



KINGS

COLLEGE OF ENGINEERING

**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
ACADEMIC YEAR 2010-2011 / EVEN SEMESTER**



QUESTION BANK

Name of the Subject: EE1452 Electric Energy Generation, Utilization & Conservation

Year / Sem : IV / VIII

UNIT – I GENERATION

PART – A (2 MARKS)

1. What is turbine?
2. What are the two basic types of hydro electric systems?
3. What is economizer and its use?
4. What is known as moderator?
5. What are control rods in the nuclear power plant?
6. What is meant by distributed generation?
7. What is super heater in a Thermal plant?
8. State the typical rated voltages of electrical sub systems used in air – craft.
9. What is penstock?
10. What is nuclear fission?
11. What is the principle of working gas turbine?
12. What are the applications of diesel electric plant?

PART – B (16 MARKS)

1. Draw a layout for a thermal plant and explain the functions of each components of that plant. (16)
2. What is meant by chain reaction in nuclear power plant Also explain the process of nuclear fusion? (16)
3. (a) Mention the advantages and Disadvantages of hydro-power plant (8)
(b) Explain the functions of the following 1.Reservoir, 2.Dam, 3.Spill ways, 4. Intake, 5. Fore bay, 6. Penstock, 7.Surge tank. (8)
4. What are pumped storage plants? Describe with neat sketch the principle of operation of such a plant Also discuss the role of this plant in a large inter-connected power system? (16)
5. Describe with neat sketch the construction and principle of operation of an electro static precipitator. Discuss its advantage over mechanical ash separators. (16)

6. Write short notes on 1. Condensers, 2. Economizers. 3. Air pre heaters 4. Super heater. 5. feed water system. 6. Cooling tower. (16)
7. (i) State electrical systems and sub stems Used in aircraft and its requirements. (8)
(ii) Describe the construction of prime move for aircraft generator. (8)
8. Explain the working of a gas turbine power plant with a schematic diagram. (16)
9. Draw block diagram of a diesel power station and discuss its operation. (10)
What is a need for distributed generating system? (6)

UNIT – II
CONSERVATION

PART – A (2 MARKS)

1. What is meant by Demand charges?
2. What is load duration curve?
3. List the various types of equipment that can cause power quality problems.
4. What do harmonics do?
5. What is sag or dip and swells?
6. Define Diversity factor?
7. What are the functions of Bureau of Energy Efficiency?
8. What is meant by base load?
9. What are the factors that influence fixing up of tariff to the consumers?
10. What is the need for depreciation reserve?
11. Define Energy Audit.

PART – B (16 MARKS)

1. What is cost of electrical generation? What are the various types of cost associated with power generation? (16)
2. The monthly reading of a consumer meter are as follows
Maximum demand = 150kw , Energy consumed 1×10^5 units,
Reactive energy = 75MVARhr,
If the tariff is Rs 50per KW per month of maximum demand + 15Paise per unit + Rs 3 per KW for each 0.1 P.F below 0.8, calculate the monthly bill of the consumer. (16)
3. What is a tariff? Discuss and compare various tariff used in practice. (16)
4. (a) Explain the term depreciation and discuss various methods of calculating the depreciation of an electrical plant. (8)
(b) What are load curves and load duration curves? Discuss their utility in the economics of generation. (8)
5. A generating stations as a maximum demand (MD) of 15 MW and the daily load curve on the station is as follows,

10pm to 05 am 2500 KW	01pm to 04pm 10000KW
05am to 07 am 3000KW	04pm to 06pm 12000KW
07pm to 11am 9000KW	06 pm to 08pm 15000KW
11am to 01pm 6000KW	08pm to 10pm 5000KW

Determine the size and the number of generator units, plant load factor, plant capacity factor, use factor and reserve capacity of plant. (16)

6. (a). what is the need for power factor correction? (4)
(b). A 3phase synchronous. Motor is connected in parallel with a load of 500 KW, 0.8p.f lagging and its excitation is adjusted until it raises the total P.F to 0.9 lagging. If the mechanical load on the motor including loss takes 125KW, calculate the KVA input to the motor. Draw pharos diagram for condition. (12)
7. i) What are the disadvantages of low power factor? How to avoid it? (8)
ii) What are the measures relates to power quality? (8)

