Course Code: **18EE3T02**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE: ODALAREVU
(AUTONOMOUS)

II- B. Tech I-Semester Supplementary Examinations (BR18), November-2025

ELECTRICAL MACHINES-I (EEE)

Time: 3 hours Max. Marks: 60

Question Paper consists of Part-A and Part-B
*Answer **ALL** the question in **Part-A***
*Answer any **FOUR** Questions from **Part-B***

PART–A (6X2 = 12M)

1. a)	Define co-energy.	(2M)
b)	Write any two differences for lap and wave winding.	(2M)
c)	Mention the different losses in D.C Generator.	(2M)
d)	What is the significance of back emf.	(2M)
e)	What is the necessity of starter?	(2M)
f)	What are the applications of D.C. Machines?	(2M)

PART–B (4X12 = 48M)

2.a)	Explain the principle of energy conversion in electromechanical systems.	(6M)
b)	Derive the expression for the energy balance in a magnetic field system. Explain the concepts of co-energy and how it relates to torque generation.	(6M)
3.	Derive the EMF equation of a DC generator. Explain the significance of lap and wave windings in its design.	(12M)
4.a)	Describe the methods of excitation in DC generators. Compare the self-excited and separately excited types with their characteristics.	(6M)
b)	Explain the open-circuit characteristics (OCC) of a DC generator.	(6M)
5.a)	Derive the torque equation for a DC motor. Explain the relationship between torque, current, and flux in DC motors.	(6M)
b)	Draw and explain the speed-torque, toque-current and speed -torque characteristics of dc shunt motor.	(6M)
6.	Describe three-point starter with a neat sketch.	(12M)
7.a)	Describe the performance of Hopkinson's test on two dc shunt machines.	(6M)
b)	A 400 V dc shunt motor takes 4A at no load. Its armature resistance (including brushes) is 0.5 Ω and shunt field resistance is 200 Estimate the power output and efficiency when the motor takes a)20A b)100A	(6M)

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Course Code: **18EC3T02**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE :: ODALREVU
(AUTONOMOUS)
II -B.Tech I - Semester Supply Examinations (BR18), NOV-2025
DIGITAL SYSTEM DESIGN-I (ECE)

Time: 3 hours **Max. Marks: 60**

Question Paper consists of Part- A and Part –B
Answer ALL the question in Part –A
Answer any FOUR Questions in Part –B

PART -A **(6 X 2 =12M)**

1.	a)	Convert $(BADA)_{16}$ to Base 8	[2M]
	b)	Find the complement of the function: $(A'+B')(CD')+AB'D$.	[2M]
	c)	Realize full adder using two half adders	[2M]
	d)	Write the merits and demerits of PLA	[2M]
	e)	Give the Characteristic table for J-K Flip-flop	[2M]
	f)	Compare Melay and Moore models.	[2M]

PART -B **(4 X 12 =48M)**

2.	a)	Solve the following the subtraction using 1's complement and 2's complement methods. (i) 11010 – 10111 (ii) 11000 – 1010 (iii) 110 – 110000	[6M]
	b)	Convert the given expressions in standard SOP form (i) f(A,B,C) =AC+BA+BC (ii) f(X,Y,Z) = Y	[6M]
3.	a)	Simplify the following using K- map and implement the same using NAND gates. f (A, B, C) =Σ (0,2,4,5,6,7)	[6M]
	b)	Design BCD to gray code converter and realize using logic gates	[6M]
4.	a)	Implement 5 to 32line Decoder using four 3 to 8 decoders with enable and a 2 to 4 line decoder?	[6M]
	b)	Design 4 bit Binary Adder/ Subtractor with control input	[6M]
5.	a)	Compare PROM, PLA and PAL	[5M]
	b)	Implement the following four Boolean functions using PAL. F1(W,X,Y,Z) = ∑m(1,3,10) F2(W,X,Y,Z) = ∑m(7,8,9,10,11,12,13,14,15) F3(W,X,Y,Z) = ∑m(0,1,2,3,13,15) F4(W,X,Y,Z) = ∑m(1,3,10,12,13)	[7M]
6.	a)	Design a modulo-10 ripple counter using D flip-flops	[6M]
	b)	Conversion of JK Flip-flop into SR Flip-flop?	[6M]
7.	a)	Draw the diagram of Mealy type FSM for serial adder and explain its operation.	[6M]
	b)	Explain the analysis of clocked sequential circuit with example?	[6M]

