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Question Paper Code : 60518

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Seventh/Eighth Semester

Electrical and Electronics Engineering

EE 2451/10133 EE 801/EE 81— ELECTRIC ENERGY GENERATION,
UTILIZATION AND CONSERVATION

(Regulations 2008/2010)

(Common to PTEE 2451/10133 EE 801 — Electric Energy Generation, Utilization
and Conservation for B.E. (Part – Time) Seventh Semester – EEE –
Regulations 2009/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is the importance of economizer and super heater in steam power plant?
2. How are costs allocated in cogeneration systems?
3. Differentiate load curve and load duration curve.
4. Compare two part tariff with power factor tariff.
5. Specify any four energy efficient lamps.
6. Why tungsten is selected as the filament material?
7. List the advantages of electric heating.
8. What is meant by resistance welding?
9. Give the expression for total tractive effort.
10. What are the recent trends in electric traction?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Draw the block diagram of a standalone solar PV power generation system. Also explain the role of individual blocks. (8)
- (ii) Compare the features of nuclear power plant with thermal power plant. (8)

Or

- (b) (i) Discuss the effect of distributed power generation on power system operation. (8)
- (ii) Explain the method of producing power from Municipal waste. (8)
12. (a) (i) A system has a straight line annual load duration curve with maximum and minimum demands of 15 MW and 5 MW respectively. The annual cost characteristics of base load and peak load station are respectively given by

$$C_1 = (\text{Rs. } 1,00,000 + \text{Rs. } 100/\text{kW} + 6 \text{ p/kWhr})$$

$$C_2 = (\text{Rs. } 80,000 + \text{Rs. } 60/\text{kW} + 8 \text{ p/kWhr})$$

Determine the operating schedule of peak load station for minimum annual cost. Hence determine the overall cost per kWhr. (8)

- (ii) Discuss the effects of load factor and diversity factor on the cost of generation of electrical energy. (8)

Or

- (b) (i) Explain 'maximum energy efficiency principle' and 'minimum cost effectiveness in energy use'. (8)
- (ii) Explain the importance of energy auditing. (8)
13. (a) (i) A hall 30 m long and 12 m wide is to be illuminated and the illumination required is 50 lumens / m². Calculate the number of fitting required, taking Depreciation Factors of 1.3 and Utilization Factor of 0.5. Given that the outputs of different types of lamp are given below. (10)

Watts	100	200	300	500	1000
Lumens	1615	3650	4700	9950	21500

- (ii) Explain the factors affecting the design of lighting system. (6)

Or

- (b) (i) Explain the operation of fluorescent lamp in details. (8)
- (ii) A lamp of uniform intensity of 200 C.P. is enclosed in a glass globe. 25% of the light emitted by lamp is absorbed by the globe. Determine :
- (1) Brightness of globe,
- (2) CP of globe if diameter of globe is 30 cm. (8)
14. (a) (i) Draw a neat sketch of induction furnace and explain its working. (6)
- (ii) An insulating material 2 cm thick and 150 sq.cm. in area is to be heated by dielectric heating, The material has permittivity of 4 and p.f. as 0.04. Power required is 400 watts and frequency of 40 MHz. Determine the voltage and the current, that will flow through the material. If the voltage were limited to 700 volts, what will the frequency to get the same loss? (10)

Or

- (b) (i) Discuss the principle of arc welding and the difference between carbon and metal arc welding and their relative merits and demerits. (8)
- (ii) Explain the characteristics of a welding generator. (8)
15. (a) (i) State the advantages and disadvantages of electric traction. (7)
- (ii) State the requirements of an ideal traction system. (6)
- (iii) List the various sources for Electric traction. (3)

Or

- (b) (i) List the requirements of electric traction system. (8)
- (ii) Explain the D.C series Traction motor control. (8)