B.Tech II Year II Semester (R13) Regular Examinations May/June 2015
ELECTRICAL TECHNOLOGY
(Electronics and Communication Engineering)

Time: 3 hours   Max. Marks: 70

PART – A
(Compulsory Question)
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1   Answer the following: (10 X 02 = 20 Marks)
   (a) Define active and reactive power.
   (b) Draw the phasor diagram for total power in two watt meter method.
   (c) What are the different applications of DC shunt generator and DC series generator?
   (d) What are the reasons for failure of induced e.m.f in D.C generator?
   (e) Explain working principle of transformer.
   (f) Why transformer rating is in KVA not in KW?
   (g) Mention some general applications of induction motor.
   (h) Define slip.
   (i) Define synchronous speed.
   (j) Differentiate the difference between salient pole rotor and cylindrical rotor.

PART – B
(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2   A 415 V, 3-phase generator supplies power to both a delta and star connected load in the manner shown
        in figure below. All the phase impedance are identical and specifically equal to 5+j8.66 ohms. Compute
        the total generator current in each line.
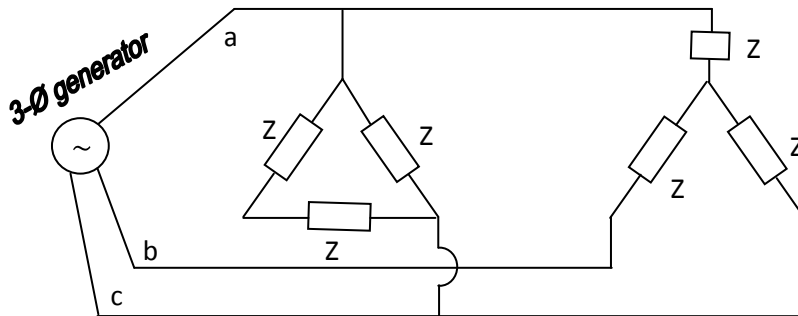
OR

3   Derive the expression for measurement of 3-phase power in two watt meter method.

UNIT – II

4   Explain with neat diagram the constructional features of DC generator and also derive the emf equation.

OR

5   A 230 V DC series motor has an armature circuit resistance of 0.2 ohms and field resistance of 0.1 ohms.
        At rated voltage the motor draws a line current of 40 amps and runs at a speed of 1000 rpm. Find the
        speed of the motor for a line current of 20 A at 230 V. Assume that the flux at 20 A line current is 60% of
        the flux at 40 A line current.

UNIT – III

6   Explain OC and SC tests of a 1-phase transformer with a neat circuit diagram also derive the expression
        for regulation and efficiency.

OR

7   (a) Derive the emf equation of a 1-phase transformer.
   (b) The no-load ratio of a 50 Hz 1-phase transformer is 6000/250 V. Estimate the number of turns in each
        winding if the maximum flux is 0.03 Wb in the core.

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UNIT – IV

8 (a) Explain the relation between maximum torque & starting torque and full load torque & maximum torque.
   (b) A 12-pole, 3-phase alternator driven at a speed of 500 rpm supplies power to an 8-pole, 3-phase induction motor. If the slip of the motor at full load is 3%. Calculate the full load speed of the motor.

OR

9 A 3300 V, 24-pole, 50 Hz, 3-phase star connected induction motor has a slipping rotor resistance of 0.016 ohms and stand still reactance of 0.265 ohms per phase. Calculate the speed at maximum torque and ratio of full load torque to maximum torque if, full load torque is obtained at 247 rpm.

UNIT – V

10 (a) Derive the expression for pitch factor.
    (b) Explain the e.m.f method of regulation of synchronous generator and determine the efficiency.

OR

11 Explain the constructional details of Synchronous Generators in detail.

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