R15/R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, March - 2021
ELECTRICAL MACHINES –I
(R15 - Electrical and Electronics Engineering;
R13 - Electrical and Electronics Engineering)

Time: 3 hours   **Max. Marks: 75**

Answer any five questions
All questions carry equal marks
- - -

1.a)   Derive an expression for magnetic force and co energy in a single excited system.
  b)   What is energy balance? Give its significance.   [8+7]

2.a)   Give constructional details of a dc machine. State functions of each part and materials used.
  b)   What is armature reaction? What are its effects on output voltage of generator?   [8+7]

3.a)   What is commutation? What are the causes for failure of commutation?
  b)   A 6 pole wave wound connected 220V D.C. shunt motor has 400 armature conductors. It takes 40A on full load. The flux per pole is 0.06 webers. The armature and field resistances are 0.08Ω and 220Ω respectively. Neglect the voltage drops at the brushes. Calculate the speed of motor at full load.   [8+7]

4.a)   What are the causes for failure of voltage to built up by a D.C. Shunt Generator?
  b)   What is critical speed and critical resistance? Give its significance.   [8+7]

5.a)   Give a brief classification of D.C.Generators based on excitation methods.
  b)   Explain the necessity of parallel operation of D.C.Generators. Give conditions necessary for parallel operation.   [8+7]

6.a)   Explain the significance of back EMF in a D.C. Motor.
  b)   List the sequence of power flow for a D.C. Motor.   [8+7]

7.a)   List the various modes of controlling the speed of a D.C. Series Motor.
  b)   Explain the necessity of a starter in starting the motor.   [8+7]

8.a)   Derive condition for maximum efficiency in a D.C. Generators.
  b)   Explain the method of testing D.C. Motor by indirect method.   [8+7]

---ooOoo---