Sub Code: EET 001/BEET-101 **ROLL NO……..……..**

ODD SEMESTER EXAMINATION, 2023 – 24

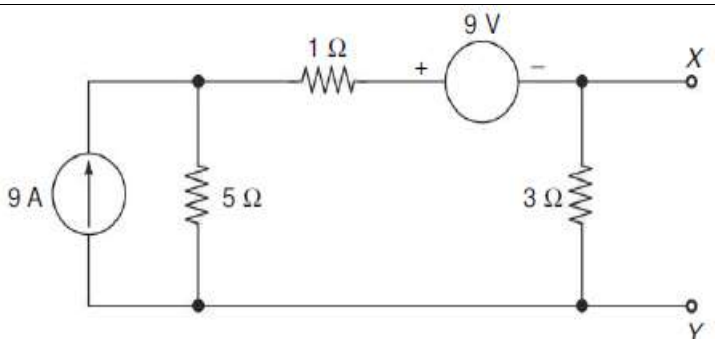
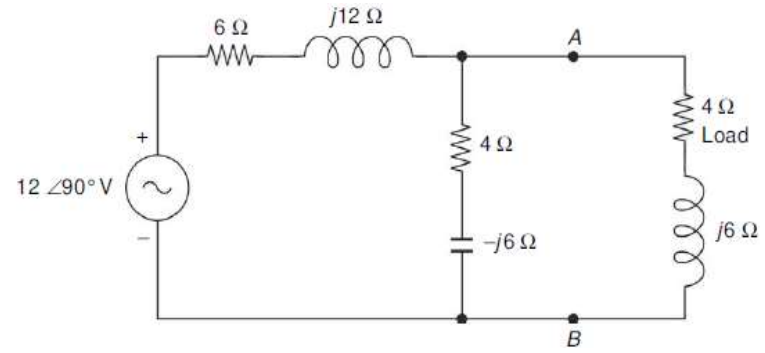
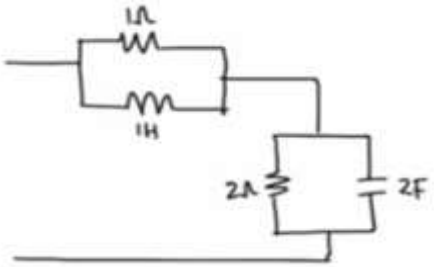
Ist Year, B.Tech.

BASIC ELECTRCIAL ENGINEERING

Duration: 3:00 hrs **Max Marks: 100**

Note: - Attempt all questions. All Questions carry equal marks. In case of any ambiguity or missing data, the same may be assumed and state the assumption made in the answer.

Q 1.	Answer any four parts of the following. a) With respect to DC circuit, state and explain Kirchhoff's law. b) A sinusoidally varying alternating voltage is given by, $v(t) = Vmsin\omega t$, obtain its RMS value of voltage in terms of maximum value. c) A pure inductor excited by sinusoidally varying AC voltage, show that the average power consumed by inductor is zero. d) Two resistors are connected in parallel and a voltage of 200V is applied to the terminals. The total current taken is 2.5 A, and the power dissipated in one of the resistors is 1500 W. What is the resistance of each element? e) A load resistance $RL\Omega$ is connected across the source VS with internal resistance $Rint$ in series with source; obtain the condition that the power transferred to load from source is maximum. f) Three phase power consumed by the balanced load is given by $P = \sqrt{3}V_L\, I_L\cos(\emptyset)$ watts, then show that two wattmeter sufficient to measure three phase power P	5x4=20
Q 2.	Answer any four parts of the following. a) For the single-phase transformer, obtain an expression for EMF induced in either primary side or secondary side. b) A dc motor running with a speed of N rpm, obtain an expression for EMF induced in the armature winding. c) To operate the transformer in maximum efficiency always, derive at what condition, this can be achieved. d) An alternator running at N rpm, induces an emf in the armature conductors of the machine and obtain an expression of induced emf. e) In a domestic consumers end, discuss how two-part electricity tariff imposed to calculate electricity bills. f) A three single phase balanced load connected in three phase three wires star form, with the help of phasor diagram, obtain the relationship between line and phase quantities of voltage and current.	5x4=20
Q 3.	Answer any two parts of the following. a) Find the Thevenin equivalent to the left of XY. Also calculate the maximum power to be transferred from source to load if variable resistive load is connected between XY.	10x2= 20

