**EE-6352 ELECTRICAL ENGINEERING & INSTRUMENTATION**

**Question Bank**

**UNIT-I**

**DC MACHINES**

**PART-A**

1. What is the purpose of yoke in a DC machine
2. The core of the armature is laminated in DC machines. Justify

3. What are types of armature windings available in DC machines?

4. What is the purpose of commutator in a DC generator?

5. Define back emf.

6. Why series motor cannot be started without any load.

7. How does a series motor develop high starting torque?

8. A 4 pole generator with wave wound armature has 51 slots each having 24 conductors. Flux per pole is 0.01 Weber. At that speed must be armature rotate to give an induced emf of 250v.What will be voltage developed, if the winding is lap connected and armature rotates at the same speed.

9. A 6 pole DC motor has 936 wave connected armature conductors. The useful flux per pole is 0.02 wb and Ra is 0.5Ω.Calculate

i) The speed and ii) the torque developed when its armature takes 35A at 400V.

10. Write down the speed equation of a DC motor

11. State the functions of interpoles.

12. What are the functions of brushes?

13. If speed is decreased in a DC motor, what happens to the back emf and armature current?

14. A dc motor operates from a 240v supply. The armature resistance is 0.2 ohm. Find the back emf when the armature current is 50A.

15. Give the applications of dc motors.

16. Mention the factors affecting the speed of dc motor.

17. Draw the characteristics of d.c compound motor.

18. Define speed regulation of dc motor.

19. State the voltage equation of a dc motor.

20. How to reverse the direction of a dc motor.

**PART-B (16 marks)**

1. Explain the construction features of a DC Machine
2. a. Explain the E.M.F Equation of the D.C Generator.

b. Explain the Principle of operation of a D.C Motor.

1. Sketch and Explain the load Characteristics of DC shunt and series Generators
2. Explain the Performance characteristics of a d.c Series Motor With the relevant derivations to justify their shape.
3. Explain the Performance characteristics of a d.c Shunt Motor With the relevant derivations to justify their shape.
4. Explain the Speed control Methods of D.C Shunt Motor.
5. Explain the Speed control Methods of D.C Series Motor.
6. A series motor has an armature resistance of 0.2Ω and a series field resistance of 0.3Ω. It is connected to a 240V supply and at a particular load runs at 24 rev/s when drawing 15A from the supply.

i). Determine the generated emf at this load.

ii). Calculate the speed of the motor when the load is changed such that the current is increased to 30A. Assume that this causes doubling of the flux.

9. a) A 250V, d.c shunt motor has armature resistance of 0.25Ω, on load it takes an armature current of 50A and runs at 750rpm. If the flux of motor is reduced by 10% without changing the load torque, find the new speed of the motor.

b) A dc shunt generator has a terminal Voltage of 160V and a no load induced emf of 168V. The resistance of armature and field are 0.03Ω and 20Ω. Find the field current, armature current, and load current. Neglect armature reaction.

10. Explain the torque equation of the D.C Motor.

**UNIT-II**

**TRANSFORMER**

**PART-A (2 marks)**

1.Define a Transformer.

2. What are turns ratio and transformation ratio of Transformer

3. Write the e.m.f equation of two winding transformer

4. .Classify the transformer according to the construction

5. What is step up transformer

6. A sinusoidal flux 0.02wb links with 55 turns of a transformers secondary coil.Calculatethrrms value of the induced emf in the secondary.The supply frequency is 50Hz.

7. A 230/115 V transformer takes a 0.05A at a powerfactor of 0.2 on open circuit.Find the magnetising and working components of no load primary current.

8. Give the principle of transformer

9. Define regulation of a transformer

10. .What are the losses in a transformer? How will you minimise them?

11. Define all -day efficiency and efficiency of a transformer?

12 What are the typical uses of auto transformer

13. Does the transformer draw any current when secondary is open

14. Why transformers are rated in kVA

15. Mention the advantages of auto transformer

16. State the functions of transformer oil.

17.Mention the function of breather in transformer.

18.Determine the optimum value of load resistancefor maximum power transfer if the load is connected to an amliffier of output resistance 150Ω through a transformer with a turns ratio 5:1

19.Draw the load characteristics of transformer for different types of load.

20. Why transformer is called constant flux machine**.**

**PART-B (16 MARKS)**

1. Discuss the construction,and principle of operation of a transformer in detail.
2. From first principles, derive the emf equation of a transformer. Also show that the voltage induced per turn is the same, whether it is primary or secondary .
3. Explain the behaviour of transformer on no load with phasor diagram.
4. Explain the behaviour of transformer on load with phasor diagram
5. Develop the equivalent circuit of a transformer.
6. .List the various losses in a transformer. How these losses can be minimized.(8)
7. A 1-ph transformer is rated at 10Kva50Hz.The secondary rated voltage is 240V and the turns ratio is 10.The resistance and leakage reactance as referred to primary are 8.4Ω and 13.7Ω.Find the voltage regulation at full load and power factors of 0.8 lagging,0.8 leading and unity.
8. A 400kva transformer has a primary winding resistance of 0.5Ω and a secondary winding resistance of 0.001Ω.The iron loss is 2.5KW aand the primaty and secondary voltages are 5kw and 320 V. If the power factor of the load is 0.85,determine the efficiency of the trandformer i) on full load, ii) on half load.
9. Explain the construction of autotransformer .Why VA rating of autotransformer is more than the corresponding two winding transformer.
10. The primary and secondary voltages of an autotransformer are 230 V and 75V .Calculate the currents in the different parts of the winding when load current is 200 A. Also calculate the saving of copper.