SEAT No._____ No. of Printed Pages : 02

[411]

SARDAR PATEL UNIVERSITY V.V.NAGAR
B.Sc.(III[rd] SEM.) INSTRUMENTATION (V)
2[nd] DECEMBER-2019 EXAMINATION
SUBJECT- ELECTRICAL INSTRUMENT AND POWER ELECTRONICS-I
SUB.CODE-US03CINV21

TIME: 2:00 pm to 5:00 pm **MARKS-70**

Q-1 Choose correct answer. [10]

1. The magnitude of the induced emf is equal to the rate of change of_____.
   (A) flux (C) hysteresis
   (B) flux linkage (D) None of above
2. The difference between the synchronous speed and actual speed of an induction motor is known as_____.
   (A) split (C) shaft torque
   (B) slip (D) None of above
3. _____ is to facilitate collection of current from the armature conductor.
   (A) Yoke (C) Slip
   (B) Commutator (D) None of above
4. _____ Winding is used for LOW voltage and HIGH current in machine
   (A) Wave (C) pole coil
   (B) Lap (D) None of above
5. ____is a machine which converts mechanical energy in to electrical energy.
   (A) Transformer (C) Generator
   (B) Motor (D) None of above
6. _____ Connection is most economical for small, high voltage transformer.
   (A) Star/ Star (C) Why/Delta
   (B) Delta/Delta (D) None of above
7. Motor efficiency is given by the ratio of _____ developed by the armature to its input.
   (A) Current (C) Power
   (B) Voltage (D) None of above
8. The stator of a 3- phase induction motor has 3 slots per pole per phase and supply frequency is 50 Hz, number of stator poles is____ and total number of slots on stator is_____.
   (A) 6,54 (C) 6,60
   (B) 13,26 (D) None of above
9. Which of the following losses varies with load in transformer?
   (A) copper loss (C) iron core
   (B) ferrite loss (D) None of above
10. On what factors the speed of dc motor depends?
    (A) Applied voltage (C) armature current
    (B) field flux (D) All of above

Q-2 **Short answer type question. (Any Ten)** [20]

1. Briefly explain split ring of D.C generator.
2. List magnetic hysteresis application.
3. Derive an expression voltage equation of a DC Motor.

4. Briefly explain general principle of induction motor.
5. Briefly principle of working three phase transformer.
6. List different types speed control of induction motor from rotor side.
7. List advantage and disadvantage of AC induction motor.
8. List different methods of speed control induction motor.
9. Briefly pole shoes and pole core.
10. Briefly explain significant of back emf.
11. Briefly explain total losses in D.C generator.
12. Briefly explain voltage transformation ratio of a transformer.

Q.3(A) State faraday's laws of electromagnetic induction and explain it in detail. [05]

Q.3(B) Discuss magnetic hysteresis with necessary figure. [05]

OR

Q.3 Explain principle of working and construction transformer and core type transformer in detail. [10]

Q.4 List practical loop generator parts and explain it in detail with necessary. [10]

OR

Q.4(A) Explain simple loop generator with necessary figure. [07]

Q.4(B) A four-pole generator having lap wound armature winding has 51 slots, each slot containing 20 conductors. What will be the voltage generated in the machine when driven at 1500 rpm assuming the flux per pole to be 7.0 mWb [03]

Q.5(A) Derive an expression for speed of series and shunt connected D.C Motor. [06]

Q.5(B) A 220 V d.c shunt motor runs at 500 rpm when the armature current is 50 A. calculate the speed if torque is doubled. [04]

OR

Q.5(A) Derive an equation for armature Torque with series and shunt connected DC motor. [06]

Q.5(B) Write a short note on shaft Torque. [04]

Q.6(A) Write a short note on stroboscopic method for finding the slip of an induction motor. [06]

Q.6(B) The stator of 3-phase induction motor has 4 slots per pole per phase. If supply frequency if 50 Hz, calculate (a) Number of stator poles produced (b)Speed of rotating stator flux. [04]

OR

Q.6(A) Draw two phase supply production of rotating field in AC induction motor and explain it. [06]

Q.6(B) Explain Rotor rheostat control for speed control of induction motor. [04]

—X—