

C 6069

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Name.....

Reg. No.....

**FOURTH SEMESTER B.TECH. (ENGINEERING) DEGREE  
EXAMINATION, JUNE 2010**

**EE 04 405—ELECTRICAL MACHINES—I**

(2004 Admissions)

Time : Three Hours

Maximum : 100 Marks

*Answer all questions.*

**Part A**

- I. (a) What do you mean by armature reaction and explain the effect of armature reaction in d.c. machines ?  
(b) List the types of generators and their application.  
(c) Explain the working principle of d.c. generators.  
(d) Draw and explain the magnetization characteristics.  
(e) Write short notes on counter e.m.f.  
(f) Explain speed control of d.c. motors.  
(g) List different types of connections of three-phase transformer.  
(h) Define and explain the all day efficiency.

(8 × 5 = 40 marks)

**Part B**

- II. (a) Explain the construction and working principle of d.c. generator with neat sketches. (15 marks)

*Or*

- (b) (i) Explain with the help of neat sketches the phenomenon of commutation in d.c. machines. (8 marks)  
(ii) State and discuss the methods adopted for minimising the sparking at the brushes. (7 marks)

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

*Or*

- (b) Explain the electrical characteristics of a dc generators with relevant experimental procedure. (15 marks)

**Turn over**

- IV. (a) List the types of d.c. motor starters and explain with sketch the operation of a 4 point starter. (15 marks)

Or

- (b) (i) Explain the various methods employed for controlling the speed of dc series motor with relevant diagram. (8 marks)

- (ii) A 200 V d.c. series motor runs at 800 r.p.m. when taking a line current of 15 A. The armature resistance and series field resistance are  $0.6 \Omega$  and  $0.4 \Omega$  respectively. Find the speed at which it will run when connected in series with a  $5 \Omega$  resistance and taking the same current at the same voltage. (7 marks)

- V. (a) Explain how the equivalent circuit of 14 transformer parameters are obtained with a neat sketch. (15 marks)

Or

- (b) (i) Explain the operation and advantages of 14 Auto transformer. (8 marks)
- (ii) A 100 kVA transformer having a percentage impedance of  $(1 + j4)$  and a 500 kVA transformer having a percentage impedance of  $(2 + j6)$  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 p.f. lagging. (7 marks)

[4 × 15 = 60 marks]