



B.E./B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, APRIL/MAY 2011

ELECTRICAL AND ELECTRONICS ENGINEERING

SEMESTER VIII – (REGULATIONS 2004)

EE481– UTILIZATION AND CONSERVATION OF ELECTRICAL ENERGY

Time:3 hrs

Max Marks:100

Answer ALL Questions

Part A – (10×2=20)

1. What is a multimotor drive? Mention any one application
2. Choose one motor for an application where quick speed reversal is the main consideration
3. State the requirements of an ideal traction system
4. Explain the term adhesive weight
5. Define luminous flux and give its unit
6. Name any one energy efficient lamp
7. Which method is used for heating of insulators?
8. What is resistance welding?
9. State the importance of high load factor
10. What is meant by energy auditing?

Part B – (5×16=80)

11. (i) Describe various methods of electric braking used for braking of DC shunt motor. (8)
- (ii) A 500V, 45 kW, 600 rpm DC shunt motor has a full load efficiency of 90%. The field resistance is 200 ohms and armature resistance is 0.2 ohm. Find the speed under each of the following conditions at which will develop an electromagnetic torque equal to rated value: regenerative braking with no limiting resistance, plugging with insertion of external limiting resistance 5.5 ohm and dynamic braking with insertion of external limiting resistance 2.6 ohm. The field current is maintained constant and armature reaction and the brush drop may be neglected. (8)
12. a. (i) Explain the typical speed time curve for electric trains operating on passenger services. (8)
- (ii) A train runs between two stations 1.6 km apart at an average speed of 36 km/h. If the maximum speed is limited to be 72 km/h, acceleration to 2.7 km/h/s, coasting retardation to 0.18 km/h/s and braking retardation to 3.2 km/h/s, compute the duration of acceleration, coasting and braking periods. Assume a simplified quadrilateral speed time curve. (8)

OR

- b. (i) What type of series-parallel transition is used for suburban trains? Give reasons. (8)
- (ii) Two motors of a motor coach are started on series-parallel system, the current per motor being 350A (considered as being constant) during the starting period which is 18 sec. If the acceleration during starting period is uniform, the line voltage is 600V and resistance of each motor is 0.1 ohm, calculate the time during which the motors are operated in series and the energy loss in the rheostat during starting period. (8)

13. a.(i) Prove that in a filament lamp the diameter of the filament is directly proportional to $I^{2/3}$, where I is the current flowing in the element. (8)

(ii) Explain the construction and operation of a fluorescent tube and compare it with tungsten filament lamp. (8)

OR

b. With suitable sketches, describe various types of lighting schemes. (16)

14.a. With suitable sketches, describe various types of high frequency heating. Compare their merits and demerits. (16)

OR

b. Describe in detail about electric arc welding. Draw suitable diagrams also. (16)

15.a. Describe the desirable characteristics and various types of tariff. (16)

OR

b. (i) Explain the disadvantages of low power factor. (6)

(ii) Discuss various methods for power factor improvement (10)