

ELECTRIC ENERGY GENERATION UTILIZATION & CONSERVATION

UNIT- 1

(2 MARKS)

1. What are the sources of energy?
2. Name the different types of power generation?
3. What is meant by hydrological or rain evaporation cycle in generation?
4. How will you classify hydro-electric plants according to nature of load?
5. What is penstock?
6. What is the use of surge tank in hydro-electric plant?
7. What is the different between impulse and reaction turbine?
8. What is the principle of pumped storage scheme?
9. What are the advantages and disadvantages of hydro-electric power plant?
10. What are the factors to be considered while selecting a site for steam power plants?
11. What is the function of deaerator in steam power plant?
12. What are the disadvantages of steam power plants?
13. What is nuclear function?
14. What are the components of nuclear reactor?
15. What are the merits of nuclear power plants?
16. What is the function of supercharger in diesel electric power plant?
17. What are the applications of diesel electric power plant?
18. What is the principle working of gas turbine?
19. What are the advantages of MHD power generation?
20. What is solar cell?
21. What are the types of collectors used in solar power generation?
22. What is the basic principle of wind power generation?
23. What is tide?
24. What are the merits and demerits of tidal power generation?
25. What is the function of moderator in nuclear power plant?
26. What are the advantages of interconnection of power stations?
27. What is the difference between condensing and non-condensing type steam power plants?
28. What is thermal efficiency?
29. Name the fuels used for gas turbines?
30. What are the types of wind mills?
31. What is power generating station?
32. What is the need for distributed generation?

(16marks)

1. What is steam power station? Discuss its advantages and disadvantages?
2. Explain the important component of a steam power station with modern plant schematic?
3. With neat sketch, explain the operation of hydro-electric plant. Discuss the merits and demerits of a hydro electric plant?
4. Explain the following:
 - 1).Dam
 - 2).Spill ways
 - 3).Surge tank
 - 4).HeadworksDraft tube
6. Draw the block diagram of a diesel power station and discuss its operation.
7. Draw the schematic diagram of a nuclear power station and discuss its operation.
8. Explain with a neat sketch the various parts of a nuclear reactor.
9. Explain the working of a gas turbine power plant with a schematic diagram.
10. Compare in detail all conventional power stations.
11. Why is the overall efficiency of a steam power station very low?
12. Why is a condenser used in a steam power plant?
13. Name the subsystems of a solar power plant?
14. Explain in detail MHD.
15. Explain the various methods of tidal power generation.
16. Narrate the concept of pumped storage systems.

UNIT-2

(2 marks)

1. What do you mean by Economics of power generation?
2. Explain the term depreciation.
3. Define load factor.
4. What is load curve?
5. Define diversity factor.
6. What do you mean by utilization factor?
7. Write short note on load duration curve?
8. Write the significance of load factor and diversity factor.
9. What is mean by base load?
10. What are the methods for determining depreciation charges?
11. How does the three-part tariff differ from the two-part tariff?
12. What are the objectives of tariff?
13. Define energy audit.
14. What are the causes of low power factor?
15. Explain the difference between chronological load curve and load duration curve.
16. What is the necessity of power factor improvement?
17. Define the term connected load factor.
18. What are the important points to be taken into consideration while selecting the size and number of units?

(16 marks)

1. Narrate about economics of power generation.
2. Explain the importance of load curve and load duration curve.
3. What is meant by integrated load duration curve and mass curve?
4. What is the significance of load factor and diversity factor? Explain in detail.
5. Which factor decides a plant is peak load plant or base load plant?
6. What are the methods commonly used for determining depreciation?
7. Derive the methodology of declining balance method for depreciation?
8. Define tariff, what are its objectives?
9. Define and explain types of tariff.
10. What is meant by energy conservation? Write in detail about energy audit.
11. What are the measures decides the equipment as energy efficient equipment?
12. Describe in detail energy conservation techniques.
13. Define power factor. What are the disadvantages of low power factor? How to avoid it?
14. List and explain in detail methods of power factor improvement.
15. What are the measures relates to power quality?
16. A plant costing Rs.65000 has a useful life of 15 years. Find the amount which should be saved annually to replace the equipment at the end of that time.
 - a). by the straight line method and
 - b).by the sinking fund method if the annual rate of compound interest is 15%.Assume that the salvage value of the equipment is Rs 5000.
17. A power station is to supply four regions of loads whose peak loads are 10000 Kw, 5000Kw, 8000 Kw and 7000 Kw. The diversity factor of the load at the station is 1.5 and average annual load factor is 60%. Calculate the maximum demand on the station and annual energy supplied from the station. Suggest the installed capacity and number of units taking all aspects into account.
18. A power station has a maximum demand of 200 MW, a plant load factor of 0.6 a plant capacity factor of 0.5 and a plant use factor 0.8. Find (1) the daily energy consumed (2) the reserve capacity of the plant and (3) maximum energy that can be produced daily.
19. The maximum demand of a consumer is 1MW and the units consumed per annum are 5,00, 000 KWh. Calculate the reduction in cost if the power factor is raised from 0.5 to 0.8. the tariff is Rs900 per annum per KW demand plus Rs 1.50 per KWh plus Rs0.30 per KVARh. Calculate the flat rate for a unity power factor load.