	 b) Using Thevenin theorem, find current across load of (4+j6).  c) Find the resonance frequency in Hz of given circuit: 	
Q 4.	Answer any two parts of the following. a) With Diagram, Explain Armature Reaction in DC machine and how to improve armature reaction. An 8-pole wave connected armature has 600 conductors and is driven at 525 rev/min. If the flux is 20 mWb. Determine the generated e.m.f. b) A 100 KVA, 1000/10000 V, 50 Hz transformer has an iron loss of 1200 W. The copper loss with 6A in high voltage winding is 500 W. Calculate efficiency: (i) 25% (ii) 100% nominal load at 0.8 pf. The output terminal is being maintained at 10000V. Also calculate maximum efficiency at 0.8 pf. c) Explain the construction of Induction motor. The efficiency of a 400 V, 3 phase, 6 pole Induction motor draw a line current of 80 A at 0.75 pf at 4% slip is 85%. Calculate the shaft output and shaft torque.	10x2= 20
Q 5.	Answer any two parts of the following. a) With a neat circuit diagram, explain the operation of MCB, MCCB and RCCB. b) What is the necessity of earthing? Give detailed explanation of types of earthing. c) Explain the general layout of Power System in India with their KV rating at different levels. In a house, there are 5 lamps 25 Watt used 14 hours per day, a 200 Watt refrigerator used 24 hours per day, and a 125 Watt water pump used 8 hours per day. How much electrical energy is used for a month (30 days)	10x2= 20

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Sub Code: BEET 101 **ROLL NO……..……..**

ODD SEMESTER EXAMINATION, 2023 – 24

Ist Year, B.Tech.

BASIC ELECTRCIAL ENGINEERING

Duration: 3:00 hrs **Max Marks: 100**

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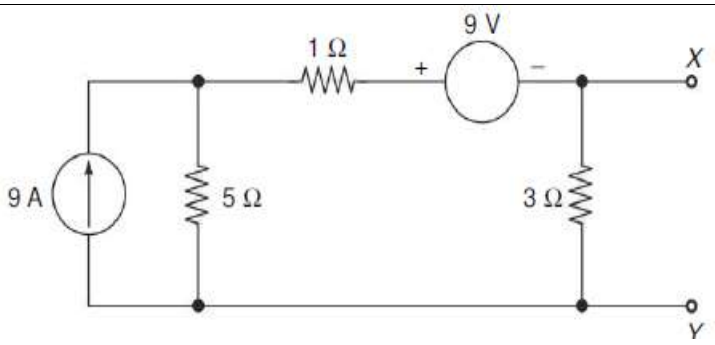
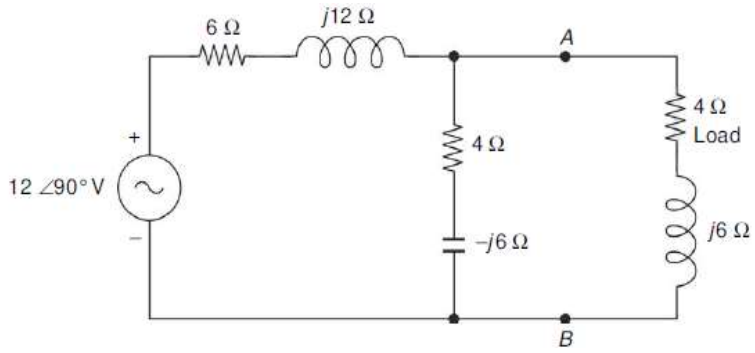
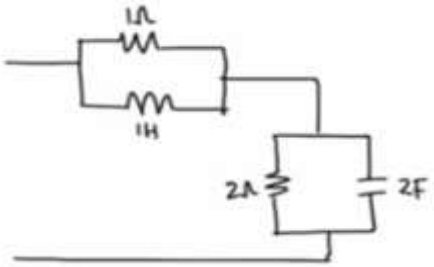
Q 3.	Answer any two parts of the following. a) Find the Thevenin equivalent to the left of XY. Also calculate the maximum power to be transferred from source to load if variable resistive load is connected between XY.	10x2= 20

	 b) Using Thevenin theorem, find current across load of (4+j6).  c) Find the resonance frequency in Hz of given circuit: 	
Q 4.	Answer any two parts of the following. a) With Diagram, Explain Armature Reaction in DC machine and how to improve armature reaction. An 8-pole wave connected armature has 600 conductors and is driven at 525 rev/min. If the flux is 20 mWb. Determine the generated e.m.f. b) A 100 KVA, 1000/10000 V, 50 Hz transformer has an iron loss of 1200 W. The copper loss with 6A in high voltage winding is 500 W. Calculate efficiency: (i) 25% (ii) 100% nominal load at 0.8 pf. The output terminal is being maintained at 10000V. Also calculate maximum efficiency at 0.8 pf. c) Explain the construction of Induction motor. The efficiency of a 400 V, 3 phase, 6 pole Induction motor draw a line current of 80 A at 0.75 pf at 4% slip is 85%. Calculate the shaft output and shaft torque.	10x2= 20
Q 5.	Answer any two parts of the following. a) Explain the Two Rotating Field Theory of Single-phase Induction Motor. b) Why DOL (Direct on Line) starting current very high but the starting torque is still low. Also show that in star/delta staring of squirrel cage motor, starting current and torque get reduced by a factor of 1/3 compared to DOL starting. c) How does the Universal motor run with both AC and DC? Discuss the features of universal motor.	10x2= 20

