Register Number: .....

B.E DEGREE EXAMINATIONS: OCTOBER/NOVEMBER - 2008

Third semester

ELECTRONICS AND COMMUNICATION ENGINEERING

U07EC301: Electrical Machines And Power System

Time: Three hours **Maximum Marks: 100**

Answer ALL Questions: -

PART A (20x1=20 Marks)

1. The direction of induced EMF in a DC generator is given by the
   a. Fleming's left hand rule b. Fleming's right hand rule
   c. Lenz law d. Faraday's law

2. ---------- has a very high starting torque.
   a. DC shunt motor b. DC series motor
   c. DC differentially compound motor d. DC cumulative compound motor

3. The voltage equation of a DC motor is
   a. $V = E_b + I_a R_a$ b. $V = E_g + I_a R_a$
   c. $E_b = V + I_a R_a$ d. $V = E_b - I_a R_a$

4. A DC series motor must not be started on no load because it would
   a. not develop starting torque
   b. b. fail to start without load
   c. run at dangerously high speed
   d. draw more current without producing sufficient torque

5. The EMF induced in a secondary of a transformer is
   a. directly proportional to the no. of turns in primary
   b. directly proportional to the no. of turns in secondary
   c. dependent on the rate of change of flux
   d. all the above

6. The high voltage winding of a transformer has
   a. larger no. of turns b. lesser no. of turns
   c. larger conductor cross-sectional area d. smaller conductor cross-sectional area

7. The open circuit test is conducted on a transformer
   a. to find out iron loss b. to find out copper loss
   c. to find the equivalent circuit parameter values d. to calculate the voltage regulation

8. A transformer transforms
   a. frequency b. voltage
   c. current d. voltage and current

9. The rotor bars in squirrel cage induction motors usually skewed for
   a. eliminating cogging b. preventing crawling
   c. improving starting torque d. both a) and b)

10. A4 pole 50HZ induction motor runs atb1440 rpm on full load. The slip speed is
a. 60 rpm b. 1500 rpm c. 1440 rpm d. 120 rpm

11. The rotor frequency of induction motor, when rotor is locked is
a. more than frequency of supply b. equal to zero
c. equal to supply frequency d. less than supply frequency

12. In an induction motor if the phase sequence of the applied voltage is changed
a. no back EMF will be developed in rotor b. no torque will be developed in rotor
b. speed will drop to zero d. direction of rotation of rotor will change

13. In a synchronous motor inverted 'V' curve represents the relation between
a. field current and power factor b. field current and armature current
b. armature current and power factor d. field current and induced EMF

14. An over excited alternator operates at
a. leading power factor b. lagging power factor
b. unity power factor d. none of the above

15. The frequency of the EMF generated in alternators is given by
a. PN/120 b. PN/60 c. PN d. 120P/N

16. Damper winding is provided in synchronous motors
a. to prevent hunting b. to make it self starting
c. both a) and b) d. to decrease armature reaction

17. The EHV system is one operating beyond
a. 11 KV b. 132 KV c. 200 KV d. 400 KV

18. The advantage of DC systems over AC systems is
a. improved line regulation b. no skin effect
c. no charging currents d. all of these

19. Pin insulators are normally used for voltages upto
a. 30 KV b. 50 KV c. 70 KVA d. 100KV

20. Insulation resistance of a cable decreases with
a. decrease in the length of the insulation of cable
b. increase in the length of the insulation of cable
c. increase in electric stress
d. increase in temperature

PART-B (5 x 16 = 80 Marks)

21. (a) (i) With a neat diagram, explain the construction and working principle of a DC generator. (8)

(ii) A long shunt compound generator delivers a load current of 100A at 600V. The resistor of armature, series and shunt fields are 0.5 Ohms, 0.1 Ohms and 300 Ohms respectively. The brush contact drop is 0.5V per brush. Calculate the generated EMF and the armature current. (8)

(OR)

21. (b) (i) With a neat diagram explain the operation of a three point starter used for a DC shunt motor. (10)

(ii) Derive the torque equation of a DC motor. (6)

22. (a) Draw the equivalent circuit of a single phase transformer and explain how the equivalent circuit parameter values are determined from the open circuit and short circuit test results. (16)

(OR)

22. (b) (i) Derive the EMF equation of a transformer. (6)

(ii) A single phase transformer has 1000 turns in the primary and 200 turns on the secondary. The no load current is 3A at a power factor of 0.2 lagging. Calculate the primary current and power factor when the secondary current is 280 A at a power factor of 0.8 lagging (10)

23. (a) (i) What is the constructional difference between cage rotor and wound rotor induction motors? Discuss their relative advantages and disadvantages.(10)

(ii) Draw and explain about the torque vs slip characteristics of a 3 phase induction motor (6)

(OR)

23. (b) Why single phase induction motors are not self starting? How they are made to self start? Explain the methods briefly. (16)

24. (a) Draw the equivalent circuit diagram and explain the procedural steps for E.M.F and M.M.F method for an alternator. (16)

(OR)

24. (b) (i) With suitable diagram explain the construction and principle of operation of a stepper motor. (10)

(ii) Explain why synchronous motors are not self-starting. (6)

25. (a) Draw and describe the structure of an electrical power system. (16)

(OR)

25. (b) (i) With neat diagrams describe different types of insulators. (8)

(ii) With the help of a neat diagram, explain about the construction of a cable. (8)

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