20. The energy cost of a 100MW steam station working an 40% load factor comes out to be 12 paise per KWh of energy generated. What will be the cost of energy generated if the load factor is improved to 60%.the fuel costs of the power station due to increased generation increase the annual generation cost by 5%.

UNIT-3

(2 marks)

1. Define luminous flux.
2. What is meant by candle power?
3. Define MHCP.
4. Define utilization factor
5. What are the laws of illumination?
6. What is meant by luminance?
7. Define space-height ratio.
8. What is polar curve?
9. Name the various photometer heads.
10. What are all the sources of light?
11. Write a short note on sodium vapour lamp.
12. What is stroboscopic effect of fluorescent tubes?
13. Define beam factor.
14. Mention the types of lighting schemes.
15. What are the drawbacks of discharge lamps?
16. What are the requirements of lighting systems?
17. What are the advantages of electric heating?
18. Classify the methods of electric heating?
19. What is meant by indirect resistance heating?
20. What are the properties of heating element material?
21. What are the causes of failure of heating elements?
22. Write the Stefan's law of heat radiation.
23. Write short note on infrared heating.
24. What is the basic principle of induction heating?
25. What is the difference between core type and coreless type induction furnaces?
26. What are the different types of welding?
27. Compare DC welding and AC welding
28. What are the modern welding techniques?
29. What is LASER welding?

(16 marks)

1. Compare fluorescent and filament lamps on basis of equality of light, capital and running cost?
2. Explain with sketch the principle of working of a sodium vapour lamp and enumerate its advantages and disadvantages as source of light?
3. What is photometry? Describe photovoltaic method of photometry.
4. What is photo emissive cell? Describe its working with a dc amplifier.
5. what is an integrating sphere? Explain its use in illuminating engineering.
6. Explain lumens or flux method of calculation for interior lighting.
7. derive expression for the illumination on a surface (1) when it is normal and (2) when it is inclined to the axis of incident light.
8. What do you mean by discharge lamp? Explain Rousseau's construction for calculating MSCP of a lamp.
9. Explain with a neat diagram the principle of operation of a sodium vapour lamp. Mention its use
10. 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?
11. A lamp with mean spherical candle of 1000 is suspended at a height of 1.2 meters. Determine (a).The total flux emitted by the lamp (b). The illumination just below the lamp.
12. A 250 V lamp takes a current of 1 amp and produces a total flux of 4000 lumens. Determine (a). The MSCP of the lamp and (b). The efficiency of the lamp.

13. A lamp of 400 CP is suspended at a height of 5 metres above the centre of circular disc of 5 metres respectively. Determine the illumination at the (a). Centre of the disc (b).periphery of the disc (c). Average illumination. What will be the average illumination if reflector of 75% efficiency is used?
14. A drawing hall measuring 30*15*5m is to be provided with illumination of 100 lux. Assuming a coefficient of utilization of 0.5 and depreciation factor of 0.8. Determine the number of lamps required, their spacing, mounting height and total wattage. Luminous efficacy of lamps is 16.67 lumens /watt for 300 watt.
15. Two lamps are hung at a height of 6m from the floor level, the distance between the lamps is 8m lamp one is of 500CP.if the illumination on the floor vertically below this lamp is 20 lux. Find the CP of second lamp.
16. A project lamp gives out 2000 lumens and has beam divergence of 16 degree. If beam factor is 0.75. Calculate average illumination on surface 60m away and normal to the source of the light. What will be the illumination if surface is rotated through 60 degree?

