R10

Set No: 1

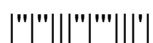III B.Tech. II Semester Regular Examinations, April/May -2013
UTILIZATION OF ELECTRICAL ENERGY
(Electrical and Electronics Engineering)

Time: 3 Hours   Max Marks: 75

Answer any FIVE Questions
All Questions carry equal marks
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1. (a) What is an electric drive? What are its advantages?
   (b) The rotor resistance at standstill condition of a three-phase four-pole 440V induction motor are 0.7 ohm and 0.9 ohm, respectively per phase. Calculate the starting current, and when the speed is 1460 rpm, the frequency of the supply is 50 c/s.   [8+7]

2. (a) Explain the Principle of dielectric heating and applications.
   (b) Describe the core-type induction furnace with a neat sketch and state its applications.   [7+8]

3. (a) Explain the following:
   (i) Resistance welding
   (ii) Arc welding
   (b) Enlist the advantages of AC arc welding machines.   [4+4+7]

4. Define the following :
   (a) Luminous intensity,
   (b) Intensity of illumination,
   (c) Coefficient utilization,
   (d) Depreciation factor.   [4+4+4+3]

5. (a) Make a neat sketch of fluorescent lamp and explain its working?
   (b) A machine shop 20m ×10m is to have an illumination of 120 lux on working plane. The lamps are mounted 4m above the working plane. Give the layout of a suitable installation: Using 60watt fluorescent lamps. Assume suitable data?   [7+8]

6. With the help of Speed-Time curve, Define and explain the following factors in a traction system:
   (a) Free running period
   (b) Accelerating period
   (c) Notching period
   (d) Coasting period   [3+4+4+4]

7. A train is to run between two stations 1.6km apart at an average speed of 60kmph, the run is to be made to a quadrilateral N-T curve. Maximum speed is to be limited to 62 kmph, acceleration, to 2 kmphps, coasting retardation to 0.17, braking retardation to 3.4, find the duration of a
   (a) Acceleration   (b) Coasting   (c) Braking periods.   [5+5+5]

8. (a) What is meant by demand response? Explain briefly.
   (b) Explain energy efficiency techniques in demand side management.   [7+8]

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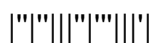(Electrical and Electronics Engineering)

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1. (a) Compare a group of drive and individual drive.
   (b) State the characteristics of various loads.   [8+7]

2. (a) Explain the advantages and applications of dielectric heating.
   (b) The power required for dielectric heating of a slab of resin 140sq cm in area and 3 cm thick is 300 watts at a frequency of 40 MHZ. The material has relative permittivity of 6and a p.f 0.04. Determine the voltage necessary and current owing through the material. If the voltage is limited to 600V. What will be the value of the frequency to obtain the same heating?   [7+8]

3. (a) Explain the flowing
   (i) Seam welding   (ii) Butt welding
   (b) Discuss the features of DC arc welding.   [4+4+7]

4. Define
   (a) Solid angle   (b) Glare   (c) Lambert cosine law   (d) Point-by-point method.
                                                                                       [4+4+3+4]

5. (a) Describe with a neat sketch the principle of operation of a fluorescent lamp. Mention the function of each component.
   (b) A machine shop 30m ×10m is to have an illumination of 160 lux on working plane. The lamps are mounted 4m above the working plane. Give the layout of a suitable installation: Using 70watt fluorescent lamps. Assume suitable data?   [7+8]

6. (a)Explain briefly the tractive effort required, while the train is moving up the gradient and down the gradient.
   (b) An electric train weighing 440 tonnes has to maintain an average speed of 50km/hr between two stations 3 km apart on an incline of 1 in 100. The train accelerates at 4km/hr/sec and retards at 6km/hr/sec. The tractive resistance is 6 kg/tonne and the allowance for rotational inertia is 15%. Assuming a trapezoidal speed-time curve, find the energy consumption for the run, while going up the gradient. The overall efficiency be taken as 60%.   [5+10]

7. What is coefficient of adhesion? How the value of coefficient of adhesion affects the slipping and skidding of the driving wheels of traction unit?   [15]

8. Explain the following categories of demand-side management.
   (a) Conservation voltage reduction.
   (b) Demand response
   (c) Real time pricing.   [5+5+5]
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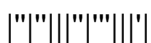(Electrical and Electronics Engineering)

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1. (a) What do you understand by load equalization?   [7+8]
   (b) For selecting a drive, what are the various factors to be taken into account?

2. (a) Describe the causes of heating elements and their protection.   [7+8]
   (b) Six resistances of 40 ohm each are used in resistance heating furnace. How much power is drawn at the supply voltage of 400V single-phase, when the resistances are arranged in two parallel groups, each group having three resistances in series?

3. (a) Write short notes on the following: [4+4+7]
   (i) Welding transformer characteristics
   (ii) Advantages of coated electrodes in welding process
   (b) Describe the various methods of current flow control in welding transformers.

4. Calculate the brightness of the snow under an illumination of:
   (a) 33,000 lux
   (b) 0.44 lux. Assume that the snow behaves like a perfect diffuser having a reflection factor of 80%.   [7+8]

5. With reference to flood-lighting, Define the following:
   (a) Coefficient of utilization
   (b) Casing
   (c) Waste light factor
   (d) Depreciation factor.   [4+4+4+3]

6. Discuss various factors which are taken into account while deciding the change over from existing system of electrification to a new system of electrification.   [15]

7. Derive the relationship between acceleration, retardation, maximum speed, running time and distance between two stops assuming a trapezoidal Speed-Time curve.   [15]
   .
8. Explain the following categories of demand-side management.
   (a) Load control.
   (b) Voluntary.
   (c) Efficient applications.
   (d) Efficient buildings.   [4+4+4+3]
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1. (a) Explain the various factors that affect the final temperature rise of a motor on load.
   (b) The maximum torque of a 440V, three-phase four-pole 60c/s induction motor is 300 N.m at a slip of 0.3. If the motor works at 50 c/s, 400V supply, find the maximum torque, slip and the speed at which it occurs. Neglect stator   impedance.   [5+10]

2. (a) What are the different types of heating? Write advantages of electric heating.
   (b) A low frequency induction furnace whose secondary voltage is maintained constant at 12Volts takes 500Kw at 0.85p.f. When the heat of the charge and reactance remains constant, find the height up to which the hearth should be filled to obtain maximum heat.   [7+8]

3. (a) What are the various welding methods? And give an example of each type.
   (b) What do you mean by resistance welding? How does it differ from spot welding? And it's various applications.   [7+8]

4. Define
           (a) Mean spherical Candlepower
           (b) Mean horizontal Candlepower
           (c) Mean hemispherical Candlepower
           (d) (d) Luminous lux.   [4+4+4+3]

5. A 150c.p lamp is hung 2m above the centre of a circular area of 4 diameter. Determine the illumination at: [4+4+3+4]
   (a) The centre of the area
   (b) A point on the circumference of the area
   (c) Average illumination
   (d) Find also the average illumination, if a reflector of 60% efficiency is used.

6. Discuss the characteristic features of a traction motor for effective traction systems.
                                                                                     [15]

7. A goods train weighing 600 tonnes is to be hauled by a locomotive up a gradient of 1.7% with an acceleration of 1.5 kmphps. Coefficient of adhesion is 10%. Track resistance =60 W/Ton and effect of rotational masses is 8% of dead weight. If axle load is not to exceed by 25 tonnes, determine the weight of locomotive and number of axles.
                                                                                     [15]

8. Explain the following categories of demand-side management.
   (a) Automation.   (b) Real time pricing.
   (c) Load control.   (d) Conservation.   [4+4+4+3]
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