Assume the following data

Specific heat of Tin = 0.055;

Latent heat of fusion of Tin = 14 K.Cal/kg;

Melting point of Tin = 235° C;

Initial temperature of Tin = 25°C.

7. (a) Explain in detail, the construction and working principle of mercury vapour lamp.

(b) Four lamps each giving 200 CP uniformly below the horizontal plane are suspended 9 metres above the ground at the corners of a square 12 metres side. Calculate the illumination

(i) Directly under each lamp and

(ii) At the centre of the ground.

8. Write short notes on the following :

(a) Spot and seam welding

(b) Street lighting

(c) Liquid metal MHD generator.

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III/IV B.E. DEGREE EXAMINATION.

Second Semester

Electrical and Electronics Engineering

ELECTRICAL POWER GENERATION AND UTILIZATION

(Effective from the admitted batch of 2006–2007)

Time : Three hours   Maximum : 70 marks

Question No. 1 is Compulsory.

Answer any FOUR from the remaining.

All questions carry equal marks.

1. (a) List the factors involved in the selection of site for thermal power station.

(b) List the advantages and disadvantages of diesel plants over thermal plants.

(c) Draw the Schematic diagram of a typical nuclear reactor and name the components.

(d) Explain two-part tariff.

(e) Explain the principle of pumped storage power plants.

(f) (i) Mention the properties required for a material to be used as a heating element

(ii) State the advantages of resistance welding.

(g) What is stroboscopic effect? How can it be avoided while using fluorescent lamps?

2. (a) What is condenser? Explain its usefulness in thermal generation.

(b) Describe the operation of any type of condenser. Explain the functions of economizer and air preheater in a steam power station. Where are they located?

(c) Describe any one type of cooling tower.

3. (a) Draw the typical layout of hydrostation and explain the function of each component.

(b) Explain briefly the following

(i) pumped storage plants

(ii) peak load plants

4. (a) Explain MHD generation, its advantages and limitations.

(b) Draw the schematic diagram showing the main parts of a nuclear power plant and explain its working.

2   [06 – 3220]

5. (a) Give the layout of a gas turbine plant. What are its advantages over a steam turbine plant? Also, give the applications of this type of power plant.

(b) Define and explain the following terms

(i) Connected load

(ii) Maximum demand

(iii) Demand factor

(iv) Load factor

(v) Diversity factor.

(c) A bulk supply is taken by a large industrial consumer at a rate of Rs. 80 / per kw plus 3.5 per kwh. What will be the over all charge per kwh that the consumer will have to pay if his load factor is

(i) 100 percent and

(ii) 20 percent.

6. (a) Explain with a neat sketch, the construction and working principle of Ajax-Wyatt furnace

(b) What is the fundamental difference between electric are welding and resistance welding?

(c) An induction furnace is required to melt 1000 kg of tin in one hour. Calculate the efficiency of the furnace if it consumes 80 KW of power.

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(b) Explain the operating principle and working of a mercury vapour lamp and compare its performance with that of a fluorescent lamp.

(c) A small light source with uniform intensity is mounted at a height of 10 metres above a horizontal surface. Two points A and B both lie on the surface with point A directly beneath the surface. How far is B from A, if the illumination at B is only $\frac{1}{15}$ as that at A.

8. (a) Explain with a neat sketch, the principle and working of spot welding.

(b) A laminated wooden board 30 cm × 16 cm × 2.5 cm thick is to be heated from 20°C to 170°C in 10 minutes by dielectric heating, using 30 mega cycles/second supply sources, specific heat of wood is 0.35 and density 0.55 grams/cc, relative permittivity 5; power factor = 0.05. Determine the voltage across the work piece and current during heating.

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III/IV B.E. DEGREE EXAMINATION.

Second Semester

Electrical and Electronics Engineering

ELECTRICAL POWER GENERATION AND UTILIZATION

(Effective from the admitted batch of 2006–2007)

Time : Three hours   Maximum : 70 marks

Question No 1 is compulsory.

Answer any FOUR from the remaining.

All questions carry equal marks.

1. (a) Define draught. Why is it necessary in thermal power plants?

(b) Distinguish between reservoir plant and pumped storage plants.

(c) (i) Distinguish between fusion and fission.

(ii) What is the necessity of reflector in nuclear reactor?

(d) Explain, how do the load factor and diversity factor effect the economics of power plant?

