Registration No : | | | | | | | | | | |

Total Number of Pages : 02 **B.Tech**

PCEE4203

4th Semester Back Examination 2018-19

ELECTRICAL MACHINE-I

BRANCH : EEE,ELECTRICAL

Time : 3 Hours

Max Marks : 70

Q.CODE : F718

Answer Question No.1 which is compulsory and any FIVE from the rest.

The figures in the right hand margin indicate marks.

Q1 **Answer the following questions :** **(2 x 10)**

a) What is armature reaction?

b) What are function of brushes and commutator in D.C. generator?

c) What is the function of interpoles and how are interpole windings connected.

d) Explain how copper loss affected by power factor.

e) Compare the parallel paths in the lap and wave winding in D.C. generator.

f) What are the advantages of Hopkinson's test over swinburn's test and what are it's limits.

g) Explain the significance of the critical field resistance of a shunt generator.

h) What are the major drawbacks of a three phase induction motor?

i) Sketch the Phasor diagram of a transformer under no load condition.

j) What is meant by voltage regulation of a transformer?

Q2 **a)** Discuss the method of speed control of a D.C. series motor. **(5)**

b) Sketch the speed-torque characteristics of a D.C. shunt motor and explain. **(5)**

Q3 **a)** Explain about polarity test of a single phase transformer with a neat sketch. **(5)**

b) The maximum flux density in the core of a 250/3000 volts, 50 Hz single phase transformer is 1.2 wb/m^2. If the emf per turn is 8 volt, determine **(5)**

a. primary and secondary turns.

b. area of the core.

Q4 **a)** Sketch the torque/slip curve of a three phase induction motor and explain. **(5)**

b) A 4-pole ,three phase induction motor operates from a supply whose frequency is 50 Hz. Calculate: **(5)**

a. The speed at which the magnetic field of the stator is rotating.

b. The speed of the rotor when the slip is 0.04.

c. The frequency of the rotor currents when the slip is 0.03.

d. The frequency of the rotor current at standstill.

Q5 **a)** A 100 KW, 240V shunt generator has a field resistance of 55Ω and armature resistance of 0.067Ω .Find the full load generated voltage. **(5)**

b) A single phase transformer has 400 primary and 1000 secondary turns. The net cross- sectional area of the core is $60cm^2$. If the primary winding be connected to a 50Hz supply at 520 volt, calculate **(5)**
a. the peak value of flux density in the core
b. the voltage induced in the secondary winding.

Q6 Derive the rotor torque of an induction motor under running condition and show the condition for maximum torque. **(10)**

Q7 With a neat sketch discuss about Open circuit and short circuit test of a single phase transformer. **(10)**

Q8 **Write short answer on any TWO :** **(5 x 2)**

a) Crawling effect of induction motor
b) Starting of induction motor.
c) Losses of D.C. motor.