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EE8015 Electric Energy Generation, Utilization and Conservation

PART B & PACT C IMPORTANT QUESTIONS

Unit I

1. Explain the various steps followed in calculation of illumination for designing the flood lighting in sports ground.
2. A drawing hall $30 \times 15 \times 5$ m is to be provided with a general illumination of 120Lux. Taking coefficient of utilization as 0.5, depreciation factor as 1.4, Design the number of fluorescent tubes required, their spacing height, mounting height and total wattage. Take luminous efficiency of fluorescent tubes as 40 Lumen/Watt for 80watts tube.
3. Explain about the following lamps with neat diagrams. (i) Incandescent lamp (ii) Sodium Vapour lamp
4. (i) Explain the construction and working of mercury vapour lamp. (ii) A lamp of 500 c.p. is placed at the centre of a room $20 \times 10 \times 5$ m. Calculate the illumination in each corner of the room
5. Point out the various factors to be taken into account for designing street lighting and flood lighting
6. (i) Describe and prove laws of illumination.
(ii) Design a street lighting of a road of 300metres long which is required to be illuminated by providing 40W fluorescent lamp. The width of the road is 4 m. Illumination is 0.6 lux. Assume efficiency of lamp as 70Lumen/watt.

Unit II

1. What is meant by water cooler and explain different types of water cooler with neat diagram.
2. Enlist the main requirement of good refrigerant and explain various types of refrigerant used for refrigeration system.
3. What is energy efficient motors and briefly explain motor efficiency labelling.
4. What are the components used for air-conditioning systems and briefly explain Air-conditioning cycle.
5. Explain with neat diagram construction and working of domestic refrigerator.
6. What is the working principle of Air-conditioning system and briefly explain classification of Air-conditioning systems.

Unit III

1. Examine the induction heating? What are the characteristics of induction heating? Explain Ajax-wyatt furnace
2. Explain the resistance heating methods with schematic diagrams.
3. Calculate the efficiency of a high frequency induction furnace which takes 12 minutes to melt 1.3Kg of Aluminium. The input to the furnace being 4.5kW and the initial temperature is 150°C . Take specific heat of Aluminium is $880\text{J/Kg}^{\circ}\text{C}$, melting point of Al is 660°C and latent heat of fusion of Al is 32KJ/Kg .
4. Discuss in details about any two types of resistance welding.

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5. Explain the process of dielectric heating and derive the expression for total heat energy

Unit IV

1. What are the various types of electric braking used in traction? Discuss any two types in detail.
2. What is tractive effort of a train and what are its function? Derive an expression for the tractive effort developed by train motion? How does the train resistance play its part in the mechanics of train motion
3. A train weighing 203 tonnes accelerates uniformly from the rest to a speed of 45kmph up a gradient of 1 in 500, the time taken being 30 seconds. The power is then cut off the coasts down as uniform gradient of 1 in 1000 for a period of 40 seconds when brakes are applied for period of 15 seconds so as to bring the train uniformly to the rest on this gradient. Estimate (i)The maximum power output from the driving axle. (ii)The energy taken from the conductor rails in Kwh. Assume efficiency is 60%, traction effort is 44 Newton/Tonne at all speed, rotational inertia is 10%.
4. (i)Explain the recent trends in electric traction systems. (ii) A sub urban electric train has a maximum speed of 65kmph.The schedule speed including a station stop of 30seconds is 43.5kmph.If the acceleration is 1.3kmphs; Identify the value of retardation when the distance between stops is 3km.
5. Describe the different methods of traction motor control and explain.

Unit V

1. Explain with neat diagram different types of domestic earthing.
2. Explain briefly different power quality problems due to home appliances
3. Compare briefly different types of house of wiring systems
4. Explain briefly with neat diagram working of Online & Offline uninterrupted power supply.
5. A 230kV 3 phase 50Hz 200km transmission line has a capacitance to earth of $0.02\mu\text{F}/\text{km}$ per phase. Calculate the inductance and kVA rating of the Peterson coil used for earthing the above system.