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Total No. of Questions : 09

B.Tech. (EE/EEE) (Sem.–6th)
ELECTRIC DRIVES AND UTILIZATION
Subject Code : EE-304
Paper ID : [A0420]

Time : 3 Hrs.   Max. Marks : 60

INSTRUCTION TO CANDIDATES :
1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students has to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students has to attempt any TWO questions.

SECTION-A

1. Answer briefly :

   a) Suggest suitable type of motors with reasons for textile mill and paper mill drives.

   b) Why projection welding is considered superior to spot welding?

   c) What is comfort air conditioning?

   d) Why single phase system is preferred for main line railway service?

   e) What is anodizing and Faraday constant?

   f) 110 Volt lamp develops 16 c.p. and lamp of same material and working at same efficiency develops 25 c.p. on 220Volt. Compare diameter and length of filaments.

   g) What do you understand by polar curve?

   h) Why are indirect furnaces not built in large sizes?

   i) What is the role of condenser and choke used in fluorescent lamp?

   j) A suburban electric train has a maximum speed of 70 kmph. The schedule speed including a station stop of 30 seconds is 45 kmph. If the acceleration is 1.5 kmphps, find the value of retardation when the average distance between stops is 4 km.

SECTION-B

2. a) Derive an expression for the motor torque drivin equipped with fly wheel.

   b) A trolley wire of a tramway is suspended from apart, if the diameter of the wire is 1 cm. and 0.5 kg. Find its sag if the tension applied is 5 total length of wire required.

3. a) Why a drooping characteristic of supply volt maintaining steady arc in electric welding ?

   b) An illumination on the working plane of 75 lux 72 m × 15 m in size. The lamps are required to b work bench. Assuming a suitable space – heigl factor of 0.5, a lamp efficiency of 14 lumens power depreciation of 20% , estimate the number, of lamps.

4. Compare D.C. and A.C. systems of railway electrifi of main line and suburban line railway service.

5. Draw electric circuit of a refrigerator and explain i temperature inside the refrigerator be adjusted?

6. a) Explain various factors to be considered while de

   b) Find the thickness of the copper deposited 0.00025 m² during electrolysis if a current of for 100 minutes. Density of copper is 8900 copper is 32.95 ×10⁻⁸ kg/C.

SECTION-C

7. a) Explain what do you understand by 'continuous', 'sl rating of an electric machine.

   b) A 3 phase arc furnace is used to melt 4.3 tonne Determine the average KW and KVA input to the arc resistance and p.f. of the current drawn from

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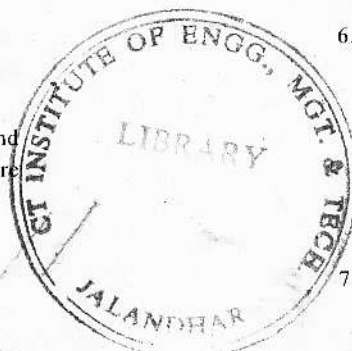
Given :

Specific heat of steel	= 0.12 K cal/kg./°C
Latent heat steel	= 8.89 K cal/kg./°C
Melting point of steel	= 1370°C
Initial temperature of steel	= 19.1 °C
Overall efficiency of furnace	= 50%
Input current	= 5700A

Resistance of transformer referred to secondary and reactance of the transformer referred to secondary are 0.008 and 0.014 ohm respectively.

(3+7)

8. Explain the working of a fluorescent tube with the help of the circuit diagram giving the function of various parts. How stroboscopic effect is eliminated in fluorescent tube lighting? (10)

9. a) Explain the working of a central air conditional system.

   b) The speed time curve of an electric train on a uniform rising gradient of 1 in 100 comprises :

   i) Uniform acceleration from rest at 2 kmphs for 30 sec.

   ii) Coasting with power off for 70 sec.

   iii) Braking at 3 kmphps to stand still.

   The weight of the train is 250 tonnes, the train resistance on level track being 5 kg/tonne, and allowance for rotary inertia 10%.

   Calculate the maximum power developed by the traction motors and total distance travelled by the train assuming efficiency as 97. (4+6)