

Hall Ticket Number :

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R-20

Code: 20A242T

II B.Tech. II Semester Regular & Supplementary Examinations May / June 2024

Electrical and Electronics Measurements

(Electrical and Electronics Engineering)

Max. Marks: 70

Time: 3 Hours

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)

2. In Part-A, each question carries **Two mark**.

3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

1. Answer **ALL** the following short answer questions (5 X 2 = 10M)
- | | CO | BL |
|---|-----|----|
| a) List out different methods for availing Damping torque in a given instrument | CO1 | 1 |
| b) Write the Significance of LPF wattmeter. | CO2 | 2 |
| c) What are the different methods used for measuring low and high resistances? | CO3 | 2 |
| d) State the limitations of Wheatstone bridge. | CO4 | 1 |
| e) List out the advantages of digital instruments over analog instruments. | CO5 | 1 |

PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

Marks CO BL

UNIT-I

2. Explain the construction and operating principle of permanent magnet moving coil instrument. Derive the expression for deflection of PMMC?
- 12M CO1 2

OR

3. a) List the different types of errors in measurements? 6M CO1 2
- b) What are the different methods of obtaining the controlling torque in an indicating instrument? 6M CO1 1

UNIT-II

4. a) Explain any two errors that occur in electrodynamicometer type wattmeter and its compensation. 6M CO2 2
- b) Explain the working of induction type dynamo meter watt meter. 6M CO2 2

OR

5. a) Write short note on single phase induction type energy meter. 6M CO2 2
- b) Briefly discuss about power factor meter in detail. 6M CO2 2

UNIT-III

6. Single range student type potentiometer has an 18 step dial switch where each step represents 0.1 V. The dial resistors are 10Ω . The slide wire of the potentiometer is circular and has 11 turns and a resistance of 11Ω each. The slide wire has 100 divisions and interpolation can be done to one-fourth of a division. The working battery has a voltage of 6.0V and negligible internal resistance. Calculate: i) the measuring range of potentiometer, ii) the resolution, iii) working current, and iv) Setting of rheostat. 12M CO3 3

OR

7. What is meant by standardization of a potentiometer? With the help of neat diagram, explain the principle of operation of D.C. Crompton's Potentiometer. 12M CO3 3

UNIT-IV

8. a) Explain how to measure Low resistances using Kelvin's double bridge. Derive the necessary equations. 6M CO4 2
 b) All four resistances in a Wheatstone bridge are $1k \Omega$, the galvanometer has a 100Ω resistance and $0.05 \mu A/mm$ sensitivity, and the supply is 20V. Determine the minimum change that can be detected in the measured resistance. 6M CO4 3

OR

9. Draw the circuit diagram of Wien's bridge and explain the measurement procedure for measuring unknown frequency using this bridge. Derive the formula used. 12M CO4 3

UNIT-V

10. a) List the general specifications of Digital Voltmeter. 6M CO5 2
 b) Explain the operation of digital multimeter. 6M CO5 2

OR

11. a) Explain the working of Dual slope Integrating type Digital Voltmeter with a neat schematic diagram. 6M CO5 2
 b) Explain the working of Digital frequency meter with a neat block diagram. 6M CO5 2

*** End ***

Hall Ticket Number :

R-20

Code: 20A243T

II B.Tech. II Semester Regular & Supplementary Examinations May / June 2024

Electromagnetic Fields

(Electrical and Electronics Engineering)

Max. Marks: 70

Time: 3 Hours

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. In Part-A, each question carries **Two marks**.
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

- | | | |
|--|-----|----|
| 1. Answer ALL the following short answer questions (5 X 2 = 10M) | CO | BL |
| a) State Coulumb's Law and mention its limitations. | CO1 | L2 |
| b) Define conduction and convection current densities. | CO2 | L1 |
| c) Distinguish between scalar and vector magnetic potential. | CO3 | L2 |
| d) Write Lorentz's force equation for a moving charge. | CO4 | L2 |
| e) What is meant by displacement current? | CO5 | L1 |

PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

Marks CO BL

UNIT-I

- | | | | |
|--|----|-----|----|
| 2. a) Derive the expression for Electric Field Intensity due to Infinite surface sheet of charge. | 8M | CO1 | L3 |
| b) Given two points in cartesian coordinate system as A(3,-2, 1), B (-3,-3, 5), find the distance from point B to point A. | 4M | CO1 | L3 |

OR

- | | | | |
|--|----|-----|----|
| 3. a) Explain any two applications of Gauss law. | 6M | CO1 | L2 |
| b) If Coulomb's force of $F = (2a_x + a_y + a_z)$ N, is acting on a charge of 10C, find the electric field intensity, its magnitude and direction. | 6M | CO1 | L2 |

