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**Question Paper Code: 53038**

B.E. / B.Tech. DEGREE EXAMINATION, JAN 2018

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)

- In a d.c. generator, the effect of armature reaction on the main pole flux is to  
(a) reduce it      (b) distort it      (c) reverse it      (d) both (a) and (b)
- The speed of a d.c. motor can be controlled by varying  
(a) its flux per pole      (b) resistance of armature circuit  
(c) applied voltage      (d) All the above
- A transformer transforms  
(a) frequency      (b) voltage  
(c) Current      (d) Voltage and current
- A transformer having 1000 primary turns is connected to a 250 volts a.c. supply. For a secondary voltage of 400 volts, the number of secondary turns should be  
(a) 1600      (b) 250      (c) 400      (d) 1250
- In a three phase induction motor, the rotor field rotates at synchronous speed with respect to  
(a) Stator      (b) Rotor      (c) Stator flux      (d) None of these

6. The effect of increasing the air gap length in an induction motor will be to increase the
- (a) Power factor (b) Speed  
(c) Magnetizing current (d) Air gap flux
7. The frequency of voltage generated by an alternator having 4 poles and rotating at 1800 r.p.m. is \_\_\_\_\_ Hz.
- (a) 60 (b) 7200 (c) 120 (d) 450
8. The angle between synchronously rotating stator flux and rotor poles of a synchronous motor is called \_\_\_\_\_ angle.
- (a) Synchronizing (b) Torque (c) Power factor (d) Slip
9. A universal motor is one which
- (a) is available universally  
(b) can be marketed internationally  
(c) can be operated either on d.c. and a.c. supply  
(d) runs at dangerous high speed on no load
10. If the starting winding of the single phase induction motor is left in the circuit, it will
- (a) draw excessive current and overheat (b) run slower  
(c) run faster (d) spark at light loads

PART - B (5 x 2 = 10 Marks)

11. What is the function of a commutator in d.c generator?
12. Why transformer is rated in KVA?
13. Define slip.
14. What is the purpose of damper winding in synchronous motor?
15. Why single phase induction motor is not self-starting?

PART - C (5 x 16 = 80 Marks)

16. (a) Explain the construction and working principle of d.c generator with relevant diagrams. (16)

Or

- (b) Explain the characteristics of d.c. series, shunt and compound motors. (16)

17. (a) Derive the emf equation of transformer and draw the phasor diagrams for resistive, inductive and capacitive loads and explain the diagram. (16)

Or

- (b) Explain the four types of three phase transformer connections with suitable diagrams. (16)
18. (a) Derive the torque equation of a squirrel cage induction motor under starting and running and running conditions and deduce the condition for maximum torque. (16)

Or

- (b) Explain the methods of starting squirrel cage induction motors with suitable diagrams. (16)
19. (a) Explain the armature reaction of an alternators for lagging, leading and unity power factors with suitable diagrams. (16)

Or

- (b) Write short notes on (i) Hunting (ii) Starting method of synchronous motor (iii) Applications of synchronous motor. (16)
20. (a) Explain the types of capacitor start single phase induction motors. (16)

Or

- (b) Write short notes on (i) Switched reluctance motor (ii) Hybrid stepper motor. (16)
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