

**DC MACHINES AND TRANSFORMERS****(EEE)****Time: 3 hours****Max. Marks: 70***Answer any FIVE Questions**ONE Question from Each unit**All Questions Carry Equal Marks*

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- 1    a) Explain in detail the constructional details of DC generator. [7]  
      b) Explain about various excitation methods of DC generators. [7]  
              (OR)
- 2    a) Derive the EMF equation of DC Generator [7]  
      b) Explain briefly about the OCC characteristics of DC shunt generator [7]
- 3    a) Derive the expressions for torque developed in DC motors [7]  
      b) A 220V shunt motor delivering 15KW at 1000rpm takes armature current of 80A. [7]  
          The armature resistance is  $0.2\Omega$  and load torque is kept constant. If the flux is  
          increased by 18% of its normal value before speed changes, find the instantaneous  
          value of armature current and torque. Determine the final value of armature current  
          and speed  
                      (OR)
- 4    a) What is the necessity of starter? Explain the operation of 3-point starter with neat [7]  
          diagram  
      b) A Dc series motor having a resistance of  $0.2\Omega$  drives a fan for which torque varies [7]  
          as the square of the speed. At 220V, the drive runs at 370rpm taking 5A. How much  
          voltage need to be applied to raise the speed to 610rpm.
- 5    a) Explain the phenomenon of Hysteresis and eddy current losses [7]  
      b) Explain the speed control of DC motors by armature and field control method [7]  
              (OR)
- 6    a) Derive the EMF equation of Transformer [7]  
      b) Explain the principle of operation of Transformer on load and no-load conditions [7]  
          with neat phasor diagram
- 7    a) Explain briefly about the calculation of regulation of single-phase transformer [7]  
      b) A 100KVA transformer has 400turns on the primary and 80turns on the secondary. [7]  
          The primary and secondary resistances are  $0.3\Omega$  and  $0.01\Omega$  respectively and the  
          corresponding leakage reactance are 1.1 and  $0.035\Omega$  respectively. The supply  
          voltage is 220v Calculate (i) equivalent impedance referred to primary (ii) the  
          voltage regulation and the secondary terminal voltage for full load having a power  
          factor of 0.8 leading.

(OR)

- 8     a) Derive the efficiency of Transformer from OC and SC Test. [7]  
       b) Explain briefly about Sumpner's Test [7]
- 9     a) Explain the Y-Y connection of three phase transformer. What are the advantages and [7]  
         disadvantages of the connection  
       b) An industrial load of takes 100A at 0.8pf lag from three phase ,11000/400V,50HZ, [7]  
         Y-Δ transformer. Calculate the KVA supplied by the transformer and the input line  
         currents.

(OR)

- 10    a) Draw the Scott connection of transformers and mark the terminals and turn ratio. [7]  
         What are the applications of Scott connection?  
       b) Explain about Off-Load tap changing transformer with neat diagram [7]

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