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| **S NO** | **QUESTION** | **KNOWLEDGE**  **LEVEL** | **CO** |
| **UNIT I** | | | |
| 1a | List the advantages and disadvantages of carbon brushes. | K1 | CO1 |
| 1b | Classify the generators based on excitation. Draw the figure and Write the current, Voltage equation for each configuration | K2 | CO1 |
| 2a | Derive the torque equation of a D.C. motor. | K2 | CO1 |
| 2b | Calculate the value of torque established by the armature of a4-pole motor having 774 conductors, two paths in parallel, 24 m wb of flux per pole, when the total armature current is 50 A. | K3 | CO1 |
| 3a | Define : i) GNA ii) MNA | K1 | CO1 |
| 3b | Explain armature reaction with neat sketches | K2 | CO1 |
| **UNIT 2** | | | |
| 1a | Draw the following curves.   1. Torque VS Current, 2. Torque VS Speed of DC series motor. | K3 | CO2 |
| 1b | Explain OCC internal and external characteristics of D.C. shunt generator. | K2 | CO2 |
| 2 | Sketch the internal and external characteristics of D.C. shunt and series generator. What are their fields of application? | K3 | CO2 |
| 3a | Draw the power flow diagram and write about various efficiencies of D C generators. | K3 | CO1 |
| 3b | A shunt generator delivers 195 A at terminal p.d. of 250V.The armature resistance and shunt field resistance are 0.02 Ω and 50 Ω respectively. The iron and friction losses equal to 950 W. Find-   1. EMF generated; 2. Copper losses; 3. Output of prime mover; 4. Electrical efficiency; | K1 | CO2 |
| **UNIT 3** | | | |
| 1 | Explain the 3-point starter with help of neat diagram. What are the additional features incorporated in four-point starter? | K2 | CO2 |
| 2a | Write the starter required for starting a DC motor? | K6 | CO2 |
| 2b | Write the function of No Volt Coil (NVC) and Over Load Coil (OLC) in a3-point starter. What are the advantages and limitations of this starter on 4-point starter? | K6 | CO2 |
| 3a | Difference between 3-point starter and 4-point starters | K4 | CO2 |
| 3b | Draw the schematic diagram of 4-point starter and explain its working. | K3 | CO2 |
| **UNIT 4** | | | |
| 1a | Derive the conditions for maximum efficiency of a DC motor | K2 | CO3 |
| 1b | A 250 V, D.C. shunt motor takes 5A at no load. Its field resistance is 125 Ω and armature resistance 0.5 Ω. Calculate the KW output and efficiency when the motor takes 60A on full load. | K3 | CO3 |
| **2** | Compare swinburne’s Test and Hopkinson’s Test conducted on DC machine.List the advantages and limitations of both the method? | K2 | CO3 |
| **3** | The Hopkinson’s test on two similar dc shunt machines gave the following results.  Time voltage 220V  Time current excluding field current=40 A  Armature current of motoring machine=200 A  Field current of motoring machine=6 A  Field current of generating machine=7 A  Calculate the efficiency of each machine at the given load conditions. The armature resistance of each of each of the machines is 0.05Ω. | K3 | CO3 |
| **UNIT 5** | | | |
| 1a | Explain the constructional features of a transformer? | K2 | CO4 |
| 1b | Comparision of core and shell type transformer? | K2 | CO4 |
| 2a | Derive the EMF equation of a transformer? | K2 | CO4 |
| 2b | Draw the phasor diagram of a transformer? | K3 | CO4 |
| 3 | List the various type test and routine test that are to be performed on transformers as per Indian standards? | K1 | CO4 |
| **UNIT 6** | | | |
| 1a | State the factors for separation of D and L cylindrical rotor machine? | K1 | CO4 |
| 1b | Explain any one cooling technique in transformer design. | K4 | CO4 |
| 2a | Draw and Derive the output equation of single phase transformer? | K3 | CO4 |
| 2b | Analyze the key concepts in designing a transformer. | K4 | CO4 |
| 3 | Derive the output equation of a dc machine? What is meant by specific electrical & magnetic loading? state the factors affecting the choice of SEL&SML | K2 | CO4 |