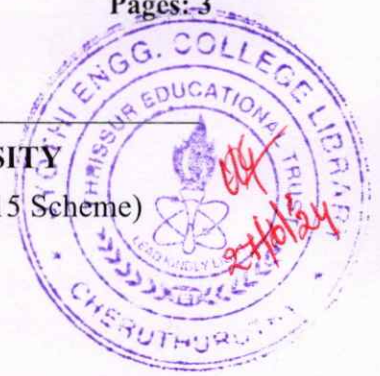Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S1 (S,FE) S2 (S,FE) Examination May 2024 (2015 Scheme)

Course Code: EE100
### Course Name: BASICS OF ELECTRICAL ENGINEERING

Max. Marks: 100   Duration: 3 Hours

PART A
Answer all questions, each question carries 4 marks

		Marks
1	State Kirchhoff's current law and voltage law. Give one example each.	(4)
2	Compare electric and magnetic circuits.	(4)
3	State Faraday's laws of electromagnetic induction.	(4)
4	Define apparent power, active power and reactive power.	(4)
5	Define RMS value and average value of a periodic waveform.	(4)
6	What are the advantages of high voltage transmission?	(4)
7	Explain the different types of DC motors?	(4)
8	Explain the working principle of a single phase transformer?	(4)
9	Explain the constructional details of a three phase squirrel cage induction motor?	(4)
10	Single phase induction motor is not self-starting. Why?	(4)

PART B
MODULE (1-4)

Answer any four questions, each carries 10 marks

11   In the following figure R1=R4=1Ω, R2=R3=2Ω, V1= 5 and V2=V3=10V. Using   (10)

mesh current analysis find the mesh currents I1, I2 and I3.
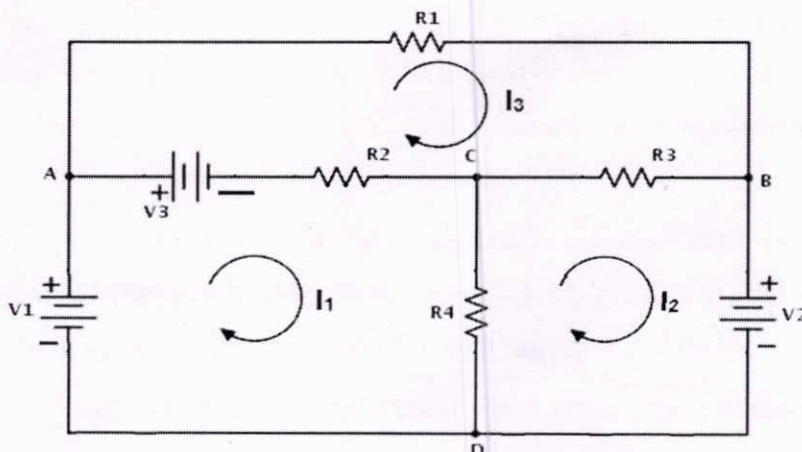
12 a) An iron cored toroidal core has 200 turns. The mean length of the flux path is   (6)
        0.5m and the cross-sectional area of the core is 10cm². Calculate the inductance
        of the coil. Relative permeability of iron is 2000. Also calculate the induced emf
        in the coil when current of 5A is reversed in 10ms.

    b) Define MMF, field strength, flux density and reluctance.   (4)

13 a) A rectangular shape iron core has an air gap of 0.01cm. The mean length of the   (6)
        flux path through iron is 39.99cm. The relative permeability of iron is 2000. A
        coil of 500 turns is wound over the core. The cross sectional area of the core is
        9cm². Calculate the current required to produce a flux of 1mWb in the core.

    b) Explain statically induced emf with example.   (4)

14 a) Three equal impedances, each consisting of a resistance and inductance in series   (10)
        are connected in star and are supplied from a 400V, 50Hz, three phase, three wire
        balanced supply system. The power input to the load is measured by the two
        wattmeter method and the two wattmeter read 2kW and 1kW respectively.
        Determine the values of resistance and inductance connected in each phase.

    a) Derive the relationship of line and phase voltages in a balanced star connected   (5)
15   three phase system.

    b) A coil having a resistance of 5Ω and inductance 20mH are connected in series   (5)
        across a 230V, 50Hz supply. Calculate the current and power factor.

16   Explain the working of a hydroelectric power plant with a neat layout.   (10)

MODULE 5

Answer any one full question

17 a) A 25kVA, 1000/100V transformer has iron loss of 350W and full load copper   (5)
        loss of 400W. Calculate the efficiency of the transformer at full load unity power
        factor.

    b) Compare the torque-speed characteristics of DC shunt motor and series motor.   (5)
        Write two applications of these motors.

OR

18 a) A transformer has 2000 turns on its primary and 1000 turns on the secondary.   (4)
        When a voltage, V of frequency 50Hz is connected across the primary winding a
        maximum flux of 4×10^{-3} Wb is produced in the core which links both the
        windings. Calculate the value of the EMF induced in the two windings.

    b) Explain the working principle of a DC generator. Write the EMF equation.   (6)

2

MODULE 6

Answer any one full question

19 a) Explain the principle of working of a three phase induction motor.   (5)

    b) Explain the working of split phase single phase induction motor.   (5)

OR

20 a) A four pole, three phase induction motor when supplied with 400V, 50Hz supply   (3)
        rotates at a slip of 3 percent. What is the speed of the motor?

    b) Write any three differences between squirrel cage induction motor and slip ring   (3)
        induction motor.

    c) Explain the constructional details of a single phase induction motor   (4)

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