

G 1577

(Pages : 2)

Reg. No.....

Name.....

**B.TECH. DEGREE EXAMINATION, MAY 2016**

**Fourth Semester**

Branch : Automobile / Mechanical / Production Engineering

AU 010 406 / ME 010 406 / PE 010 406 – ELECTRICAL TECHNOLOGY [AU, ME, PE]

(New Scheme – 2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours

Maximum : 100 Marks

**Part A**

*Answer all questions.*

*Each question carries 3 marks.*

1. Define critical field resistance and critical speed.
2. What is the necessity of starter for DC Motor?
3. How starting torque is increased in slip ring induction motor?
4. Draw and explain the mechanical characteristics of DC series motor.
5. Mention the application of Dielectric heating.

(5 × 3 = 15 marks)

**Part B**

*Answer all questions.*

*Each question carries 5 marks.*

6. Explain the reasons for voltage drop in shunt generator when loaded.
7. Explain Swinburne's Test in DC Machines.
8. Explain the types of rotor construction in Alternator.
9. Discuss the factors that affect the choice of motor for a particular application.
10. Explain the types of power diodes.

(5 × 5 = 25 marks)

**Part C**

*Answer all questions.*

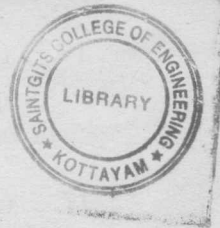
*Each full question carries 12 marks.*

11. (a) Explain the load characteristics of DC series generator.  
(b) A shunt generator has FL current of 196 A at 220 V. The armature and shunt field resistances are 0.15 Ω and 55 Ω respectively. The stray losses are 1000 W. Calculate the FL efficiency.

(6 + 6 = 12 marks)

Or

**Turn over**



12. (a) Derive the condition for maximum efficiency in DC generator.  
 (b) A short shunt compound generator has armature, series and shunt field resistances of  $0.15 \Omega$ ,  $0.1 \Omega$  and  $110 \Omega$  respectively. It supplies a load of 4 kW at 250 V. Find the generated e.m.f. if the contact drop/brush is 1 V.

(6 + 6 = 12 marks)

13. (a) Draw and explain the equivalent circuit of transformer.  
 (b) A 25 KVA, 2000/200 V single-phase transformer has iron and full load copper losses of 400 W and 500 W respectively. Calculate :  
 (i) Efficiency at 80% full load, 0.9 pf.  
 (ii) Primary and secondary FL currents.



(6 + 6 = 12 marks)

Or

14. (a) Explain the various methods of cooling of transformers.  
 (b) SC test results of a 20 KVA, 2200/220 V, 1  $\phi$  transformer is 86 V, 10.5 A, 360 W on HV side. Calculate the % Regulation at FL, 0.8 pf leading.

(6 + 6 = 12 marks)

15. (a) Derive the EMF equation of Alternator.  
 (b) Explain why synchronous motor is not self starting and the methods of starting.

(6 + 6 = 12 marks)

Or

16. (a) Draw and explain the Torque slip characteristics of 3-phase induction motor.  
 (b) Discuss different types of single-phase motors and their applications.

(6 + 6 = 12 marks)

17. (a) Explain individual and group drive with example.  
 (b) Explain Regenerative braking.

(8 + 4 = 12 marks)

Or

18. (a) Discuss the advantages of electric traction and what are the different systems for track electrification.  
 (b) Explain Plugging.

(8 + 4 = 12 marks)

19. Explain the principle of operation and two transistor analogy of SCR.

Or

20. With block schematic, explain Resistance welding scheme.

[5  $\times$  12 = 60 marks]