No. of Printed Pages : 2

SEAT No._____

[35]

SARDAR PATEL UNIVERSITY
T.Y.B.Sc. Examination, FIFTH Semester
Thursday, 1st November 2018
Time : 10.00 am To 1.00 pm
Instrumentation Course Code : US05CINS05
Course Title : Industrial Electronics - 1

Total Marks : 70

Q-1 Write answers to the following multiple choice questions in your answer book by selecting the proper option. **[10]**

(1) The principal of working of transformer is
(a)Faraday's law (b)Lenz's law
(c)mutual inductance (d)self inductance

(2) If the windings surround a considerable part of the core the transformer is called
(a) shell type (b) oil-filled (c) core-type (d) air-tight

(3) At no loads and light loads, the leakage fluxes are
(a) zero (b) unity (c) negligible (d) maximum

(4) The hysteresis loss W_h is directly proportional to
(a) f (b) f^2 (c) f^{-1} (d) f^{-2}

(5) In a simple loop dc generator the rectifying action is performed by ____
(a) end rings (b) slip rings (c) split rings (d) wound rings

(6) Under which of the following conditions the output mechanical power of a dc motor will be maximum?
(a) $E_b = V$ (b) $E_b = V/3$ (c) $E_b = V/2$ (d) $E_b = V/4$

(7) For a series dc motor
(a) $\Phi \propto R_a$ (b) $\Phi \propto I_a$ (c) $\Phi \propto E_b$ (d) Φ = constant

(8) An induction motor is also called as a rotating ____.
(a) transformer (b) transistor (c) capacitor (d) inductor

(9) If the frequencies of stator and rotor currents are f and f' respectively, then f' =___.
(a) sf (b) s/f (c) s-f (d) s+f

(10) The quantity (N_s – N) is called ___ speed.
(a) actual (b) virtual (c) sleep (d) split

Q-2 Answer the following questions in brief. (Answer any Ten Questions) **[20]**

(1) Discuss the theory of an ideal transformer in brief.
(2) Write a short note on voltage-transformation ratio.
(3) Discuss the general principle of operation of a dc motor.
(4) Write a note on significance of back emf.
(5) Derive the condition for obtaining the maximum mechanical power output for a dc motor.
(6) Write a short note on mechanical losses in a dc generator.
(7) Enlist the applications of series dc motors.
(8) Write a short note on speed regulation.
(9) Enlist the various characteristics curves of dc motors.
(10) State the disadvantages of induction motors.

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(11) Provide the classification of ac motors with regards to their principle of operation.

(12) State the advantages of induction motors.

Q-3 With the help of necessary circuit diagrams, discuss the procedure for obtaining a single-line equivalent circuit of a transformer. [10]

OR

Q-3 (a) Write a note on emf equations of a transformer. [5]

(b) Derive the formula for the equivalent resistance of a transformer. [5]

Q-4 (a) With the help of necessary diagrams compare the generator and motor actions in detail. [5]

(b) Write a note on emf equations of a transformer. [5]

OR

Q-4 (a) Write a detailed note on armature torque of a dc motor. [5]

(b) Give a detailed account of the total losses in a dc generator. [5]

Q-5 (a) Discuss the different types of characteristics of a series dc motor in detail. [5]

(b) Write a detailed note on the applications of dc motor. [5]

OR

Q-5 (a) Discuss the different types of characteristics of a shunt dc motor in detail. [5]

(b) Derive the expression for the speed of a dc motor. [5]

Q-6 (a) In case of a two-phase induction motor, explain how the rotating magnetic field is generated by its stator windings. [5]

(b) Explain the construction and working of a squirrel-cage induction motor in detail. [5]

OR

Q-6 (a) In case of a three-phase induction motor, explain how the rotating magnetic field is generated by its stator windings. [5]

(b) Explain the construction and working of a phase-wound induction motor in detail. [5]

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