NARSIMHA REDDY ENGINEERING COLLEGE
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INTRODUCTION TO ELECTRICAL ENGINEERING

Worksheet - 4

Unit 4: Electrical Machines

Choose the correct answer

1. In a DC motor, the back EMF (electromotive force) opposes
   (a) Input voltage (b)Armature current (c)Magnetic flux (d)Rotor speed
2. In a DC generator, the commutator acts as a
   (a) Mechanical rectifier to convert AC to DC
   (b) Regulator for output voltage
   (c) Generator for alternating EMF
   (d) Device to reduce copper losses
3. Which of the following is the correct formula for the frequency (f) of the generated EMF in a synchronous generator
   (a) f=P*N/120 (b) f=P*N/60 (c)f=P/120N (d)f=N/60
4. An induction motor can be considered analogous to a
   (a) Synchronous motor (b) Transformer (c) DC motor (d) Universal motor
5. Which of the following is a type of DC motor where the armature winding is connected in parallel with the field winding
   (a) Series motor (b)Compound motor (c)shunt motor (d)Synchronous motor
6. The electromagnetic torque in a rotating electrical machine is present when:
   (a) Stator winding alone carries current
   (b) Rotor winding alone carries current
   (c) Both stator and rotor windings carry current
   (d) The air gap is uniform
7. Which of the following is a characteristic of a synchronous motor?
   (a) It can operate at any speed depending on the load
   (b) It always operates at synchronous speed
   (c) It has high starting torque
   (d) It is self-starting
8. Which of the following is the primary advantage of a 3-phase induction motor?
   (a) Higher starting torque
   (b) Smooth operation with less vibration
   (c) High efficiency
   (d) Simple construction and low cost

9. Which of the following is true about the slip in an induction motor?
   (a) It is always zero at synchronous speed
   (b) It is negative during motoring mode
   (c) It increases as the load increases
   (d) It is independent of load
10. What is the primary function of the stator in a synchronous machine?
   (a) To generate the magnetic field
   (b) To provide mechanical power
   (c) To act as a conductor for the current
   (d) To control the speed of the rotor

Fill in the blanks

1. A 4-pole wave connected DC generator has 360 conductors and is rotated at 1000 rpm, if the useful flux per pole is 30 mWb then the generated voltage is _____.
2. The back emf equation of the dc motor is given by Eb = _____.
3. For a dc series motor the starting torque is _____
4. The induction motor slip is usually expressed as (s) = _____.
5. In three phase machines the phase voltages are phase displaced by _____.
6. An induction generator is basically an induction motor, which runs above the _____speed.
7. The 3-phase induction motor with rotor circuit open is considered as _____
8. _____synchronous generator is used in thermal power stations.
9. _____ synchronous generator is used in hydro electric power plants.
10. In a three phase slip ring induction motor, brushes are connected to _____