(e) Mention the advantages and limitations of MHD generation.

(f) Explain clearly the terms :

(i) MSCP and

(ii) MHCP.

(g) Name the power frequency and high frequency methods of electric heating.

2. (a) What is the function of economiser and electro static precipitator in steam power plant? Where are they located?

   (b) Explain the factors that govern the choice of site for locating thermal power plant.

3. (a) State what is meant by a base load and peek load station. Explain the functions of the following in a hydel station.

   (i) surge tank
   (ii) pen stock
   (iii) fore bay.

   (b) Sketch a modern nuclear reactor and explain the function of each part.

4. (a) Describe with a neat diagram, the principle of operation of a gas turbine power plant. Give the applications of this type of power plant.

   (b) For a hydro-electric station, what difference does it make :

   (i) if the head of water is 30 metres and

   (ii) if the head of water is 300 metres? Consider the aspects of type of turbines, preferred operating speed and specific speed.

   (c) Write briefly on radiation hazards in nuclear power station.

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5. (a) Explain the term " Two-part tariff ".

   (b) A factory has a maximum load of 240 kW at 0.8 power factor lagging, with an annual consumption of 50,000 units. The tariff is Rs.50 per KVA of maximum demand plus to paise per unit. Calculate the flat rate of energy consumption. What will be the annual saving if the power factor is raised to unity?

6. (a) Distinguish between thermal, mechanical, electrical and over all efficiency of a thermal power plant.

   (b) A generating station is to supply four regious of load whose peek loads are 10 MW, 5 MW, 8 MW and 7 MW. The diversity factor at the station is 1.5 and the average annual load factor is 60%. Calculate :

   (i) The M.D on the station

   (ii) The annual energy supplied by the station. Suggest the installation capacity and the number of units that would be suitable.

7. (a) Define the terms :

   (i) Solid angle

   (ii) Lux

   (iii) Luminous efficiency

   (iv) Brightness.

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8. Write short notes on the following:

(a) Comparison of different sources of energy

(b) Different power reactors

(c) Different Tariffs.

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III/IV B.E. DEGREE EXAMINATION.

Second Semester

Electrical and Electronics Engineering

ELECTRICAL POWER GENERATION AND UTILIZATION

(Effective from the admitted batch of 2006–2007)

Time : Three hours   Maximum : 70 marks

Question No. 1 is compulsory.

Answer any FOUR from the remaining.
All questions carry equal marks.

1. (a) Why is steam preheated in thermal power stations? Explain.

(b) Distinguish between peak load and base load type hydro-power plants.

(c) What are the functions of moderator and control rods in a nuclear power reactor?

(d) Differentiate between open cycle and closed cycle MHD system.

(e) Explain, how do the load factor and diversity factor effect the economics of power plant.

(f) Define lux and luminous efficiency.

(g) What is the fundamental difference between electric arc welding and resistance welding?

2. (a) What is a condenser in thermal power stations? Describe the operation of

    (i) Surface condenser and

    (ii) Jet condenser.

   (b) Write a brief note on "Cooling towers". Comment on the shape of the towers.

   (c) Why is Pulverized coal used in thermal power plants?

3. (a) What are the different factors to be considered while selecting the site for a hydro-electric plants?

   (b) Discuss the classification of hydro-electric plants.

4. (a) Draw the schematic diagram of a nuclear reactor and explain the function of each part.

   (b) Explain the terms - fission, chain reaction and fast breeder reactor.

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5. (a) Explain the combined cycle operation of gas turbine plant. Give the applications of this type of power plant.

   (b) Mention the advantages and limitations of MHD generation.

   (c) Explain flat rate tariff and power factor tariff.

6. (a) Describe the construction and principle of operation of fluorescent lamp with the circuit diagram.

   (b) Define the terms:
    (i) Solid angle
    (ii) Lux
    (iii) MSCP, MHCP and
    (iv) Brightness

   (c) What is polar curve? What is its significance?

7. (a) Explain briefly the different welding Processes under resistance welding. Why is it necessary to use welding transformer?

   (b) A laminated Wooden board 0.5m × 0.25 m ×0.1 m is to be heated to 160°C in 10 minutes by dielectric heating employing a frequency of 30 MHZ. The Wood has a specific heat of 0.35; a weight of 0.05 Kg/cu.m., a permittivity of 5 and power factor of 0.05. Determine the power required, the voltage across the work and the current through it during the heating process.

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