



**SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR**

Siddharth Nagar, Narayanavanam Road – 517583

**QUESTION BANK (DESCRIPTIVE)**

**Subject with Code :** EMT(15A01301)

**Course & Branch:** B.Tech-CE

**Year & Sem:** II-B.Tech & I-Sem

**Regulation:** R15

**UNIT –II**

**DC Machines**

1. a) From fundamentals, derive the EMF equation of a DC generator.[L4] 5M  
b) Derive the torque equation of a DC motor.[L4] 5M
2. Explain the constructional details of DC generator.[L2] 10M
3. a) Explain the principle of operation of DC motor.[L2] 5M  
b) Calculate the emf generated by a 4 pole wave wound armature having 45 slots with 18 conductors per slot. When driven at 1200 rpm the flux per pole is 0.016Wb.[L3] 5M
4. Explain the classification of DC generator?[L2] 10M
5. Explain the principle operation of DC generator?[L2] 10M
6. Explain magnetization characteristics of a DC shunt generator?[L2] 10M
7. a) Explain in detail what are the losses in DC motor?[L1,L2] 5M  
b) A dynamo has a rated armature current at 250A. What is the current per path of the armature if the armature winding is lap or wave connected? The machine has 12 poles.[L3] 5M
8. Explain speed control of DC shunt motor?[L2] 10M
9. The resistance of the field circuit of a shunt wound dc generator is 200Ω. When the output of the generator is 100KW, the terminal voltage is 500V and the generated emf is 525V. Calculate (a) the armature resistance (b) the value of the generated emf when the output is 60KW, with a terminal voltage of 520V.[L3] 10M
10. a) State Fleming's left hand rule?[L1] 2M  
b) State the function of commutator and brushes?[L1] 2M  
c) State Fleming's right hand rule?[L1] 2M  
d) Write terminal voltage equation for dc shunt generator?[L1] 2M  
e) What is the reason emf is called back emf in case of dc motors?[L1] 2M

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**QUESTION BANK (OBJECTIVE)**

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**UNIT – II**  
**DC Machines**

1. Iron losses in a D.C. machine are independent of variations in [      ]  
 A) Voltage                      B) Current                      C) Load                      D) Speed
2. The resistance of armature winding depends on [      ]  
 A) length of conductor                      B) cross-sectional area of the conductor  
 C) number of conductors                      D) all of the above
3. The field coils of D.C. generator are usually made of [      ]  
 A) mica                      B) copper                      C) cast iron                      D) carbon
4. In case of D.C. machines, mechanical losses are primary function of [      ]  
 A) current                      B) voltage                      C) speed                      D) none of above
5. A separately excited generator as compared to a self-excited generator [      ]  
 A) is amenable to better voltage control                      B) has exciting current independent of load current  
 C) is more stable                      D) has all above features
6. The D.C. Generator works on the principle of [      ]  
 A) Flemings left hand rule                      B) Ampere's law  
 C) Lenz's law                      D) Faradays laws of Electromagnetic induction
7. The load current and field current of a DC shunt generator are 50A and 5A respectively.  
 It's armature current is [      ]  
 A) 50A                      B) 55A                      C) 45A                      D) 40A
8. Residual magnetism is essential in the field electromagnets for building up of voltage

- of all types of d.c generators except [     ]
- A) shunt                      B) compound                      C) series                      D) separately excited
9. The purpose of commutator in a d.c. generator is to [     ]
- A) reduce sparking at brushes                      B) provide smoother output
- C) convert the induced a.c. into d.c.                      D) increase output voltage
10. For short shunt compound generator, which of the following equation is correct? [     ]
- A)  $I_A = I_{SH} + I_L$                       B)  $I_L = I_A + I_{SH}$
- C)  $I_A = I_{SE}$                       D) All
11. The induced emf in the armature of d.c generator is [     ]
- A) Statically induced emf                      B) Dynamically induced emf
- C) Self induced emf                      D) None
12. For a given d.c generator, the magnitude of generated voltage depends on [     ]
- A) Flux only                      B) Speed only                      C) No. of poles only                      D) All
13. A 200V DC Generator has a shunt field resistance of 200ohms. Its field current is [     ]
- A) 1A                      B) 2A                      C) 3A                      D) 4A
14. The current relation in dc series generator is [     ]
- A)  $I_{se} = I_a + I_L$                       B)  $I_L = I_{se} - I_a$                       C)  $I_a = I_L$                       D) All
15. Magnetic field in a D.C generator is produced by [     ]
- A) Electro magnets                      B) Permanent magnets
- C) both (a) and (b)                      D) None
16. The O.C. Characteristics of a D.C. generator gives the relation between [     ]
- A) V and  $I_L$                       B) E and  $I_a$                       C)  $E_o$  and  $I_f$                       D) V and  $I_f$
17. In cumulative compound D.C. generator the total flux  $\Phi_T$  [     ]
- A)  $\Phi_{Sh} + \Phi_{Se}$                       B)  $\Phi_{Sh} - \Phi_{Se}$                       C)  $\Phi_{Sh} = \Phi_{Se}$                       D) none
18. In Differential compound D.C. generator the total flux  $\Phi_T$  [     ]
- A)  $\Phi_{Sh} + \Phi_{Se}$                       B)  $\Phi_{Sh} - \Phi_{Se}$                       C)  $\Phi_{Sh} = \Phi_{Se}$                       D) none
19. Brushes in D.C machines are made of [     ]