UNIT – III
ILLUMINATION AND ELECTROLYTIC PROCESS
PART – A (2 MARKS)

1. Define Brightness.
2. Define Glare.
3. Define Lambert Cosine law.
4. Define Inverse Square Law.
5. Define Solid angle.
6. Define MHCP.
7. Define Luminous flux.
8. What is stroboscopic effect?
9. Explain the working of thermal starter.
10. Define candle power.
11. Define Absorption factor.
12. Show how to connect a fluorescent lamp for DC operation?
13. What is flood lighting where is it generally used?
14. Define Electro deposition.
15. What is meant by extraction metals?
16. Define current efficiency.
17. Define energy efficiency.
18. Define Electrolysis.
19. Define throwing power of an electrolyte.
20. Define laws of electrolysis
21. What are the materials used in a choke?

PART – B (16 MARKS)

1. (a) Explain the method of working of a Neon lamp with a neat sketch. (12)
(b) state the Lambert's cosine law of illumination. (4)
2. Estimate the number and wattage of lamps which would be required to illuminate ever shop space 60 X 15metres, by means of lamps mounted 5metres above the working plane. The average illumination required is about 100 Flux, Co-efficient of utilization = 0.4, luminous efficiency is 16 lumens per Watt. Assume a space height ratio of unity candle power depreciation of 20% (16)
3. (a) Two lamps one 200cp and another 500cp are hung at a height of 10metres and 25metres respectively. The horizontal distance between the poles is 80metres. Determine the illumination at the mid point between the poles on the ground. (10)
(b) What are the requirement of good heating materials? (6)
4. (a). Explain the working of a sodium vapour lamp with in a neat sketch. (12)
(b). what is Halogen lamp? (4)
5. Explain the operation principle and working of a mercury vapour lamp and compare its performance with a fluorescent lamp. Describe with a neat sketch the principle of operation of a fluorescent lamp. Mention the function of each component. (16)
6. Explain the types of lamps and lighting fitments you should select for
(i) A large machine shop with rows of drilling machines
(ii) A drawing office and lathes. (16)
7. (a) A 100 candle power lamp is hung 2m above the centre of a circular area of 3 diameters. Determine the illumination at (i) the centre of the area, (ii) a point on the circumference of the area, (iii) average illumination. Find also the average illumination, if a reflector of 50% efficiency is used. (8)
(b) A lamp of 300 candle power. is placed 1.5 m below a reflecting plane mirror surface, which reflects 70% of the light falling on it. Find the illumination at a point 4m. (8)
10. (a) Explain the principle of street lighting? Show different types of lighting with neat Sketches. (8)
(b) Discuss about Diffusion principle of street lighting. (8)
11. (a) Explain the basic principle of electrolytic process and discuss briefly some of its applications. (8)
(b) Define and explain "Current efficiency", "Voltage required" and "Energy efficiency" When referred to electrolytic processes. (8)
12. Explain electrodepositing processes and discuss clearly various factors governing the Electrodepositing processes. (16)

13. Describe the process of extraction of metals. Explain how zinc and aluminum are extracted from their ores. (16)
14. (a) Explain how chemicals are manufactured using electrolytic processes. (8)
(b) Discuss briefly electric power supplies for various electrolytic processes. (8)

UNIT – IV
ELECTRIC TRACTION
PART – A (2MARKS)

1. What are various traction systems you know of?
2. Discuss merits and demerits of steam engine drive.
Advantages
3. What are the different systems of railway electrification?
4. What are the merits and demerits of D.C system of track electrification?
5. What are the functions of a D.C. sub station?
What are various current collection systems?
6. What are the factors affecting the schedule speed of a train?
7. What is the difference between dead weight and accelerating weight of a locomotive?
8. What do you meant by tractive effort?
9. What are the advantages of electric braking?
10. Why three phase traction system employing induction motors is now obsolete
give reasons?
11. What are the various types of braking methods?
12. Discuss the current trends in AC traction systems?
What are the advantages of pantographs?