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Sub Code: EET-001 **ROLL NO……..……..**

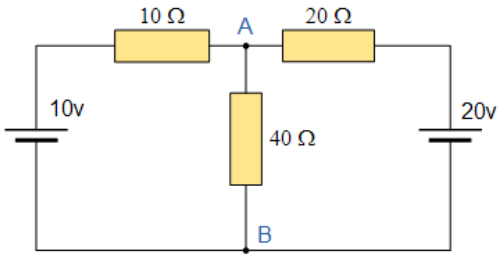
ODD SEMESTER EXAMINATION, 2024 – 25

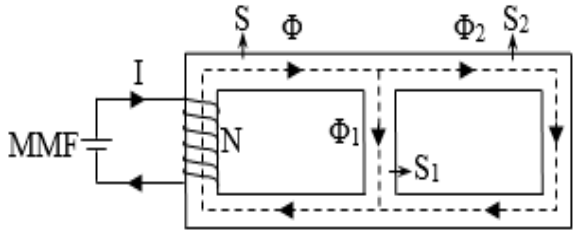
1st Year (I Sem) B.Tech.

BASIC ELECTRICAL ENGINEERING

Duration: 3:00 hrs **Max Marks: 100**

Note: - Attempt all questions. All Questions carry equal marks. In case of any ambiguity or missing data, the same may be assumed and state the assumption made in the answer.

Q 1.	Answer any two parts of the following. (10x2= 20) a) (i) Explain Thevenin's theorem with a suitable example. (5 marks) (ii) What is a first-order circuit? How do a capacitor and an inductor behave in steady-state conditions? (5 marks) b) Use the superposition theorem to find the current in branch AB in the circuit shown in Figure 1.  Figure 1 (10 marks) c) Three Resistances; R_1, R_2, R_3 are connected in a star configuration, each having a value of 10 Ω. Compute the value of each resistance in the delta configuration. (10 marks)
Q 2.	Answer any two parts of the following. (10x2= 20) a) (i) Explain the terms: True Power, Active Power, and Reactive Power. (5 marks) (ii) In an electrical circuit, explain the concept of resonance. Derive an expression for a series resonance circuit. (5 marks) b) In a circuit containing a resistance of 5 kΩ and an inductance of 1.0 H in series, a supply voltage of 150 V at 400 Hz is applied. Determine: • Voltage across the resistance and inductance, • Magnitude and phase of the current, and • Power taken from the supply. (10 marks) c) For a certain load, one wattmeter reads 20 kW and the other reads 5 kW. Calculate the total power and power factor of the load when both wattmeters show positive values. (10 marks)
Q 3.	Answer any two parts of the following. (10x2= 20) a) (i) In the magnetic circuit shown in Figure 2, MMF represents the magneto motive force, S, S_1 and S_2 represent reluctance, and Φ, $Φ_1$, and $Φ_2$ represent the flux in different portions of the circuit.

	Draw the electrical equivalent circuit for the given magnetic circuit.  Figure 2 (5 marks) (ii) What are the conditions for an ideal transformer? (5 marks) b) Draw the phasor diagram of an actual transformer at a unit power factor. Also, provide the expressions for E_2 and V_1. (10 marks) c) Draw the equivalent circuit of a transformer referred to the primary side. Additionally, calculate the equivalent resistance and reactance of the transformer as referred to the primary side. (10 marks)
Q 4.	Answer any two parts of the following. (10x2= 20) a) (i) Explain the working principle of a DC generator. (5 marks) (ii) Why is a single-phase induction motor not self-starting? What arrangements are made to make it self-starting? (5 marks) b) Derive the expression for the EMF equation of a DC machine. (10 marks) c) Classify synchronous generators. Provide their constructional details and explain their principles of operation. (10 marks)
Q5	Answer any two parts of the following. (10x2= 20) a) (i) Explain the generalized layout of a power system, highlighting its main components and their functions. (5 marks) (ii) What are the standard transmission and distribution voltages in India? Discuss their importance in ensuring an efficient power system. (5 marks) b) Describe the following types of low-tension (LT) switchgear along with their applications: • Switch Fuse Unit (SFU) • Miniature Circuit Breaker (MCB) • Earth Leakage Circuit Breaker (ELCB) • Moulded Case Circuit Breaker (MCCB) (10 marks) c) Explain the different types of batteries used in electrical installations. Discuss the important characteristics to be considered when selecting a battery for a specific application. (10 marks)

