

EX-503

B.E. V Semester

Examination, December 2014

Electrical Machine - II

Time: Three Hours

Maximum Marks: 70

- Note: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.
ii) All parts of each question are to be attempted at one place.
iii) All questions carry equal marks, out of which part A and B (Max.50 words) carry 2 marks, part C (Max. 100 words) carry 3 marks, part D (Max.400 words) carry 7 marks.
iv) Except numericals, Derivation, Design and Drawing etc.

UNIT-I

1. a) What are the advantages and uses of lap and wave windings?
b) What do you mean by armature reaction in DC machine?
c) Enumerate the methods used for improving commutation and explain any one of them.
b) Distinguish between internal and external characteristics of DC generator. How can the internal characteristic be derived from the external characteristic of DC generators.

OR

Describe the constructional features and principle of working of a DC generator.

UNIT-II

2. a) Why is a starter necessary for DC motor?
b) Name the losses of a DC machine and classify them into
i) Constant and
ii) Variable losses.
c) Draw the characteristic curves of DC machines. Use these curves to explain the applications for which these motors are used.
d) The armature and field resistances of a 250V DC shunt motor are 0.5Ω and 250Ω respectively. When driving a load of constant torque at 600 rpm the armature current is 20A. If it is desired to raise the speed from 600 to 800 rpm. What resistance should be inserted in the shunt field?

OR

What is Hopkinson's test and why is it called regenerative test? Draw connection diagram to conduct this test.

UNIT-III

- 3 a) Why alternators are rated in KVA and not in KW.
b) What is the effect of armature reaction on the voltage regulation of an alternator?
c) Explain the causes of harmonics in the voltage wave of the alternator.

Or

d) Explain the two reaction theory pertaining to a salient pole synchronous machine and show how it can be used to predetermine the regulation of alternators.

OR

An 8-pole, 500 KVA, 3-phase, star connected alternator is connected to 3.3 KV, 50 Hz bus-bar. Its effective resistance is 0.7Ω per phase and its synchronous reactance is 6.53Ω per phase. Calculate the synchronizing power and torque per mechanical degree of displacement when the alternator is operating on full load at 0.8 p.f. lagging.

UNIT-V

5. a) Explain the principle of operation of synchronous motor.

b) State the characteristic features of synchronous motor.

c) How the synchronous motor is made self starting?

d) Explain the phenomena of hunting in synchronous motors and the methods adopted to minimize the effect of hunting.

OR

Write a short note on a single phase reluctance motor and repulsion motor.