- A) Carbon                      B) Soft Copper                      C) Hard Copper                      D) all the above
20. The current relation in dc compound generator is [       ]
- A)  $I_a = I_{sh} + I_L$                       B)  $I_a = I_{sh}$                       C)  $I_a = I_L$                       D)  $I_a = 0$
21. For short shunt compound motor, which of the following equation is correct? [       ]
- A)  $I_A = I_{SH} - I_L$                       B)  $I_L = I_A + I_{SH}$   
 C)  $I_A = I_{SE}$                       D) All
22. Which motor should not be started on no-load [       ]
- A) differentially compound motor                      B) shunt motor  
 C) cumulatively compound motor                      D) series motor
23. A D.C.Motor is a machine that converts [       ]
- A) Electrical energy into Mechanical energy. B) Mechanical energy into Mechanical energy.  
 C) Electrical energy into Electrical energy. D) Mechanical energy into Electrical energy.
24. The load current and field current of a DC shunt motor are 40A and 4A respectively.  
 Its armature current is [       ]
- A) 44A                      B) 1A                      C) 36A                      D) 40A
25. In a d.c series motor the field winding is connected to the armature in [       ]
- A) Series                      B) Parallel                      C) both A & B                      D) none of the above
26. The EMF generated in a D.C. Motor is called as [       ]
- A) Back emf                      B) Generated emf                      C) both A & B                      D) None
27. The current relation in dc Series Motor is [       ]
- A)  $I_{se} = I_a + I_l$                       B)  $I_l = I_{se} - I_a$                       C)  $I_a = I_l = I_{se}$                       D) All
28. The condition for maximum power in case of dc motor is [       ]
- A)  $\text{backemf} = 2 * \text{supply voltage}$                       B)  $\text{back emf} = 1/2 * \text{supply voltage}$   
 C) Both mF                      D) None
29. Which rule/law is used to determine the direction of rotation of dc motor [       ]
- A) Flemings left hand rule                      B) Ampere's law  
 C) Lenz's law                      D) Faradays laws

30. Which of the following is a electrical machine [     ]  
A) Motor                      B) Generator                      C) Both                      D) None
31. The D.C.Motor works on the principle of [     ]  
A) Flemings left hand rule                      B) Ampere's law  
C) Lenz's law                      D) Faradays laws of electromagnetic induction
32. A 100V DC Motor has a shunt field resistance of 100ohms. Its field current is [     ]  
A) 1A                      B) 2A                      C) 3A                      D) 4A
33. The current relation in dc compound Motor is [     ]  
A)  $I_{sh} = I_a + I_f$                       B)  $I_{sh} = I_f - I_a$   
C) lags behind the current by  $90^\circ$                       D) leads the current by  $90^\circ$
34. The current drawn by a 120V D.C. motor of  $R_a$   $0.5\Omega$  and back emf 110V is [     ]  
A) 20A                      B) 240A                      C) 220A                      D) 5A
35. The shaft torque of a D.C. motor is less than the armature torque because of \_\_losses [     ]  
A) copper                      B) mechanical                      C) iron                      D) rotational
36. In D.C. shunt motor the electromagnetic torque developed is directly proportional to [     ]  
A)  $1/I_a^2$                       B)  $1/I_a$                       C)  $I_a^2$                       D)  $I_a$
37. In D.C. series motor the electromagnetic torque developed is directly proportional to [     ]  
A)  $1/I_a^2$                       B)  $1/I_a$                       C)  $I_a^2$                       D)  $I_a$
38. The speed of a D.C motor is directly proportional to [     ]  
A)  $E_b * \phi$                       B)  $E_b^2$                       C)  $E_b/\phi$                       D) None
39. The \_\_\_\_\_ torque which is used to do the useful work [     ]  
A) shaft torque                      B) Loss torque                      C) armature torque                      D) none
40. The purpose of commutator in a d.c.Motor is to [     ]  
A) convert the induced d.c. into a.c                      B) reduce sparking at brushes  
C) provide smoother output                      D) increase output voltage

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