D 48866　　　　　　　　(Pages : 2)　　　　　Name..................................

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FOURTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, JUNE 2008

EE 04 405—ELECTRICAL MACHINES—I

(2004 admissions)

Time : Three Hours　　　　　　　　　　　　　　　　　　　　Maximum : 80 Marks

Answer all *questions.*

Part A

I. (a) Classify the motor winding and give their significance.

　(b) Explain the principle of operation of d.c. machines.

　(c) Draw and explain the magnetisation characteristics.

　(d) List the types of d.c. generators and given the applications.

　(e) Write short notes on back e.m.f.

　(f) An eight-pole lap-connected armature runs at 750 r.p.m. It has 800 conductors and flux/pole of 60 mWb. Calculate the e.m.f. generated.

　(g) Draw and explain the phasor diagram of a 1ϕ transformer.

　(h) Define and explain all day efficiency.

$$(8 \times 5 = 40 \text{ marks})$$

Part B

II. (a) Explain the constructional details of a D.C. machines with the help of a neat diagram.

(15 marks)

Or

　(b) Explain about armature reaction and derive the expression demagnetising and cross magnetising ampere turns.

(15 marks)

III. (a) State the condition for parallel operation of two generators and explain.　　(15 marks)

Or

　(b) Explain the electrical characteristics of a d.c. generators with relevant experiment procedure.

(15 marks)

IV. (a) List the types of d.c. motor starters and explain with sketch the operation of a 3-point starter.

(15 marks)

Or

　(b) (i) Explain the various control methods of d.c. shunt motors and compare the methods.

(8 marks)

Turn over

(ii) Determine the torque developed when a current of a 30 A passes through armature of a motor with the following particulars :

Lap winding, 310 conductors, 4-pole, pole-shoes 16.2 cm long subtending an angle of 60° at the centre bore radius 16.2 cm, flux density in air gap 0.7 tesla.

(7 marks)

V. (a) Explain how the equivalent circuit of 1 φ transformer parameters are obtained with neat sketch.

(15 marks)

Or

(b) (i) Explain the operation and advantages of 1 φ Autotransformer. (8 marks)

(ii) A 100 kVA transformer having a percentage impedance of $(1 + j 4)$ and a 500 kVA transformer having a percentage impedance of $(2 + j 6)$ are connected in parallel. The no load secondary voltage of each transformer is 550 V. Find the load shared by each transformer and its power factor, if the total load is 750 kVA at 0.8 power factor lagging.

(7 marks)

[4 × 15 = 60 marks]