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Code No: EE1513

GEC-R14

II B. Tech I Semester Regular / Suppl. Examinations, November 2017

ELECTRICAL MACHINES-I
(Electrical and Electronics Engineering)

Time: 3 Hours

Max. Marks: 60

Note: All Questions from **PART-A** are to be answered at one place.

Answer any **FOUR** questions from **PART-B**. All Questions carry equal Marks.

PART-A

6 × 2 = 12M

1. Define the terms pole pitch and back pitch with reference to armature windings of dc machines.
2. Write down any two applications of dc shunt motor and dc series motor.
3. What are the factors on which the speed of a dc motor depends?
4. Why Swinburne's test cannot be performed on dc series machine?
5. What type of load should be connected to a transformer for getting maximum voltage regulation and for negative voltage regulation?
6. While connecting transformers in parallel, what factors must be taken into consideration?

PART-B

4 × 12 = 48M

1. a) Define commutation. Explain the process of commutation in dc generators with neat sketches. (6M)
b) An 8 pole lap wound armature rotated at 350rpm is required to generate 260V. The useful flux per pole is about 0.05Wb. If the armature has 120 slots, calculate a suitable number of conductors per slot and also determine the value of flux required to generate the same voltage if it is rotated at 600 rpm. (6M)
2. a) Explain the speed-current, torque-current and speed-torque characteristics of a dc shunt motor. (6M)
b) Determine (i) total torque developed (ii) the useful torque of a 250V, 4-pole series motor with 782 conductors wave connected developing 8KW and taking 40A with a flux per pole of 25mWb. The resistance of the motor is 0.75Ω. (6M)
3. a) A 440V shunt motor while running at 1500rpm takes an armature current of 30A and delivers an output of 15hp, the load torque varies as the square of speed. Calculate the value of resistance to be connected in series with the armature for reducing the motor speed to 1300rpm. (6M)
b) Explain the working of a 4 point starter. (6M)

4. Describe Swinburne's test with the help of a neat diagram to find out the efficiency of a dc machine. What are the advantages and disadvantages of this test? (12M)
5. a) Draw and explain the phasor diagram of a practical transformer on load. Consider a lagging load. (6M)
- b) The primary and secondary windings of a 500kVA, single phase transformer have resistances of 0.4Ω and 0.0015Ω respectively. The primary and secondary voltages are 6000V and 400V respectively and the iron losses are 3.2KW. Calculate the efficiency on full load. (6M)
6. a) Explain the procedure for conducting OC test on a single phase transformer. (6M)
- b) An auto transformer supplies a load of 5KW at 125V and at upf. If the primary voltage is 250V, determine (a) transformation ratio (b) secondary current (c) primary current (d) number of turns across secondary if the total number of turns is 250 (e) power transformed (f) power conducted directly from the supply mains to load. (6M)
