

**MARIA COLLEGE OF ENGINEERING AND TECHNOLOGY
ATTOOR
DEPARTMENT OF MECHANICAL ENGINEERING**

**BASIC CIVIL & MECHANICAL ENGINEERING
TWO MARKS QUESTION AND ANSWERS (ME 26)
Common to (C.S.E, E.E.E, I.T, E.C.E)**

UNIT-1

SURVEYING AND CIVIL ENGINEERING MATERIALS

1. What is the difference between a plan and a map?

Map is a representation of a large area to a small scale. Example: Map of India, Map of Tamil Nadu. Plan is a representation of a relatively small area to a small scale. Example: Plan of a building.

2. Differentiate between plane surveying and geodetic surveying.

Plane surveying is a type of survey in which the surface of the earth is assumed to be plane neglecting the effect of curvature of earth's surface; whereas Geodetic surveying is the type of survey in which the curvature of the earth is taken into account.

3. State the purposes of surveying?

- To prepare the plan or map showing the ground features.
- To determine the relative heights of objectives/points in a vertical plane.
- To fix control points and thus to establish the boundaries.
- To set out any engineering works like buildings, roads, bridges, etc. which
- Involves surveying.

4. Define Levelling.

It is the art of determining the relative height point on the earth surface

5. Define Bearing.?

It is the direction of a line relative to a given reference direction .

6. What are the types of surveying.

- Plane surveying
- Geodetic surveying.

7. What are the constituent's of good brick earths?

- Alumina
- Silica
- Lime
- Oxide of iron
- Magnesia

8. What is meant by local attraction?

Local attraction is the influence caused on the measured bearing of lines due to the presence of objects like railway track, current carrying lines or cables, etc.

9. How are rocks classified?

- Igneous rocks.
- Sedimentary rocks.
- Metamorphic rocks.

10. What is Quarrying of stones?

The process of extracting stones from rocks is known as Quarrying of stones.

11. What is dressing of stones?

The process of making quarried stone into a definite and regular shape is known as Dressing of stones.

12. What are the important qualities of a good building stone?

Stones used for walls should be hard and tough.

Stone should be highly weather resistant.

Stone should be durable to withstand fire.

13.State the uses of sand.

- Used as Fine aggregate in mortar and concrete.
- Used as cushion material at the bottom of foundation to distribute the load uniformly to the subsoil.
- Used as filling material in flooring.

14.List out some varieties of sand.

- 1.Ordinary Portland cement.
- 2.Rapid hardening cement.
- 3.Quick Setting Cement.
- 4.High Alumina Cement.
- 5.Acid Resisting Cement.
- 6.Coloured Cement.
- 7.Pozzuolana Cement.
- 8.White Cement.
- 9.Low Heat Cement.

15.What is proportioning of concrete?

The process of determining the relative proportions of cement, sand, coarse aggregate, and water so as to obtain a concrete of desired quality.

16.Define water cement ration.

The ration of water to the cement in cement concrete is known water cement ration.

$$\text{Water cement ratio} = \frac{\text{Weight of water}}{\text{Weight of cement}}$$

17. Define workability of concrete.

It is the property which indicates the ease with which concrete can be mixed, placed and compacted.

18.Define curing of concrete.

Curing is the process of keeping the concrete surface wet for a certain period after placing of concrete, to attain the desired strength and durability.

19. What is theodolite? Name the types.

Theodolite is an intricate instrument used mainly for accurate measurements of horizontal and vertical angles. It is the most precise instrument available for angular measurements.

Theodolites may be classified as transit or non-transit theodolite and also classified as vernier theodolite or micrometre theodolite.

20. What are the classification of steel ?

- Angle sections
- Channel sections
- Corrugated sheets
- Expanded metals
- Flat bars
- I section
- Plates
- T section
- Round bar
- Square bar

UNIT II

BUILDING COMPONENTS AND STRUCTURES

1. How the foundations are classified?

Foundations are mainly classified into two types.

Shallow foundation: The depth of foundation is less than or equal to its width.

Deep foundation: The depth of foundation is greater than its width.

2. Define Bearing capacity of soil.

Bearing capacity of soil is defined as the ability of the soil to support the load coming on it without any sort of failure.

3. Define safe bearing capacity of soil.

The load that can be safely applied on the soil is called safe bearing capacity of the soil.

$$\text{Safe bearing capacity} = \frac{\text{Ultimate bearing capacity}}{\text{Factor of safety}}$$

4. When combined footings are used?

Combined footings are used for two or more columns located on the boundary of the property or when the isolated footings are very close to each other, overlap when individual footings are made.

