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Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FIRST/SECOND SEMESTER B.TECH DEGREE EXAMINATION, JULY 2018
Course Code: EE100
Course Name: BASICS OF ELECTRICAL ENGINEERING

Max. Marks: 100   Duration: 3 Hours

PART A
Answer all questions, each carries 4 marks   Marks

1   State Kirchhoff's Current Law. Illustrate with a simple example.   (4)
2   What is magneto motive force (MMF)? Explain MMF and field strength.   (4)
3   What is the difference between Time period and frequency of a periodic wave (4)
     form? How are they related?
4   Describe any one method of connection used in a 3-phase circuit and write the (4)
     relation for current and voltage.
5   Distinguish between feeder, distributor and service mains in a secondary   (4)
     distribution system.
6   Why high voltage is used for electric power transmission?   (4)
7   Derive the EMF equation of DC generator.   (4)
8   Give the constructional details of a core type 3-phase transformer.   (4)
9   Compare a Squirrel cage induction motor with a slip ring induction motor.   (4)
10   Draw and explain the Torque –Slip Characteristics of a 3-phase induction motor. (4)
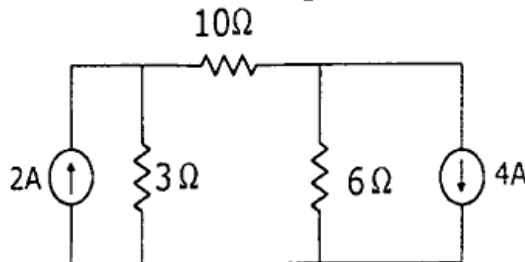
PART B
MODULE (1-4)
*Answer any four questions, each carries 10 marks*

11   a)   By Mesh Analysis find the currents flowing through 4 Ω and 3 Ω resistors in the   (7)
          following network
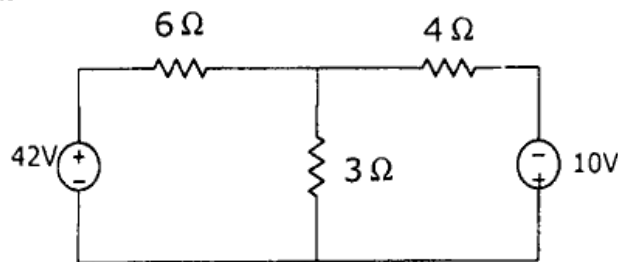
     b)   Differentiate Real and Ideal Voltage sources with the help of graphs   (3)
12   a)   For the given network find the current through the resistor 3 Ω.   (6)

     b)   Find the equivalent resistance between the terminals 1 and 2, for the given circuit. (4)
          Take $R_1 = R_2 = R_3 = 3Ω$ and $R_{12} = R_{31} = R_{23} = 5Ω$.

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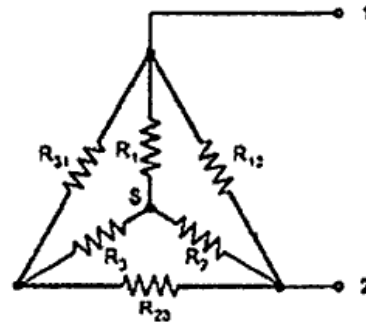
13 a) A coil consists of 750 turns and a current of 10 A in the coil produces a magnetic   (5)
        flux of 1.2 mwb. Calculate the inductance of the coil. If the current in the coil is
        reversed in 0.01 seconds,find the average emf induced in the coil.
    b) Derive the expressions for self-inductance and mutual-inductance.   (5)

14 a) Derive the expressions for RMS value, Average value and Form factor of a   (7)
        sinusoidal waveform.
    b) Draw the phasor diagram for a series RL circuit and give the expression for   (3)
        Impedance.

15 a) A balanced Y connected load of $8+j6\ \Omega$ per phase is connected to a 3 phase, 400   (5)
        V supply. Find the line current, Power factor, Active Power, Apparent power and
        Reactive Power.
    b) How power is measured in a 3-phase system using 2 wattmeters? Give the   (5)
        Connection diagram, Phasor diagram and necessary expressions.

16   With the help of a neat schematic diagram explain the working of a Hydroelectric   (10)
        Power Plant.

MODULE 5
Answer any one full question

17 a) A 4 pole,250 V DC series motor has a wave connected armature with 1254   (5)
        conductors. The flux per pole is 22 mwb when the motor is taking 50 A.
        Armature resistance is 0.2 ohms and series field resistance 0.2 ohms. Calculate
        the speed.
    b) Give the classification of DC generators with necessary diagrams   (5)
OR
18   In a 25 KVA, 3300/230V single phase transformer, the iron and full load Copper   (10)
        losses are 350 and 400 watts respectively. Calculate the efficiency at half full
        load,0.8 pf.

MODULE 6
Answer any one full question

19   Why a single-phase induction motor is not self-starting? Give a detailed   (10)
        description of any two methods for starting asingle-phase induction motor.
OR
20 a) Describe briefly the principle of operation of a 3-phase induction motor.   (4)
    b) Define Synchronous speed and slip with respect to an Induction motor   (3)
    c) A 3-phase Induction motor has 6 poles. It is connected to 3 phase, 400Volts, 50   (3)
        Hz supply. The motor is operating at 5% slip. What is the speed of the motor.

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