PART – B (16 MARKS)

1. (a) Sketch the typical speed-time curve for (1) Main line service and to sub – urban services in electric Traction. (10)
(b) Explain the mechanics of train movement? (6)
2. (a) What is multiple unit control in electric train and explain in details each one of them? (8)
(b) What are different braking systems and explain them in details? (8)
3. (a) What is the speed controls of different system of motors used in electric train? (10)
(b) Define co-efficient of adhesion “ and explain the factors on which it depends? (6)
4. (a). Discuss the various arrangement of current collection used in electric traction. (8)
(b). Write short notes on the recent trends in electric traction. (8)
5. Two stations A & B are 12Km apart and average speed of the train is 60Kmph. The acceleration is 5Kmph, retardation during coasting is 0.3kmph and braking is 5Kmph respectively. Taking quadrilateral approximation of speed, time curve, determine the

duration of acceleration, coasting and braking periods and distance covered during these periods. (16)

6. State the principle of regenerative braking. Explain regenerative braking in respect of
a) DC motors, b) Induction motors. (16)
7. (a) What are the various methods of speed control of series motors and their scope of speed range? (8)
(b) Discuss the merits and demerits of the induction motor for traction duties? (8)
8. (a) What is the main advantage of series parallel control of motors over rheostatic method of starting and speed control? (8)
(b) What is multiple unit control and for what application will you suggest this? (8)

UNIT – V
ELECTRIC HEATING AND WELDING
PART – A (2MARKS)

1. State the advantages of electric heating?
2. State the properties of a heating element that you will look for?
3. Explain the advantages of induction heating?
4. Give relative advantages and disadvantages of direct and indirect arc furnace?
5. Compare the performance of various electrodes used in electric arc furnace?
6. How high frequency supply is obtained?
7. Give various types of electric arc welding.
8. What do you understand by resistance welding?
9. What is welding?
10. What are the different types of electric welding?
11. Explain clearly pinch effect?

PART – B (16 MARKS)

1. a) What are the types of ARC furnace? Describe the operation of them. (8)
b) Discuss the characteristic requirement of welding generator sets (both AC and DC). (8)
2. a) Explain the working of core type induction furnace with a neat sketch. (8)

b) A 5KW, 440volts, 3 phase resistance oven is to have a 3star connected nichrome strip of 0.3mm thick heating element. If the wire temperature is to be 1500°C and that of the charge 1000°C, estimate the suitable width of the strip. Resistivity of nichrome alloy is 1.016×10^{-6} . Assume the radiating efficiency and emissivity of the element as 0.6 and 0.91 respectively. (8)
3. (a) What is dielectric heating? How is this different? (8)
(b) A laminated plywood board 40cm x 25 cm x 1.8 cm is to be heated from 25°C to 160°C in 12 minutes, using 25 MHz supply, specific heat of wood is to be taken as 0.32, density

is 0.6 g / cm^3 , relative permittivity of wood is 6 and power factor 0.05. Find the supply voltage, power required and current drawn. Take the efficiency of the process as 75% (8)

4. (a) Explain the construction and working principle of dielectric heating. (8)

(b) Calculate the energy required to melt one metric ton of brass in a single – phase Induction furnace. If the time taken is 1.5 hr, find the power input to the furnace.

Specific heat of brass = 0.094

Latent heat of fusion of brass = 38 kcal / kg

Melting point of brass = 920°C

Furnace efficiency = 80%, Temperature of charge = 20°C (8)

5. i. Explain thyristor control of welding? (8)

ii. Explain methods of energy storage welding. (8)

6. i. Explain coreless type induction furnace? (8)

ii. A 105 KVA of tin is to be melt during an hour in a melting furnace. Determine a suitable rating of the furnace if melting temperature of tin is 240°C . Take initial temperature of metal as 35°C .

Specific heat = 0.055 Kcal/kg $^\circ \text{C}$

Latent heat of liquid = 13.3 Kcal/kg
