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Seat No : \_\_\_\_\_

No. of Printed Pages : 2

**SARDAR PATEL UNIVERSITY V.V.NAGAR****B.Sc.(III<sup>rd</sup> SEM.) INSTRUMENTATION (V)****22<sup>th</sup> NOVEMBER-2019 EXAMINATION(NC)****SUBJECT- ELECTRICAL INSTRUMENT AND POWER ELECTRONICS-I****SUB.CODE-US03CINV01****TIME: 2:00 pm to 5:00 pm****MARKS-70**

Q-1 Choose correct answer.

[10]

1. \_\_\_\_\_ Connection is most economical for small, high voltage transformer.  
 (A) Star/ Star (C) Why/Delta  
 (B) Delta/Delta (D) None of above
2. The alloyed sheet steel material is used for \_\_\_\_\_.  
 (A) armature (C) both (A) & (B)  
 (B) transformer (D) None of above
3. \_\_\_\_\_ is facilitate collection of current from armature conductor .  
 (A) Yoke (C) Armature  
 (B) Commutator (D) None of above
4. \_\_\_\_\_ Winding is used for high voltage and low current in machine  
 (A) Wave (C) pole coil  
 (B) Lap (D) None of above
5. The gross mechanical power developed by a motor is maximum when back emf is equal to \_\_\_\_ applied voltage.  
 (A) full (C) double  
 (B) half (D) None of above
6. \_\_\_\_\_ is machine which converts electrical energy to mechanical energy.  
 (A) Motor (C) power supply  
 (B) Generator (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. An induction motor works on \_\_\_\_\_.  
 (A) DC only (C) both (A) and (B)  
 (B) AC only (D) None of above
9. Which type of Core coil mainly used in Transformer ?  
 (A) Iron (C) Ferrite  
 (B) Air (D) None of above
10. The magnitude of the induced emf is equal to the rate of change of \_\_\_\_\_.  
 (A) flux linkage (C) flux  
 (B) voltage (D) None of above

Q-2 Short answer type question. (any ten)

[20]

1. Write a principle of working transformer and briefly explain it.
2. Briefly explain total losses in D.C generator.
3. List advantage and disadvantage of AC induction motor.

4. List magnetic hysteresis application.
  5. Briefly explain wave winding.
  6. Briefly explain general principle of induction motor.
  7. Briefly explain speed regulation.
  8. Briefly explain slip used in induction motor.
  9. Briefly pole shoes and pole core.
  10. Briefly explain significant of back emf.
  11. Differentiate core and shell type transformer.
  12. A 220-v DC machine has an armature resistance of 0.5 ohm. If full load armature current is 20A, find induced emf when machine acts as motor.
- Q.3(A) State faraday's laws of electromagnetic induction and explain it in detail. [06]
- Q.3(B) Discuss magnetic hysteresis with necessary figure. [04]
- OR
- Q.3(A) Explain core type transformer with necessary figure. [06]
- Q.3(B) Explain elementary theory of an ideal transformer. [04]
- Q.4 List practical loop generator parts and explain it in detail. [10]
- OR
- Q.4(A) Explain simple loop generator in detail with necessary figure [10]
- 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, series and shunt connected motor. [06]
- Q.5(B) A dc motor takes an armature current of 110 A at 480 V. The armature circuit resistance is 0.2 ohm. The machine has 6 poles and the armature is lap-connected with 864 conductors. The flux per pole is 0.05 Wb, Calculate (a) speed (b) gross torque developed by the armature. [04]
- Q.6(A) Draw two phase supply production of rotating field in AC induction motor and explain it. [06]
- Q.6(B) Explain changing the number of stator pole control from stator side. [04]
- OR
- Q.6(A) Write a short note on stroboscopic method for finding the slip of an induction motor. [06]
- Q.6(B) Explain cascade operation for speed control of induction motor. [04]

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