UNIT-II

- | | | | |
|---|----|-----|----|
| 4. a) Illustrate the Laplace and Poisson's equations for electrostatic fields. | 6M | CO2 | L4 |
| b) Compute the torque for a dipole comprising of 1 μ C charge in an electric field $E = 10^3 (z a_x - a_y - a_z)$ V/m separated by 1mm and located on the z-axis at the origin. | 6M | CO2 | L3 |

OR

- | | | | |
|---|-----|-----|----|
| 5. What is dipole? Derive the expressions for potential and electric field intensity due to a dipole. | 12M | CO2 | L2 |
|---|-----|-----|----|

UNIT-III

6. a) How does the magnetic field vary with distance from a current-carrying filament according to Biot-Savart's law? 6M CO3 L1
- b) Calculate the magnetic field intensity at a point due to a finite straight current-carrying filament. 6M CO3 L3

OR

7. a) Discuss the mathematical representation of vector magnetic potential for various current distributions. 6M CO3 L2
- b) Investigate the magnetic field inside and outside a toroid using Ampere's law. 6M CO3 L3

UNIT-IV

8. a) Demonstrate the concept of magnetic dipole and define magnetic dipole moment 6M CO4 L3
- b) Outline the expression for inductance of a toroid. 6M CO4 L4

OR

9. a) Derive the expression for the force between two parallel current-carrying conductors. 6M CO4 L3
- b) A 6000 turns solenoid is 3 m long and has a diameter of 10cm. Calculate the inductance of a solenoid and energy stored when a current of 12 A is flowing through the coil. 6M CO4 L2

UNIT-V

10. a) Define Poynting theorem and briefly explain about Poynting vector. 6M CO5 L2
- b) Find the displacement current density within a parallel plate capacitor having a dielectric, $\epsilon_r = 10$, area of plates, $S = 0.01\text{m}^2$, distance of separation, $d = 0.05\text{mm}$, applied voltage, $V=200 \sin 200t$. 6M CO5 L3

OR

11. a) State and explain Faraday's laws of electromagnetic induction with its integral and point forms. 6M CO5 L2
- b) Write the Maxwell's equations both in point and integral forms for time varying fields. 6M CO5 L2

*** End ***

Hall Ticket Number :

R-20

Code: 20AC45T

II B.Tech. II Semester Regular & Supplementary Examinations May/June 2024

Managerial Economics & Financial Analysis

(Common to ME & EEE)

Max. Marks: 70

Time: 3 Hours

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)

2. In Part-A, each question carries **Two marks**.

3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

1. Answer **ALL** the following short answer questions (5 X 2 = 10M)
- | | | |
|--|-----|----|
| | CO | BL |
| a) What are the types of elasticity of demand | CO1 | L1 |
| b) Fixed Cost Rs.500, Variable Cost Re.1 per unit and Selling Price per unit Rs.2. Calculate Break even in units | CO2 | L4 |
| c) Explain Partnership | CO3 | L2 |
| d) Define NPV | CO4 | L1 |
| e) Explain about the Debt Equity Ratio along with assumed figures | CO5 | L2 |

PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

- | | Marks | CO | BL |
|--|-------|----|----|
| UNIT-I | | | |
| 2. What is Managerial Economics and explain its scope? | 12M | 1 | L1 |
| OR | | | |
| 3. Explain the classification of demand forecasting methods? | 12M | 1 | L2 |
| UNIT-II | | | |
| 4. Discuss internal and external economies of scale? | 12M | 2 | L2 |
| OR | | | |
| 5. XYZ Company. Ltd., given the following data and expecting from you its break-even level and Margin of Safety.
a) Total Sales = 200000,
b) Variable Cost = 30000,
Fixed is Rs.50000 | 12M | 2 | L4 |
| UNIT-III | | | |
| 6. Define Perfect Competition and explain the price-output determination? | 12M | 3 | L2 |
| OR | | | |
| 7. a) What is Sole Trading? Discuss its chief characteristics? | 6M | 3 | L1 |
| b) Define the term Partnership and explain its characteristics? | 6M | 3 | L2 |

UNIT-IV

8. a) What is Capital and discuss the types of Capital? 6M 4 L2
 b) Explain the Payback period and its merits and demerits? 6M 4 L2

OR

9. From the following, evaluate the Net Present Value at 10% D.F. whose value is Rs.200000 and also give your opinion whether the project has to accept or not?
 (PV factor @10% I Year – 0.909, II Year – 0.857, III Year – 0.757, IV Year – 0.653, V year – 0.593) 12M 4 L4

