S.E. (chemical)(Sem. III) may 08

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06/558   Sub; electronics & electrical engg.

345-08.   04|06|08   (REVISED COURSE)   CO-9616

(3 Hours)   [Total Marks : 100

(1)   Question No. 1 is **compulsory**.
(2)   Attempt any **four** questions out of the remaining **six** questions.
(3)   In all solve **five** questions.
(4)   Correct diagram indicate **full** marks.

Solve any **four** :—

   (a)   Explain balanced resistive load in four steps.   5
   (b)   Explain phase sequence of three phase a. c. source as per R–Y–B.   5
   (c)   Compare center tapped full wave rectified and bridge rectified.   5
   (d)   Explain the slip of three phase Induction motor.   5
   (e)   What is mean by back E.M.F in case of D.C. Motor.   5

a)   Explain in detail power measurement in case of delta connected load by three wattmeter   10
   method. (Take load as R–L load).

b)   A 746 kW, 3–phase, 50 Hz, 16–pole induction motor has a rotor impedance of   10
   $(0.02 + j0.15)$ at stand still. Full load torque is obtained at 360 r.p.m.
   Calculate :—

     (i)   the speed at which maximum torque occurs
     (ii)   the ratio of maximum to full load torque
     (iii)   the external resistance per phase to be inserted in the rotor circuit to get
        maximum torque at starting.

a)   A d.c. series motor drives a load; the torque of which varies as the square of the   10
   speed. Assume the magnetic circuit to be remain unsaturated and the motor resistance
   to be negligible; estimate the percentage reduction in the terminal voltage which
   will reduce the motor speed to half the value it has on full voltage. What is then
   the percentage fall in the motor current and efficiency ? Stray losses of the motor
   may be ignored.

)   Explain the firing of an SCR using UJT with proper diagram.   10

)   Explain in detail with block diagram of CRO.   10

)   Draw and explain the experimental set up with polarity of ammeter and voltage for   10
   output characteristics of N–D–N transistor for CE configuration.

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5. (a) Show that, the transformation $y = \dfrac{u}{\sqrt{x}}$ a Bessel's differential equation reduces to

$$\frac{d^2 u}{dx^2} + \left[1 - \frac{n^2 - \frac{1}{4}}{x^2} \right] u = 0$$

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5. (a) The use full load torque of 3-phase, 6-pole, 50 Hz induction motor i
        162·84 N-m. The rotor e.m.f. is observed to make 90 cycles (Ninty Cycles) per minute
        Calculate :—
        (i)   motor output
        (ii) cu-loss in rotor
        (iii) motor input
        (iv) efficiency if mechanical torque lost in windage and friction is 20·36 N-r
              and stator losses are 830W.

    (b) Each phase of a three phase, delta connected load consists of a
        . impedance = 20 $\underline{/60°}$ ohms. The line voltage is 440V at 50 Hz. Compute the pow
        consumed by each phase impedance and the total power.
        What will be the readings of the two wattmeters connected for measurement ? Wh
        is the resistance and inductance of each phase ?

6. (a) Explain the internal architecture of 8085 microprocessor.
    (b) Realize the Ex-OR gate using only NAND gate.
    (c) Find binary equivalent of 63.

7. Write short notes on :—
    (a) V-curves of synchronous motor
    (b) Torque-slip characteristics of 3-phase induction motor
    (c) Voltage regulation of an alternator
    (d) L-C filter.