ANNA UNVERSITY COIMBATORE

B.E / B.TECH DEGREE EXAMINATIONS : DECEMBER 2009

REGULATIONS : 2007

THIRD SEMESTER : ELECTRICAL & ELECTRONICS ENGG.

070280009 - DC MACHINES AND TRANSFORMERS

TIME: 3 Hours   Max.Marks : 100

PART- A

(20 x 2 = 40 MARKS)

ANSWER ALL QUESTIONS

1.   What is the purpose of interpoles in modern d.c machines?

2.   Write down the emf equation of d.c generator.

3.   Define: armature reaction

4.   What are the requirements to be considered for parallel operation of d.c generators?

5.   Define: back emf

6.   Write down the torque equation of d.c motor

7.   What is meant by flux control method?

8.   What are the applications of d.c motor?

9.   Define: leakage flux

10.   What are the different types of transformer?

11.   What is meant by eddy current loss?

12.   What is the condition for maximum efficiency of a transformer?

13.   What are the advantages of Swinburne's test?

14.   What is the use of short circuit test?

15.   What are the advantages of Hopkinson's test

16.   Define: All day efficiency

17.   List out the few examples for singly excited magnetic field systems.

18.   Define: Co-energy

19.   What is meant by electromechanical energy conversion?

20.   Define: Critical resistance.

PART - B

(5 x 12 = 60 MARKS)

ANSWER ANY FIVE QUESTIONS

21. (a)   Derive the emf equation of a d.c generator.   (6)

    (b)   A 50KW, 250 V shunt generator operates at 1500 rpm.The armature has 6 poles and is lap wound with 200 turns. Find the induced emf and the flux per   pole at full load given that the armature and field resistances are 0.01 and 125 ohms respectively.Neglect armature reaction.   (6)

22. (a)   Explain the different types of d.c generators.   (6)

    (b)   A dc shunt generator delivers 60KW at 240V and 960rpm.The armature and field resistances are 0.015 and 60ohm respectively. Calculate the speed of the machine running as a shunt motor and taking 60KW input at 240V.Allow 1 volt per brush for contact drop.   (6)

23. (a)   Explain the different types of characteristics of d.c motor.   (8)

    (b)   A dc motor connected to a 460V supply takes an armature current of 120A on full load. The armature circuit has a resistance of 0.25ohm.Calculate the value of the back emf at this load.   (4)

24. (a)   Draw the diagram of 3 point starter and explain.   (8)

    (b)   A 4pole dc motor is connected to a 500V dc supply and takes an armature
           current of 80A.The resistance of the armature circuit is 0.4ohm.The armature
           is wave connected with 522 conductors and useful flux per pole is
           0.025wb. Determine the speed of the motor.   (4)

25.   Explain the equivalent circuit of transformer.

26. (a)   A 6600/440V single phase 600KVA transformer has 1200 primary
           turns.Find:Transfromation ratio, Secondary turns,Voltage/turn,Secondary
           current when it supplies a load of 400kw at 0.8 power factor lagging.   (8)

    (b)   A 3300/220V, 30KVA single phase transformer takes a no load current of
           1.3A.The iron loss component is equal to 0.3A.Find No load input power,
           Magnetizing component, No load power factor.   (4)

27.   The Hopkinson's test on two similar d.c shunt machines gave the following
           results. Line voltage=220V, line current excluding field current=40A, the
           armature current of motoring machine=200A, Field current 6A and 7A,
           Armature resistance of each machine=0.05ohm, Calculate the efficiency of
           each of the machines at the given load conditions.

28.   Explain in detail the different types of excitation systems used.

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