Year	2015	2016	2017	2018	2019
Cash Flows	40000	50000	60000	80000	100000

UNIT-V

10. Write journal entries in the books of Sri Charan for the month of January, 2024.
 January 1st Sri Charan commenced business with a capital of Rs.100000
 On 2nd Deposited in the bank Rs.10000
 On 3rd Stationary purchased for Rs.2000
 On 15th Paid electricity bill Rs.5000
 On 18th Rent paid Rs.5000
 On 31st Paid Salaries of Rs.20000 12M 5 L4

OR

11. What is Ratio and explain the classification of Ratio Analysis in brief? 12M 5 L2

*** End ***

Hall Ticket Number :										
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R-20

Code: 20AC42T

II B.Tech. II Semester Regular & Supplementary Examinations May/June 2024

Numerical Methods and Random Variables

(Common to EEE and ECE)

Max. Marks: 70

Time: 3 Hours

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. In Part-A, each question carries **Two marks**.
 3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

1. **Answer ALL the following short answer questions (5 X 2 = 10M)** CO BL
- a) Write Regula falsi method formula. CO1 L5
- b) Evaluate $\int_0^{0.6} e^x dx$, by Simpson's $\frac{1}{3}$ rule, taking n=6. CO2 L5
- c) Write the Properties of rank correlation coefficient. CO3 L6
- d) What is the probability for a leap year to have 52 Mondays and 53 Sundays? CO4 L1
- e) A fair coin is tossed six times. Find the probability of getting four heads. CO5 L1

PART-B

Answer **five** questions by choosing one question from each unit (5 x 12 = 60 Marks)

Marks CO BL

UNIT-I

2. a) Determine the root of $xe^x = 2$ by method of false position. 6M CO1 L3
- b) Applying Newton's backward interpolation find $f(1.38)$ from the following table.

x	1.1	1.2	1.3	1.4
f(x)	7.831	8.728	9.627	10.744

6M CO1 L3

OR

3. a) Find a real root of equation $x^3 - x - 11 = 0$ by bisection method. 6M CO1 L1
- b) Compute the value of y, when x=3 by using Lagrange's interpolation formula.

x	-2	-1	1	2
y	-7	2	0	11

6M CO1 L3

UNIT-II

4. a) Find the first and second derivatives of the function tabulated below at the point x=1.2

x	1.0	1.2	1.4	1.6	1.8	2.0	2.2
y	2.7183	3.3201	4.0552	4.9530	6.0496	7.3891	9.0250

6M CO2 L1

- b) Evaluate $\int_0^2 e^{-x^2} dx$ using Simpson's rule taking h = 0.25. 6M CO2 L5

OR

5. Obtain $y(0.02)$, $y(0.04)$ for $y' = y + x^2$, $y(0) = 1$ Using modified Euler's method. 12M CO2 L3

UNIT-III

6. Calculate the mean, median and mode for the following:

Mid Value	15	20	25	30	35	40	45	50	55
Frequency	2	22	19	14	3	4	6	1	1

12M CO3 L3

OR

7. Find the rank correlation coefficient for the following data

x	68	64	75	50	64	80	75	40	55	64
y	62	58	68	45	81	60	68	48	50	70

12M CO3 L1

UNIT-IV

8. a) Two marbles are drawn in succession from a box containing 10 red, 30 white, 20 blue and 15 orange marbles, with replacement being made after each draw. Find the probability that (i) Both are white (ii) First is red and second is white. 6M CO4 L1
- b) In a bolt factory machines A, B, C manufacture 20%, 30% and 50% of the total of their output 6%, 3% and 2% are defective. A bolt is drawn at random and found to be defective. Find the probabilities that it is manufactured from (i) Machine A (ii) Machine B (iii) Machine C. 6M CO4 L1

OR

9. The frequency function of a continuous random variable X is given by $f(x) = cx(2-x)$, $0 \leq x \leq 2$. Find the value of c, mean and variance of X. 12M CO4 L5

UNIT-V

10. a) 20% of items produced from a factory are defective. Find the probability that in a sample of 5 chosen at random (i) none is defective (ii) one is defective (iii) $p(1 < x < 4)$ 6M CO5 L1
- b) The average number of phone calls/ minute coming into a switch board between 2 pm and 4 pm is 2.5. Determine the probability that during one particular minute there will be (i) 4 or fewer (ii) more than 6 calls. 6M CO5 L1

OR

11. The marks obtained in mathematics by 1000 students is normally distributed with mean 78% and standard deviation 11%. Determine (i) How many students got marks above 90% (ii) What was the highest mark obtained by the lowest 10% of the students (iii) Within what limits did the middle of 90% of the students lie. 12M CO5 L1

