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**Question Paper Code: 51339**

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2016

Third Semester

Electronics and Instrumentation Engineering

15UEE326 - ELECTRICAL TECHNOLOGY

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

- Laminations of core are generally made of
  - cast iron
  - carbon
  - silicon steel
  - stainless steel
- The material for commutator brushes is generally made of
  - Mica
  - Copper
  - Cast iron
  - Carbon
- A shunt DC motor works on AC mains
  - unsatisfactorily
  - satisfactorily
  - not at all
  - none of these
- In a DC motor, unidirectional torque is produced with the help of
  - brushes
  - commutator
  - end-plates
  - both (a) & (b)
- The slip speed of an induction motor depends upon
  - Armature current
  - Supply voltage
  - Mechanical load
  - Eddy currents

6. The starting torque of a simple squirrel-cage motor is
- (a) low
  - (b) increases as rotor current rises
  - (c) decreases as rotor current rises
  - (d) high
7. The power factor of an alternator depends on
- (a) load
  - (b) speed of rotor
  - (c) core losses
  - (d) armature losses
8. Synchronous motor can operate at
- (a) lagging power factor only
  - (b) leading power factor only
  - (c) unity power factor only
  - (d) lagging, leading and unity power factor only
9. The starting torque of a capacitor start motor is
- (a) zero
  - (b) low
  - (c) same as rated torque
  - (d) more than rated torque
10. The speed of a universal motor can be controlled by
- (a) introducing a variable resistance in series with the motor
  - (b) tapping the field at various points
  - (c) centrifugal mechanisms
  - (d) any of the above

PART - B (5 x 2 = 10 Marks)

11. Give the applications of DC shunt and series motor.
12. Define voltage regulation of transformer.
13. State the condition for three phase induction motor to attain its maximum torque.
14. What is meant by hunting?
15. Give the comparison between permanent magnet synchronous motor and switched reluctance motor.

PART - C (5 x 16 = 80 Marks)

16. (a) Explain the constructional details and principle of DC generator. (16)

Or

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

(ii) Explain in detail about compound motor electrical and mechanical characteristics. (8)

17. (a) (i) Derive the EMF equation of single phase transformer. (8)

(ii) Explain in detail about phasor diagram of single phase transformer on resistive, inductive and capacitive load conditions. (8)

Or

(b) A 4 kVA, 200/400 V, 50 Hz, single phase transformer has equivalent resistance referred to primary as 0.15  $\Omega$ . Calculate,

(i) The total copper loss on full load

(ii) The efficiency while supplying full load at 0.9 p.f. lagging

(iii) The efficiency while supplying full load at 0.8 p.f. leading

Assume total iron loss equal to 60 W. (16)

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

(ii) Explain in detail about equivalent circuit of three phase induction motor. (8)

Or

(b) Classify different types of three phase induction motor starters and explain in detail following three phase induction motor starters

(i) Stator resistance starter (8)

(ii) Autotransformer starter (8)

19. (a) Explain the principle of operation and constructional details of alternators with neat sketch. (16)

Or

(b) (i) Write a short note on V curve of synchronous motor. (8)

(ii) Write a short note on starting methods of synchronous motor. (8)

20. (a) Explain the operation and characteristics of single phase capacitor start capacitor run motors. State its applications. (16)

Or

(b) Explain the principle of operation and constructional details of switched reluctance motor. (16)

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