5. When raft foundation is adopted?

Raft foundation is adopted for medium heavy structures in places where the soil has low bearing capacity. It is also used where unequal settlement is suspected.

6. Distinguish between uncoursed and coursed rubble masonry.

Uncoursed rubble masonry is built with stones of irregular shapes and size as obtained from quarry. In coursed rubble masonry, stones dressed into regular sizes are laid in courses.

7. What is lap in brick work?

The horizontal distance between the vertical joints of successive brick courses is known as lap.

8. How the beams are classified?

- a. Cantilever beam.
- b. Simply supported beam.
- c. Fixed beam.
- d. Overhanging beam.
- e. Continuous beam.

9. State the different types of lintel.

- a. Wooden lintel.
- b. Stone lintel.
- c. Brick lintel.
- d. Steel lintel.
- e. Reinforced cement concrete lintel.

10. Distinguish between Lintel and Beam.

Lintel is a short beam placed over openings to support the load above opening. Beam spans between two walls, columns or beams.

11. What are the functions of a floor?

To provide a levelled surface for day-to-day living and support the weight of occupants, furniture, equipment's and internal partition walls and distribute the load to the supporting structure.

12. State the purposes of plastering.

1. To provide an even and smooth surface to improve the appearance.
2. To conceal defects in workmanship and use of inferior material.
3. To provide a base for whitewashing, colour washing painting or distempering.

13. State the Hooke's law.

It states that, "within the elastic limit, the stress is directly proportional to the strain and bears a constant, known as young's modulus or modulus of elasticity.

14. Define elastic limit.

The limit upto which the body is capable of regaining its shape and size after the removal of load is known as elastic limit.

15. What is factor of safety?

Factor of safety = ultimate stress / Allowable stress

16. State the purposes of Dam.

- a. To store the surplus water.
- b. To control the stored water for irrigation.
- c. To create hydro-electric power plant.
- d. To divert the water for domestic uses.

17. What are the different types of dam?

- a. Based on structural behaviour: Gravity dam, Arch dam, Buttress dam.
- b. Based on hydraulic design: Non over flow dam, over flow dam.
- c. Based on materials used: Earth dam, Rockfill dam, RCC dam, composite dam, steel dam.

18. What is the difference between Pier and Abutment?

Pier is an intermediate support of bridge and abutment is the end support of a bridge.

19. What is interior design?

Interior design refers to designing the interior space of important buildings.

20. What is Landscaping?

Landscaping refers to any activity that modifies the visible features of an area of land outside or surrounding a building.

UNIT-III
POWER PLANTS, PUMPS AND TURBINES

1. What are the classifications of power plants based on non-renewable source of energy?
 - ❖ Steam power plant.
 - ❖ Nuclear power plant.
 - ❖ Diesel power plant.
 - ❖ Gas turbine power plant.

2. What are the classifications of power plants based on renewable source of energy?
 - ❖ Hydro-electric power plant.
 - ❖ Solar power plant.
 - ❖ Wind power plant.
 - ❖ Tidal power plant.

3. Write the steam power plant circuits.
 - ❖ Coal and ash
 - ❖ Air and flue gas
 - ❖ Feed water and steam.
 - ❖ Cooling water circuit.

4. What is the function of economiser?

The economiser is used to pre-heat the feed water.

5. What is the function of super heater?

The function of super heater is used to super heat the saturated steam and to supply the steam to turbine.

6. What are the advantages of thermal power plants?
 - Power can be generated continuously.
 - Power plant can withstand the varying load.
 - Initial cost low
 - The construction period for the power plant is minimum.

7. What are the dis-advantages of thermal power plants?
 - Power generation cost is high.
 - Handling of coal is a major problem.
 - Handling of coal is a major problem.

- Life of the plant is low.
- Plant efficiency is less.

8. What is the function of penstock?

Penstock is the pipe made up of steel or concrete used to carry water from the dam to power house.

9. What is meant by draft tube?

Draft tube is an integral part of reaction turbine. Draft tube connects the runner exit to tail race. The area of the draft tube is same as that of the runner to avoid shock and is circular cross section. The water after doing work on the turbine runner passes through the draft tube.

10. Write the advantages of hydro electric power plant.

- This plant uses water for power generation.
- Water is easily available.
- Beside power generation, this also provides benefits like irrigation, flood control, affore station-culture.
- Fuel cost is eliminated.
- Plants are automated and hence operating labor cost is low.

11. Write the dis-advantages of hydro electric power plant.

1. The plant disrupts the surrounding aquatic ecosystems.
2. Initial cost of plant is very high.
3. Failure of dams is potentially serious.
4. Large investments, long gestation periods are major issues.

