?
10. State poynting theorem.

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions. **(5×4=20)**

1. What do you mean by transformer and motional electromotive force. Derive the expression for transformer EMF

2. Prove that $\Lambda XH = J + \partial D / \partial t$

3. Define the following vector field: - solenoidal, irrotational, conservative.

4. Explain boundary condition for magnetic field.

5. Find the divergence of given vector field: $P = x^2yz\, a_x + xza_z$

6. Find the divergence of the given vector field: - $Q = \rho \sin \Phi a_\rho + V^2 z a_\Phi + z\cos\Phi a_z$

7. A ferrite material to be operating in a linear mode with B = .05T ,let us assume $\mu_r = 50$ then calculate the value of M and H

PART - C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any Three questions. **(3×10=30)**

1. Given point P(-2,6,3) and a vector $ya_x + (x+z)a_y$, express P and A in cylindrical and spherical Coordinate system.

2. The xy- plane serves as a interface between two different media .Medium l(Z<0) is filled with a material whose μr =6and medium 2(Z>O) is filled with a material whose mr =4.If the interface carries a current $(1/\mu)a_y$ mA/m and $B_2 = 5a_x + 8a_z$ mwb/m^2, then find H_1 andB_1.

3. Derive the equation for attenuation constant (α) and phase constant (β) for lossy dielectric.

4. a) Explain Faraday's law in detail.
   b) Explain magnetization and permeability.

5. a) Discuss about Propagation in good conductors
   b) Discuss steady magnetic fields produced by current carrying conductors.