*** End ***

Hall Ticket Number :

R-20

Code: 20A241T

II B.Tech. II Semester Regular & Supplementary Examinations May/June 2024

Electrical Machines - II

(Electrical and Electronics Engineering)

Max. Marks: 70

Time: 3 Hours

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. In Part-A, each question carries **Two marks**.
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

1. Answer **all** the following short answer questions (5 X 2 = 10M)
- | | | |
|--|-----|-----|
| | CO | BTL |
| a) Write down the condition for maximum torque and the value of maximum torque. | CO1 | L1 |
| b) Draw the power flow diagram of a 3- Induction motor. | CO2 | L2 |
| c) What are the applications of universal motor? | CO3 | L1 |
| d) Brief about concentrated and distributed windings. | CO4 | L2 |
| e) Write the necessary and sufficient conditions for parallel operation of alternator. | CO5 | L2 |

PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

Marks CO BL

UNIT-I

2. a) With a neat diagram, explain the constructional details of Three phase induction motor
- | | | | |
|--|----|-----|----|
| | 6M | CO1 | L2 |
|--|----|-----|----|
- b) A 400 V, 50Hz, 30 HP three phase induction motor is drawing 50 A current at 0.8 power factor lagging the stator and rotor copper losses are 1.5kW and 900 W, respectively. The friction and windage losses are 1050 W and the core losses are 1200W. Determine air gap power.
- | | | | |
|--|----|-----|----|
| | 6M | CO1 | L3 |
|--|----|-----|----|

OR

3. a) With neat diagram the explain Torque-Slip characteristics of Induction motor for different rotor resistances.
- | | | | |
|--|----|-----|----|
| | 6M | CO1 | L2 |
|--|----|-----|----|
- b) A three - phase 440V, 6 pole, 50Hz, squirrel cage induction motor is running at a slip of 5%. Compute the speed of stator magnetic field to rotor magnetic field and speed of rotor with respect to stator magnetic field.
- | | | | |
|--|----|-----|----|
| | 6M | CO1 | L3 |
|--|----|-----|----|

UNIT-II

4. a) What is the necessity of starter and with neat diagram explain star -delta starting method of three phase induction motor
- | | | | |
|--|----|-----|----|
| | 8M | CO2 | L3 |
|--|----|-----|----|
- b) The rotor resistance and standstill reactance per phase of a 3-phase slip-ring induction motor is 0.05 and 0.2 , respectively. What should be the value of external resistance per phase to be inserted in the rotor circuit to give maximum torque at starting?
- | | | | |
|--|----|-----|----|
| | 4M | CO2 | L3 |
|--|----|-----|----|

OR

5. a) Write the various methods of speed control of 3 phase induction motor. 8M CO2 L2
- b) How to get the operation of Induction generator from the Induction motor. Explain? 4M CO2 L2

UNIT-III

6. a) Explain the construction and working principle of capacitor start single phase induction motor 6M CO3 L2
- b) If an 8-pole induction motor running from a supply of 50HZ has an emf in the rotor of frequency 1.5HZ, analyze the slip and speed of the motor. 6M CO3 L3

OR

7. a) Explain how starting torque is obtained in split phase single phase induction motors? 6M CO3 L2
- b) Explain the construction and working principle of Shaded Pole Induction Motors 6M CO3 L2

UNIT-IV

8. a) Explain in detail the distributed and concentrated windings and how the performance of the machine can get affected by the winding's construction. 6M CO4 L2
- b) A 9 kVA, 208 V, 1200 rpm three phase, 60 Hz star-connected generator has a field winding resistance of 4.5 Ω . The armature impedance is $(0.3 + j0.5) \Omega$ per phase. When the generator operates at full load and 0.8 pf lagging, the field winding current is 5 A. Its rotational losses are 500W. Determine i) voltage regulation ii) efficiency of alternator iii) torque applied by the prime mover. 6M CO4 L3

OR

9. a) Explain the MMF method of determining the voltage regulation of alternator. 6M CO4 L2
- b) Discuss the two-reaction theory applicable to salient pole synchronous machine. 6M CO4 L2

UNIT-V

10. Explain the various starting methods of synchronous motor. 12M CO5 L2

OR

11. a) Explain in detail about various techniques to reduce hunting. 6M CO5 L2
- b) A 3-phase synchronous motor of 8500W at 1100V has synchronous reactance of 8 Ω per phase. Find the minimum current and the corresponding induced e.m.f for full load condition. The efficiency of the machine is 0.8. Neglect armature resistance. 6M CO5 L3

*** End ***