FACULTY OF ENGINEERING

B.E. 2/4 (ECE) I – Semester (Supplementary) Examination, July 2014

Subject : Electrical Technology

Max. Marks: 75

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B. PART – A (25 Marks)

1	Classify the DC generators.	2
2	Explain about Flux control method of speed control of DC motor.	3
3	Show that the line voltage is $\sqrt{3}$ times the phase current in a three phase delta connected system.	3
4	Calculate the distribution factor for a 36 slots, 4-pole, single-layer three-phase winding.	2
5	What is the importance of transformer voltage transformation ratio?	2
6	A 2,200/200-V transformer draws a no-load primary current of 0.6 A and absorbs 400 watts. Find the magnetizing and iron loss currents.	3
7	Explain why the three phase induction motor is self starting.	3
8	Write the applications of split phase and shaded pole machines.	2
9	What are the limitations of non-conventional energy sources?	2
10	Draw the block diagram representation of nuclear power station.	3

PART – B (50 Marks)

- 11 a) Explain with necessary diagrams about commutation in a DC generators.
 - b) A 2-pole series motor runs at 707 r.p.m. when taking 100 A at 85 V and with the field coils in series. The resistance of each field coil is 0.25Ω and that of the armature 0.04Ω . If the field coils are connected in parallel and load torque remains constant, find i) speed ii) the additional resistance to be inserted in series with the motor to restore the speed to 707 r.p.m.
- 12 a) Three equal star-connected inductors take 8 kW at power factor 0.8 when connected a 460 V, 3 phase, 3-wire supply. Find the line current if one inductor is short circuited.
 - b) In a 50 kVA, star-connected, 440V, 3 phase, 50 Hz alternator, the effective armature resistance is 0.25 ohm per phase. The synchronous reactance si 3.2ohm per phase and leakage reactance is 0.5 ohm per phase. Determine at ratedload and unity power factor : a) Internal e.m.f. Ea (b) no-load, e.m.f. E0 (c) percentage regulation of full-load d) value of synchronous reactance which replaces armature reaction.

Time : 3 hours

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- 13 a) Draw the vector diagrams of a transformer for leading and lagging loads.
 - b) A 5 kVA 200/1000 V, 50 Hz, single-phase transformer gave the following tests results.

O.C. Test (L.V. Side) : 2000 V, 1.2 A, 100 W S.C. Test (H. V. Side) : 50 V, 5 A, 110 W

- i) Calculate the parameters of the equivalent circuit referred to the L.V. side.
- ii) Calculate the output secondary voltage when delivering 3 kW at 0.8 p.f. lagging, the input primary voltage being 200 V. Find the percentage regulation also.
- 14 a) A 440 V, 3 φ, 50 Hz, 4 pole, Y-connected induction motor has a full-load speed of 1425 rpm. The rotor has an impedance of (0.4 + J4) ohm and rotor / stator turn ratio of 0.8. Calculate i) full-load torque ii) rotor current and full-load rotor Cu loss iii) power output if windage and friction losses amount to 500 W iv) starting current and v) starting torque.
 - b) Explain the basic working principle of single phase split phase induction motor.
- 15 Draw the block diagram representation of thermal power station and explain each part of it.
- 16 a) Three resistors 10, 20 and 20 ohms are connected in star to the terminals A, B and C of a 3-phase, 3 wire supply through two single-phase wattmeters for measurement of total power with current coils in lines A and C and pressure coils between A and B and C and B. Calculate i) the line currents ii) the readings of each wattmeter. The line voltage is 400 V.
 - b) Explain about hydro electric power stations.
- 17 Explain the following :
 - i) Star delta staring of three phase induction motor
 - ii) Short line calculations