12. What are the advantages of diesel power plants?

- Power plant can be easily installed.
- The plant is smaller in size and fuel handling and storage is easier.
- Quick starting and easy pickup is possible.
- No ash disposal problem.

13. What are the dis-advantages of diesel power plants?

- Fuel is more expensive.
- Repair and maintenance cost is high.
- Capacity of diesel engine is low.
- Lives of plants are low.

14. What is the function of intercooler?

This reduces the work of compressor; hence the power spent by compressor is less when the air is cooled.

15. Write the advantages of gas turbine power plants.

- The capital cost of plant is low.
- This can be quickly commissioned.
- It requires less space.
- Capacity to use wide variety of fuels.

16. Define nuclear fission.

Nuclear fission is defined as the splitting up the nucleus of an atom into parts where enormous amount of energy is released and this energy is used to generate power.

17. What are the dis-advantages of nuclear power plant?

- Initial cost is higher.
- Not suitable for varying load condition.
- Maintenance cost is higher.
- Trained workers / Engineers are required to handle the operation.

18. What is pump?

Pump is a mechanical device which is used for moving liquids or gases from lower pressure to higher pressure. In a pump mechanical forces are used to move the fluids.

19. What is priming?

Priming is the operation of filling up of water in the suction pipe, casing and a portion of delivery valve to remove the air present inside. If any air is present, the pressure developed across the impeller will not be sufficient to suck the water from the sump. The delivery valve is kept closed during priming.

20. What are the types of casing?

- Volute casing.
- Vortex casing.
- Diffuser casing.

UNIT-IV

INTERNAL COMBUSTION ENGINES

1. What is meant by I.C. engine?

In this type of engine, combustion of fuel takes place within the cylinder. This type of engine includes gas engine, petrol engines and diesel engines. These are generally used for road vehicles, locomotives, and aircraft and for other industrial applications.

2. Write the classification of I.C. engines.

Based on ignition:

- Spark ignition
- Compression ignition.

Based on fuel:

- Petrol engine
- Diesel engine.

Based on cooling system:

- Air cooled
- Water cooled.

3. What are the basic components of I.C. engines?

- Cylinder block.
- Cylinder head.
- Cylinder liners.
- Crankcase.
- Piston.

4. What is meant by Top dead centre?

This refers to the position of the crankshaft when the piston is in its top most position i.e., the position closest to the cylinder head.

5. What is meant by Bottom dead centre?

This refers to the position of the crankshaft when the piston is in its lowest position i.e., the position closest to the cylinder head.

6. Define stroke.

Stroke is defined as the distance traveled by the piston while moving from T.D.C to the B.D.C.

7. What is meant by clearance volume?

The volume of cylinder above the piston when it is in the T.D.C. position is referred to as Clearance volume (V_c).

8. What is compression ratio?

This indicates the extent to which the charge in the engine is compressed.

This is calculated as the ratio of the volume above the piston at B.D.C to the volume above the piston at T.D.C. If V is the compression ratio

$$V = \frac{V_S + V_C}{V_C}$$

9. Define Scavenging.

It is defined as a process of forcing out the exhaust gases from the cylinder by admitting the fresh charge into the cylinder. This action takes place in two-stroke cycle engines.

10. Define Carburettor.

The carburetor is a device for atomizing and vaporizing the fuel and mixing it with the air in varying proportions to suit the changing conditions of spark ignition engines. The air fuel mixture so obtained from the carburetor is called the combustible mixture.

11. What are the main functions of a carburetor?

- It preserves fuel at a constant head.
- It vaporizes and atomizes the fuel and mixes it with the air.
Vaporization means the change of fuel from a liquid to a vapour where as 'atomization' is the breaking up of fuel by mechanical system, so that every small particle of the fuel is surrounded by air.
- It provides and controls the amount and strength of air-fuel mixture under varying conditions of load and speed of the engine.
- It provides easy starting with the engine in cold
- It ensures the engine to run slowly without missing and without undue wastage of fuel,
- It provides maximum acceleration without hesitation to pick up speed when the throttle is suddenly or slowly opened.

12. What are the functions of Fuel injector?

The purposes of the fuel injector is to injector a small volume of fuel in a fine spray and, to assists in bringing each droplet into contact with a sufficient oxygen to give quick and complete combustion.

13. Define spark plug.

Spark plug is defined as a device which is used to ignite the compressed air-fuel mixture by producing an electric spark. It is usually mounted on the cylinder head.

14. Write the basic components of spark plug.

- Insulator.
- Central electrode.
- Earth electrode.
- Metallic shell.
- Gasket.

