

BE8255 Basic Electrical Electronic & Measurement

Engineering

Unit – III

UTILIZATION OF ELECTRICAL POWER

Part-A

1.What is conventional energy source? Give some examples.

[OR]

Define conventional energy source? Give some example.

The basic energy source for generating electric power are fossil fuels, hydel source and nuclear fuel, these sources are used over several decades for power generation.

2.What is non-conventional energy source? Give some examples.

[OR]

What is Renewable energy source? Give some example.

Renewable source of energy is defined as the energy source which is produced continuously in nature it is neither consumed nor converted into something else it is inexhaustible.

Ex. Hydel energy, solar energy, wind energy, tidal energy, geo-thermal energy, ocean thermal energy and energy from bio-mass.

3.What are the advantages and disadvantages of renewable energy sources?

[OR]

List the advantages and disadvantages of non-conventional energy sources.

Advantages:

1. Maintenance requirements are lower.
2. It is a clean form of energy to use.
3. It is a safe form of energy.

Disadvantages:

1. Pollution is still generated with renewable energy.
2. It may not be a permanent energy resource.
3. It can take a lot of space to install.
4. It has expensive storage costs.

4. What are the application of solar energy?

[OR]

List the application of solar energy.

1. Solar water heater
2. Solar cookers
3. Solar driers
4. Solar engines for water pumping
5. Solar power generation
6. Photo-voltaic conversion (solar cells)

5.Mention the merits and demerits of solar energy?

[OR]

List the advantage and disadvantage of solar energy.

Merits:

1. It is pollution free
2. No maintenance as solar panels last over 30 years.
3. Can be installed virtually anywhere, in a field to on a building.
4. Use batteries to store extra power for use at night.

Demerits:

1. High Initial cost for material and Insulation.
2. Needs lots of space.
3. No solar power at night so there is a need for a large battery bank.
4. Cloudy days do not produce much energy.
5. Lower production in the winter months.

6.What are the advantages and disadvantages of wind energy?

[OR]

List the merits and demerits of wind energy.

Advantages:

- The wind is free and with modern technology it can be captured efficiency.
- Energy is generated without polluting environment.
- In remote areas, wind turbines can be used as great resource to generate energy.
- Reduces Fossil Fuel consumption.

Disadvantages:

- Requires large open areas for setting up wind forms
- Noise pollution problem is usually associated with wind mills.
- Maintenance cost of wind turbines is high.

7.What are the applications of refrigeration?

[OR]

List the application of refrigeration

1. Used to preserve fruits, milk, drinks, food etc.,
2. Used in water coolers.
3. Used to preserve medicines, blood etc., in hospitals.
4. Refrigerating machines are used to produce use in ice plants.

8.Write the commonly used refrigerants

[OR]

Mention the list of commonly used refrigerants.

1. Ammonia
2. Freon – 12
3. Freon – 12
4. Carbon di-oxide
5. Air

9.Define air conditioning?

[OR]

What is meant by air conditioning?

Air conditioning is defined as the simultaneous control of the temperature of air, purity of air and motion of air for the purpose of human comfort, food processing and other industrial purposes.

10.List the major units on vapour compression refrigeration system.

[OR]

What are the major units in vapour compression refrigeration system?

1. Evaporator
2. Compressor
3. Condenser
4. Expansion valve in the form of capillary tube.

11.Mention some applications of air conditioner?

[OR]

What are the application of air conditioner?

1. Residential buildings.
2. Office rooms.

3. Industrial buildings
4. Hotels
5. Hospitals
6. Theatres
7. Industries' etc.,

12.How does the sodium vapour lamp works? [AU]

[OR]

How does the monochromatic lamp works?

As the lamp is switched on, electrons are emitted from cathode and attack the gas molecules. This starts the process of ionisation and the discharge commences. The sodium is vapourised due to heat of the discharge and the lamp assumes normal operation. The lamp will come up to its rated light output in about 15 minutes. Since the discharge has a negative resistance characteristic, so a high leakage reactance transformer is used which stabiliser current.

The lamp emits characteristic yellow high at a single wavelength of about 5980 A.U. Due to this reason it is sometimes called a monochromatic lamp.

13.What is meant by earthing?

[OR]

Define Earthing.

Earthing system is to provide an alternative path for dangerous currents to flow, so that accidents due to electric shock and damage to the equipment can be avoided.

14.What are the basic needs of earthing?

