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Question Paper Code: 53323

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2019

Third Semester

Mechanical Engineering

15UEE323 - ELECTRICAL MACHINES

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The starting torque developed in the d.c. series motor and in d.c. shunt motor is CO1- R
(a) High, low (b) High, moderate (c) Moderate, low (d) Moderate, high
2. Which of the following rule is used to determine the direction of rotation of D.C motor? CO1- R
(a) Coulomb's Law (b) Lenz's Law
(c) Fleming's Right-hand Rule (d) Fleming's Left-hand Rule
3. For maximum efficiency in a transformer CO2- R
(a) Core losses = 2 * copper losses (b) Core losses = copper losses / 2
(c) Core losses = copper losses (d) Core losses = copper losses ^ 2
4. In performing the short circuit test of a transformer CO2- R
(a) High voltage side is usually short circuited (b) Low voltage is usually short circuited
(c) Any side is short circuited with preference (d) None of the above
5. In induction motor, greater the number of poles CO3- R
(a) Lesser the speed (b) Greater the speed
(c) Lesser the frequency (d) All of these

6. An autotransformer starter is suitable for CO3- R
 (a) Star connected induction motor (b) Delta connected induction motor
 (c) Both (a) & (b) (d) None of these
7. Alternator works on the principle of CO4- R
 (a) Self and mutual induction (b) Self induction
 (c) Faraday's law of electromagnetic induction (d) Mutual induction
8. With increase in load, the speed of synchronous motor CO4- R
 (a) Increases (b) Decreases
 (c) Remains constant (d) None of the above
9. An unexcited single phase synchronous motor is CO5- R
 (a) Reluctance motor (b) Repulsion motor (c) Universal motor (d) AC series motor
10. In washing machines, most commonly used motors are CO5- R
 (a) Split phase induction motors (b) Slip ring induction motors
 (c) Capacitor start induction motors (d) Shaded pole induction motors

PART – B (5 x 2= 10Marks)

11. Define Back emf in a D.C. Motor? CO1- R
12. List out the merits and demerits of core and shell type transformer. CO2- R
13. State the advantages of skewing. CO3- R
14. Define voltage regulation CO4- R
15. Differentiate between "Capacitor start" and "Capacitor start capacitor run" induction motors. CO5- R

PART – C (5 x 16= 80Marks)

16. (a) With neat diagram explain the principle of operation of a DC Machine. Also Obtain the expression for the EMF Equation of a DC Generator. CO1- App (16)
- Or
- (b) A 230V DC shunt motor on no-load runs at a speed of 1200rpm and it draw a current of 4.5A The armature and shunt field resistances are 0.3Ω and 230Ω respectively. Calculate the back emf induced and speed, when loaded and drawing a current of 36A. CO1-App (16)

17. (a) Draw and explain the phasor diagram of transformer when it is operating under load. CO2- U (16)
- Or
- (b) Explain the construction, working principle and operation of a transformer. And also Derive its emf equation. CO2- U (16)
18. (a) Derive an expression for the torque of an induction motor and torque-slip characteristics and obtain the condition for maximum torque. CO3- U (16)
- Or
- (b) Explain the operation of auto- transformer starter and star-delta starter of three phase induction motor with a neat diagram. CO3- U (16)
19. (a) Describe the construction and working of an alternator. CO4- U (16)
- Or
- (b) Explain starting methods of synchronous motor with its necessary diagram. CO4-U (16)
20. (a) Give the classifications of single phase induction motors .Explain any one type of single phase induction motors. CO5-U (16)
- Or
- (b) Explain the construction and working principle of BLDC motor CO6- U (16)