15. What are the purposes of cooling system?

- To maintain smooth running of engine.
- To avoid the distortion of engine parts.
- To avoid pre-ignition of charge.
- To maintain the temperature of engine within the limit.
- To maintain the strength of the cylinder and piston

16. What is meant by Boiler?

A boiler is a closed vessel in which water or other fluid is heated. The heated or vaporized fluid exits the boiler for use in various processes or heating applications.

17. Write the classification of boilers.

- Fire tube boilers.
- Water tube boilers.

18. What are the advantages of steam boiler?

- Cost of production is cheap when compared with other boilers.
- Less space is required.
- Fuel used is cheaper.
- Steam engines can work under overload of 25percent continuously.

19. What are the dis-advantages of steam boiler?

- Water requirement is more.
- Required more time for installation.
- Maintenance and operating costs are high.
- Coal handling is difficult.

20. What is the function of Boiler?

The function of the boiler is to evaporate water into steam at a pressure higher than the atmospheric pressure. Water free from impurities such as dissolved salts, gases and non soluble solids should be supplied to boilers. This is done by suitable water treatment. Steam is useful for running steam turbines in electrical power stations.

UNIT-V

REFRIGERATION AND AIR CONDITIONING SYSTEM

1. What is Refrigeration?

Refrigeration is the process of removing heat from an enclosed space or from a substance, under controlled conditions and moving the heat to an unobjectional place.

2. What is meant by refrigerator?

A refrigerator is a machine that removes heat from a low temperature region. Since energy cannot be destroyed, the heat taken in at a low temperature must be dissipated to the surroundings.

3. State the second law of Thermodynamics.

Second law of Thermodynamics states that heat will not pass from cold region to a warm one without the aid of an external agent. Therefore, a refrigerator will require this external agent or energy input, for its operation.

4. What is meant by refrigerant? Give some examples.

The substance which absorbs heat the materials placed in refrigerator is called refrigerant. E.g.: Freon-12, Freon-22, and Ammonia.

5. Define Ton of refrigeration.

The capacity of air conditioner and ice plant is represented in Tons.
 $1\text{ton} = 3024 \text{ kilo calories/hr}$

6. What is meant by sensible heat.

The amount of heat removed from the body or given to the body to decrease or increase its temperature is called sensible heat.

7. Write the different kinds of heat transfer modes with examples.

- Conduction E.g.: Metal and other solids
- Convection E.g.: Heat through fluid
- Radiation E.g.: Sun light

8. Define Co-efficient of performance.

The purpose of the refrigerator is to remove heat from the cold region while requiring as little external work as possible.

$\text{COP} = \text{Heat exerted} / \text{Work supplied}$

9. What are the applications of refrigeration?

- Preserving foodstuffs in homes, restaurants and in large warehouses.
- Used to liquefy gases like oxygen, Nitrogen, Propane and Methane.
- Preserving dairy products, fruits and vegetables.
- Preserving Meats, poultry and fish.

10. What are the types of refrigeration system?

- Vapour compression refrigeration system
- Vapour absorption refrigeration system

11. Write the difference between Vapour compression and Vapour absorption refrigeration system.

In Vapour compression system The capacity of the system is above 1000 tons

In Vapour absorption system Maximum capacity is limited to 1000 tons

In Vapour compression system The operation is quiet & Maintenance cost is low In Vapour absorption system The operation is noisy & Maintenance cost is high.

12. Write the classification of refrigerants with examples.

- Primary refrigerants E.g. R12, Ammonia, Freon.
- Secondary refrigerants E.g. Co₂, CaCl₂, NaCl

13. What is meant by Air conditioning?

Air conditioning is the process of controlling the temperature and humidity of air by heating or cooling, humidifying or dehumidifying, and filtering the atmospheric air, and thus creating a healthy and comfortable condition for human beings.

14. What are the applications of Air conditioning?

- Providing relatively constant indoor environment for a building as per human comfort.
- For taller buildings where natural ventilation is not possible due to high
- In hospital operation theatres, to reduce infection risk.

15. Define Psychometry

It is the science which deals with the study of the behavior of air and water vapour mixture.

16. Define dry bulb temperature.

It is the temperature of air measured by an ordinary thermometer.

17. Define Wet bulb temperature.

It is the temperature of air measured by thermometer when its bulb is covered with a wet cloth and is exposed to atmospheric air.

18. Define dew point temperature.

It is the temperature at which the moisture present in the air begins to condense. It corresponds to the saturation temperature of water vapour in the mixture of air and water vapour.

19. Write the types of Air conditioner?

- Window air conditioner
- Package air conditioner
- Centralised air conditioner
- Split type air conditioner

20. Define relative humidity

It is defined as the ratio of water vapour present in the given amount of air to the mass of water vapour present in the same volume under same temperature conditions.