[OR]

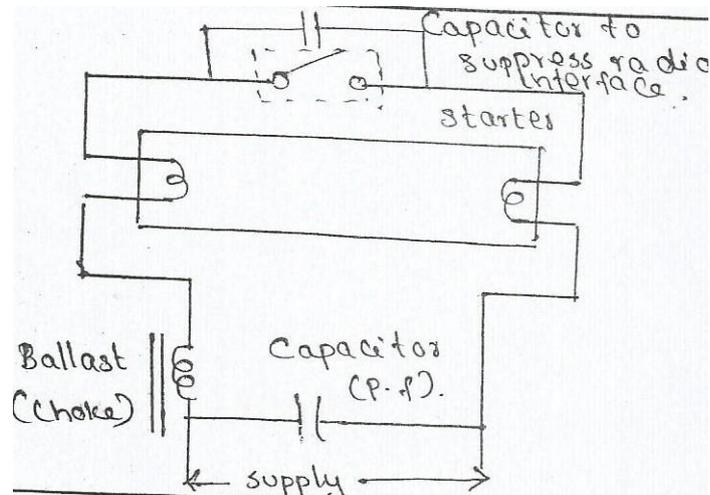
What are the advantage of earthing?

- To protect human lives as well as provide safety to electrical devices and appliances from leakage current.
- To keep voltage as constant in the healthy phase.
- To protect electric system and buildings from lightning.
- To serve as a return conductor in electric traction system and communication.
- To avoid the risk of fire in electrical installation systems.

15.Sketch the fluorescent lamp connection arrangement.

[OR]

Draw the diagram of fluorescent lamp connection?



16. List the different types of tariff calculation electrical system. [AU]

[OR]

List out the various types of tariff.

1. Uniform rate tariff or simple tariff.
2. Two-part tariff or Hopkinson demand rate.
3. Three-part tariff or dohetry rate
4. Flat demand tree
5. Straight meter
6. Flat demand Tariff
7. Block Rate Tariff
8. Maximum demand tariff
9. Power factor tariff
10. Off-peak tariff.

17. Mention the advantages and disadvantages of fuse.

[OR]

Write the merits and demerits of fuse.

Advantages/Merits:

1. It requires no maintenance
2. It can break heavy short circuit currents without noise or smoke.
3. It is suitable for over current protection.
4. Small size of fuse element is enough for under short circuit conditions.

Disadvantages/Demerits:

1. Considerable time is lost in newing or replacing.
2. The current-time characteristic of a fuse element cannot always be co-related with that of the protected electrical apparatus.

18. Define fusing factor.

[OR]

What is fusing factor?

It is the ratio between the minimum fusing current and rated carrying current. Fusing factor is always greater than 1.

19. Give the general tariff equation.

[OR]

Write down the general tariff equation.

$$Z = ax + by + c$$

Where

Z = Total amount of bill for the period.

x = Maximum demand (kW)

y = Energy consumed in kWh during the period

a = Rate per kW of maximum demand

b = Energy rate per kWh

c = Contant amount charged to consumer during each billing period even if the consumer not use energy but a consumer that remains connected to the line.

20. State Double Field Revolving Theory. [AU]

[OR]

Write the principle of single phase induction motor.

Any alternating quantity can be resolved in the two quantities which rotate in opposite directions and have half of the magnitude. The alternating flux (ϕ_m) produced in the single phase induction motor can be represented by of ($\frac{\phi_m}{2}$) the alternating flux and each rotating synchronously $N_s = \frac{120f}{p}$ in opposite directions.

21. List the types of single phase motor

[OR]

What are the different types of a single phase motor?

- i) Single phase induction motors.
- ii) Single phase synchronous motors.
- iii) Single phase series (or universal) motors.

22. Compare Fuses and circuit breakers.

[OR]

Write the difference between Fuses and circuit breakers.

Sl.NO	Fuses	Circuit Breakers
1.	It is able to detect fault and interruption	It is able to detect only interruption.
2.	Fully automatic function	Needs large equipment in order to perform automatic action.
3.	Small breaking capacity	Very high breaking capacity
4.	Very less operating time.	Comparably, high operating time.
5.	Each time after operation, replacement of fuses is needed	Replacement of equipment is not needed.

23. What are the application of split phase induction motors?

[OR]

Which type of single phase induction motor is to be selected for driving fans and blowers why?

Split phase induction motor is used for driving fans and blowers because it requires lesser starting torque.