UNIT-4

(2 marks)

1. What are the requirements of an ideal traction system?
2. Name the various systems of traction.
3. Classify the supply systems for electric traction.
4. What are the advantages and disadvantages of electric traction?
5. What is meant by speed- time curve? Why it is used?
6. Sketch the speed- time curve for main-line service.
7. What are the different types of speed used in traction?
8. What are the factors affecting schedule speed?
9. Define coefficient of adhesion
10. What is tractive effort?
11. What are the factors affecting energy consumption?
12. Define dead weight, adhesive weight.
13. What are the motors used in traction system?
14. Name the various methods of traction motor control.
15. What are the basic requirements of a braking system?
16. What are the various methods of applying electric braking?
17. What is meant by mechanical braking? Name the types of brakes used.
18. Name the various systems of current collection system and where are they employed?
19. Name the advanced methods of speed control of traction motors.
20. What are the advantages of microprocessor based control of traction motors?

(16 marks)

1. sketch the typical speed- time curves for(a)main line service and (b) suburban service with electric traction.
2. Define specific energy consumption and discuss the factors which affect the specific energy consumptions of trains operating at a given scheduled speed.
3. Derive the expression for the tractive effort for propulsion of a train on level track.
4. Explain briefly the principle operation of a single phase a.c series motor, compare its performance with dc series motor when used for traction purposes.
5. Discuss with neat diagrams the construction, principle of operation and application of metadyne converter.
6. Explain various methods of electric braking. State the conditions to be fulfilled for each method of braking.
7. what are the main characteristics of diesel engine with special reference to its application for traction purpose?
- 8.what are the different types of function performed by the tractive effort developed by a traction unit?
- 9.explain the function of a reactor when used in series with traction motors.
10. Compare AC traction with DC traction

UNIT-5

(2 marks)

1. What is meant by electrical drives?
2. What are the advantages of electric drives & mention the parts of electrical drives?
3. Mention the application and types of electric drives?
4. Define equivalent current method.
5. Define four-quadrant operation?
6. What are the three methods of operation for electric drive?
7. Mention three types of braking?
8. Define and mention different types of braking in s dc motor?
9. List the drawbacks of armature resistance control?
10. What is static ward-Leonard drive?
11. Mention the methods of armature voltage control dc motor?
12. What are the disadvantages of conventional ward- Leonard schemes?
13. Mention the drawbacks of rectifier fed dc motor?
14. What are the different methods of speed control of induction motor?
15. What is meant by stator voltage control?
16. Mention the application of stator voltage control?
17. mention the application of dc drives?
18. What are the advantages of stator voltage control method?
19. What are the disadvantages of stator voltage control method?
20. What are the features of variable frequency control?
21. What are the advantages and disadvantages of ac drives?
22. What is meant by frequency control of induction motor?
23. Frequency control is not normally used. why?
24. What is meant by frequency control of induction motor ?
25. Frequent control is not normally used .why?
26. What is meant by V/F control?
27. What are the advantages of V/F control?
28. What is meant by stator current control?
29. What is meant by regenerative braking?
30. What is meant by dynamic braking?
31. What is meant by rotor resistance control?
32. What are the advantages and disadvantages of rotor resistance control?
33. What is meant by slip power?
34. What is the effective resistance of slip control by chopper?
35. What is meant by Kramer system?
36. What is meant by static scherbius drive?
37. What are the advantages and disadvantages of static scherbius drive?
38. Compare conventional method of Kramer and scherbius system.
39. Compare the static Kramer and scherbius system.
40. What are the disadvantages of Kramer system?

(16 marks)

1. State essential parts of electrical drives? What are the functions of a power modulator?
2. Explain the performance of different types of dc motor with its performance curves?
3. Explain the operation single-phase fully controlled rectifier control of dc separately excited motor?
4. Write the working principle of ac machine? Define induction.
5. Compare ac machine and dc machine.
6. Explain in detail closed loop control of three phase induction motor.
7. Describe the need of different kind of braking applies to the induction motor.
8. Describe the operation of closed loop control for static rotor resistance control.
9. Explain the operation of conventional Kramer system.
10. What is meant by super-synchronous operation?
11. Explain the principle operation of static scherbius system.

12. With neat diagram, explain conventional scherbius system.
13. Explain in detail, the speed-torque characteristics of induction motor.
14. What are the different types of slip power recovery system?
15. Explain the operation of modified Kramer system.