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**Reg. No. :**

**Question Paper Code: 43030**

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2017

Third Semester

Electronics and Communication Engineering

14UEE323 - ELECTRICAL MACHINES

(Common to Instrumentation and Control Engineering and Mechanical Engineering)

(Regulation 2014)

Duration: Threehours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. A carrier of 100W is modulated to the depth of 50% .The total transmitted power is

(a) 112.5W (b) 125W(c) 150 W (d) 100W

2. EMF induced in a coil rotating in a uniform magnetic field will be maximum when the

(a)Flux linking with the coil is maximum (b)Rate of change of flux linkage is minimum (c)Rate of change of flux linkage is maximum (d) Rate of cutting flux by the coil sides is minimum

3. Transformer are rated in KVA instead of KW because of

(a) Load power factor is not known (b) KVA is fixed whereas KW depends on load power factor

(c) Total transformer loss depends on VA (d) None of these

4. Full-load voltage regulation of a power transformer is zero when power factor of the load is near

(a)Unity and leading  (b) Zero and leading  (c) Zero and lagging (d) Unity and lagging

5. Which one of the following statements is correct in respect of an induction motor?

(a)The maximum torque will depend on rotor resistance (b)Although the maximum torque does not depend on rotor resistance, yet the speed at which maximum torque is produced depends on rotor resistance (c)The maximum torque will not depend on standstill rotor reactance (d) The slip of induction motor decreases as rotor increases

6. In an induction motor, what is the ratio of copper loss and rotor input?

(a) S (b) (1 - S) (c) 1/S (d) S/(1 - S)

7. What is the frequency of a alternator, if P = number of poles and N = revolution made

per second?

(a) PN / 2 Hz (b) 120 / PN Hz (c) 120N / P Hz (d) 120P / N Hz

8. What is the distribution factor for a 108 slot, 12 pole, 3-*Φ* winding?

(a) 0.88 (b) 0.96 (c) 0.92 (d) 1

9. The electric motor used in domestic mixers is

(a) Universal motor (b) Shaded pole motor

(c) Capacitor starts motor (d) Hysteresis motor

10. The motor which can produce uniform torque from standstill to synchronous speeds is

(a)Universal motor (b)Stepper motor (c)Reluctance motor (d) Hysteresis motor

PART - B (5 x 2 = 10 Marks)

11. Why dc series motor should never be started on no load?

12. Define all day efficiency.

13. Define slip of a three phase induction motor.

14. Mention the reasons if a 3-phase synchronous motor fails to start.

15. Which type of 1-phase induction motor would be used for Ceiling fan and Wet grinder?

PART - C (5 x 16 = 80 Marks)

16. (a) Draw the performance characteristics of different types of dc generators and explain them briefly. (16)

Or

(b) (i) Derive the torque equation of the DC motor. (8)

(ii) What is back EMF and explain the significance of Back EMF. (8)

17. (a) Derive the EMF equation of a transformer. (16)

Or

(b) Draw the equivalent circuit of a transformer and derive the components with respect toprimary and secondary side. (16)

18. (a) (i) Derive the torque equation of a three phase induction motor. (8)

(ii) Derive the equation for torque at running condition and the condition for maximum torque. (8)

Or

(b) Draw the exact equivalent circuit of a 3-phase induction motor. State the difference between the exact and approximate equivalents? Discuss. From the approximate equivalent circuit, find the rotor output, output power and output torque. Also find the slip at maximum torque. (16)

19. (a) Explain the constructional details of three phase alternator with neat sketch. (16)

Or

(b) (i) Discuss about the various starting methods of synchronous motor. (8)

(ii) Explain the procedure to obtain the V and inverted V curves of a synchronous motor.

(8)

20. (a) Draw the constructional diagram of the stepper motor. Explain its different modes of working. (16) Or

(b) Describe the constructional features and working of ‘variable-reluctance type’ stepper motors. (16)