Course Code: **18EE3T03**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE:: ODALAREVU
(AUTONOMOUS)

II-B.Tech I-Semester Supplementary Examinations (BR18), NOV - 2025

ELECTROMAGNETIC FIELDS (EEE)

Time: 3 hours | Max. Marks: 60

Question Paper consists of Part-A and Part-B
Answer ALL the question in Part-A
Answer any FOUR Questions from Part-B

PART–A (6X2 = 12M)

1. a) State Coulomb's law in electrostatic fields. (2M)
   b) State Ohm's law in point form. (2M)
   c) State the Biot-savart's law. (2M)
   d) Find the force on Charge Q=12C when placed in E= $(18a_x+5a_y+10a_z)$v/m. (2M)
   e) Define self inductance and mutual inductance. (2M)
   f) Write the Maxwell's equation in integral from. (2M)

PART–B (4X12 = 48M)

2. Derive the equation for electric filed intensity due to infinite surface charge distribution. (12M)
3. Derive the capacitance equation of parallel plate capacitor with composite dielectrics. (12M)
4. Derive the Maxwell's equation in point form and integral form using Ampere's Circuit law? (12M)
5. a) Derive the expression for torque on a current loop placed in a magnetic field. (6M)
   b) In a magnetic flux density of B= (1.0ax+ 3.0ay) Wb/m2, a current element, 10az mA/m is placed. Find the force on the current element. (6M)
6. a) Derive the self inductance of toroid. (6M)
   b) A Toroid has air core and has a cross–sectional area of 10 mm^2. It has 1000 turns and its mean radius is 10 mm. Find its self Inductance. (6M)
7. a) State and explain the faradays laws of electromagnetic induction. (6M)
   b) Derive the expression for the Poynting vector. (6M)

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Course Code: 18EC3T05

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE: ODALAREVU
(AUTONOMOUS)

II- B. Tech I-Semester Reg. /Supplementary Examinations (BR18), November-2025

BASIC ELECTRONICS AND DEVICES (EEE)

Time: 3 hours | Max. Marks: 60

Question Paper consists of Part-A and Part-B
*Answer **ALL** the question in **Part-A***
*Answer any **FOUR** Questions from **Part-B***

PART–A (6X2 = 12M)

1. a)	Define intrinsic and extrinsic semiconductors.	(2M)
b)	What is diffusion capacitance in a diode?	(2M)
c)	Define ripple factor in rectifiers.	(2M)
d)	How does a transistor function as a switch?	(2M)
e)	What are the characteristics of a thyristor?	(2M)
f)	Define feedback in amplifiers and its types.	(2M)

PART–B (4X12 = 48M)

2.a)	Draw energy band diagram of Conductor, Insulator and Semiconductor	(6M)
b)	Describe the role of electrons and holes in intrinsic semiconductors with neat diagrams.	(6M)
3.a)	Explain the operation and VI characteristics of a PN junction diode.	(6M)
b)	Describe the working and characteristics of Zener diodes.	(6M)
4.a)	Explain the working of a half-wave rectifier and its input and output waveforms.	(6M)
b)	Discuss overload voltage protection in voltage regulators with examples.	(6M)
5.a)	Describe the I/O characteristics of a transistor in CB configurations.	(6M)
b)	What is transistor biasing? Explain the need for thermal stabilization and its methods.	(6M)
6.a)	Discuss the construction, characteristics of N-channel JFET.	(6M)
b)	Explain the construction, operation, and characteristics of power IGBT.	(6M)
7.a)	Describe the general characteristics of negative feedback amplifiers and their effect on input and output resistance.	(6M)
b)	Describe the working principle of an RC-phase shift oscillator with a neat diagram.	(6M)

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