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Sub Code:BEET101 **ROLL NO……..……..**

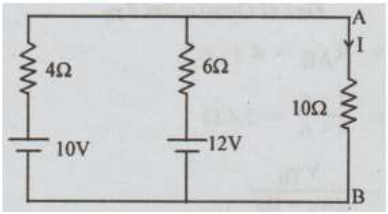
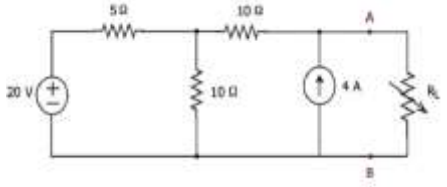
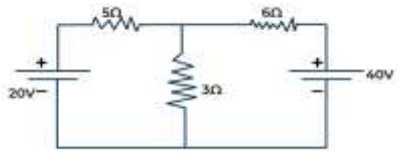
ODDSEMESTER EXAMINATION, 2024 – 25

First Year (First Sem) B.Tech.

Basic Electrical Engineering

Duration: 3:00 hrs **Max Marks: 100**

Note: - Attempt all questions. All Questions carry equal marks. In case of any ambiguity or missing data, the same may be assumed and state the assumption made in the answer.

Q 1.	Answer any two parts of the following. [Unit-1]	(10x2= 20)
	a) (i)Find the current through 10 Ω resistance using Thevenin's Theorem	(5 marks)
		
	(ii)Explain maximum power transfer theorem and derive the condition of maximum power to be transferred from source to load.	(5 marks)
	b) Find the maximum power that can be delivered to the load resistor R_L of the circuit shown in the following figure and also find the value of maximum power.	(10 marks)
		
	c) Find the current through 3Ω resistor using superposition theorem.	(10 marks)
		
Q 2.	Answer any two parts of the following.	(10x2= 20)
	a) (i)Describe different types of electrical power.	(5 marks)
	(ii)A 220 V,50 Hz AC supply is applied to a coil of 0.2 H inductance and 20 Ω resistance connected in series with a capacitor of 100 μF. Calculate Impedance, Circuit current, Power factor of the circuit.(5 marks)	
	b) Derive the relationship between line & phase quantities in three phase star connected system.	(10 marks)
	c) Derive the equation of power factor for a three phase system using two wattmeter method of power measurement.	(10 marks)
Q 3.	Answer any two parts of the following.	(10x2= 20)
	a) (i)Explain different types of losses that occur in transformer.	(5 marks)
	(ii)Discuss the analogy between electric and magnetic circuit.	(5 marks)

	b)A 25 KVA, 2200/220 V, 50 Hz, single phase transformer has following parameters, R_1=1.75 Ω, R_2=0.0045 Ω, X_1=2.6 Ω, X_2=0.0075 Ω. Calculate equivalent resistance and Equivalent reactance referred to primary & secondary side. (10 marks) c) Derive the condition of maximum efficiency in transformer. (10 marks)
Q 4.	Answer any two parts of the following. (10x2= 20) a) (i)A 3-phase ,4 pole Induction motor is supplied from 3 phase ,50 Hz AC supply, calculate 1. Synchronous speed, 2. Rotor speed when slip is 4% 3. Rotor frequency when rotor runs at 600 rpm. (5 marks) (ii)Describe different methods of speed control of DC motor. (5 marks) b) Explain the working principle of single-phase induction motor and describe any one method of it's starting. (10 marks) c) Describe torque-slip and torque-speed characteristics of three phase induction motor with neat diagram. (10 marks)
Q 5.	Answer any two parts of the following. (10x2= 20) a) (i)Give a brief introduction of MCCB and SFU. (5 marks) (ii)Name the different types of batteries and differentiate between primary and secondary cell(5 marks) b)Describe Generalized layout of power system using single line diagram with clear indication of different voltage levels. (10 marks) c)Calculate the electricity bill amount for a month of 30 days if following are used as specified: (10 marks) i. 4 Bulb of 50 W for 6hrs ii. 3 Tubelight of 40 W for 8hrs iii. A Television of 100W for 6 hrs iv. A Refrigerator of 300 W for 24hrs. Cost per unit is Rs 2.50.

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