Register Number.....

B.E. DEGREE EXAMINATIONS: APRIL / MAY 2009

Third Semester

ELECTRICAL AND ELECTRONICS ENGINEERING

U07EE302 Electrical Machines I

Time: Three Hours **Maximum Marks: 100**

Answer ALL the Questions:-

PART A (20 x 1 = 20 Marks)

1. The function of a commutator in a d.c generator is
   a. to collect current from conductors.
   b. To change d.c to a.c
   c. To conduct current to the brushes
   d. To change a.c to d.c
2. Armature reaction is attributed to
   a. the effect of magnetic field setup by back emf
   b. the effect of magnetic field setup by field current
   c. the effect of magnetic field setup by armature current
   d. copper loss in the armature
3. For parallel operation the polarities of two generators
   a. must oppose each other
   b. must be same
   c. must attract each other
   d. may or may not be same
4. E.m.f of dc generator depends upon
   a. number of poles
   b. flux per pole
   c. number of conductors
   d. all of the above
5. The speed of a dc motor is
   a. directly proportional to back emf and inversely proportional to flux
   b. inversely proportional to back emf and directly proportional to flux
   c. directly proportional to emf as well as flux
   d. inversely proportional to emf as well as flux

6. Plugging of dc motor is normally executed by
   a. reversing the field polarity
   b. reversing the armature polarity
   c. reversing the both field polarity and armature polarity
   d. connecting the resistor across the armature
7. Maximum efficiency of the motor will occur when
   a. copper loss > iron loss
   b. copper loss < iron loss
   c. copper loss = friction loss
   d. copper loss = constant loss
8. Inter poles are meant for
   a. increasing the speed of the motor
   b. increasing counter emf
   c. strengthening the main field
   d. reducing sparking at the commutator
9. The mechanical losses ..... with speed
   a. decrease
   b. increase
   c. first decrease and then increase
   d. first increase and then decrease
10. A dc machine has maximum efficiency near
   a. half full-load
   b. full-load
   c. twice the full-load
   d. three fourth full-load
11. The most economical method of finding no-load losses of a large dc machine is ..... test
   a. retardation
   b. hopkinson's
   c. swinburne's
   d. load
12. In a dc machine maximum losses occur due to .....
   a. copper loss
   b. iron loss
   c. mechanical loss
   d. friction and windage loss
13. The primary and secondary of a transformer are ..... coupled
   a. electrically
   b. magnetically
   c. electrically and magnetically
   d. electrostatically
14. The voltage transformation ratio of transformer is given by
   a. N1/N2
   b. E1/E2
   c. N2/N1
   d. E2/E1

15. A transformer transfers electrical energy from primary to secondary usually with a change in

a. Frequency b. power c. voltage d. time period

16. The laminations of transformer are made from

a. silicon sheet steel b.nickel alloy steel stampings

c. low carbon steel d.chrome steel

17. Two transformers operating in parallel will share the load depending upon their

a. ratings b. leakage reactance

c. efficiency d. per unit impedance

18. For off-load tap changing the best method is to use

a. tap changers inside the tank operated by external selector switches

b. tap changers outside the tank operated by selector switches

c. tap changers inside the tank but with no selector switches

d. tap changers outside the tank operated by no selector switches

19. Eddy current loss in transformer depends upon

a. both voltage and frequency b. voltage alone

c. load current alone d. thickness of core

decrease

20. Which of the below statements is true about autotransformer

a. it has two windings

b. it has only one winding

c. it can only step down the voltage

d. it is most suitable for power transformation

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Part B (5 x 16 = 80 Marks)

21	i.	Describe with a neat diagram the constructional features of a DC machine	10
	ii.	Derive the emf equation of a DC generator	6

(OR)

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21	i.	Draw and describe the no load and load characteristics of different types of DC generators	10
	ii.	Describe briefly the armature reaction of a DC generator	6
22	i.	Draw and describe the load characteristics of different types of motors	10
	ii.	Derive the Torque equation of a DC motor	6

(OR)

22 i. Describe with a neat diagram the working of a 3 point starter

ii. Describe with a neat diagram the flux control method

23 i. What are the losses in a DC machine and how these losses can be minimized

ii. Describe with a neat diagram the Swinburn's test to predetermine the efficiency of a DC motor

(OR)

23 Describe with a neat diagram the Hopkinson's test to predetermine the efficiency of a dc machine as a motor and generator

24 i. Describe with a neat diagram the constructional features of a Single phase transformer

ii. Derive the emf equation of a single phase transformer

(OR)

24 i. Draw the phasor diagram of a single phase transformer on no load and load conditions

ii. Draw the equivalent circuit of a single phase transformer

25 Describe with neat diagrams the open circuit and short circuit test of a single phase transformer and how the efficiency of a transformer is determined by this method.

(OR)

25 i. Describe briefly the parallel operation of a single phase transformer

ii. Describe with a neat diagram the Sumner's test

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