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3E1145
B. Tech. III - Sem. (Main) Exam., Dec. - 2018
PCC Electrical & Electronics Engineering
3EX4 – 07 Electrical Machine - I
EE, EX

Time: 3 Hours **Maximum Marks: 120**

Instructions to Candidates:

Attempt all ten questions from Part A, selecting five questions from Part B and four questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

PART – A

(Answer should be given up to 25 words only) **[10×2=20]**

All questions are compulsory

Q.1 What is mmf and flux?

Q.2 State Bio-Savart law.

Q.3 What is the importance of electromagnet in machine?

Q.4 What is working principle of DC motor?

Q.5 Explain the B-H curve of magnetic materials.

Q.6 Enumerate the advantages and disadvantages of armature voltage control method.

Q.7 Enumerate various losses in d.c. machines.

Q.8 Explain the working of commutator in d.c. machine.

Q.9 What is autotransformer and its applications?

Q.10 What is harmonics in transformer?

PART – B

(Analytical/Problem solving questions) **[5×8=40]**

Attempt any five questions

Q.1 Enumerate the influence of highly permeable material on the magnetic flux lines.

Q.2 Discuss the energy stored in the magnetic circuit.

Q.3 Explain the basic construction of D.C. machine with relevant diagram.

Q.4 Find the active and reactive components of no load current, and the no load current of a 440/220 V single phase transformer if the power input to the high voltage winding is 80 w. The low voltage winding is kept open. The power factor of the no load current is 0.3 lagging.

Q.5 Describe the operation of single phase transformer, explaining clearly the functions of the different parts. Why are the core laminated?

Q.6 Draw and explain torque-speed characteristics of dc series motor.

Q.7 Enumerate the comparison of autotransformer with two winding transformers.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[4×15=60]**

Attempt any four questions

Q.1 Discuss the visualization of magnetic fields produced by a bar magnet and a current carrying coil through air and through a combination of iron and air.

Q.2 Compare linear and non-linear magnetic circuit and also discuss the flux linkage versus current characteristics of magnetic circuits.

Q.3 What is armature reaction? Describe the effect of armature reaction on the operation of dc machines. How the armature reaction is minimized.

Q.4 Draw and explain speed-current, torque-current and speed-torque characteristics of dc shunt motor.

Q.5 Draw the complete phasor diagram of an ideal transformer on load when load power factor is lagging and derive the emf equation of transformer.
