

VETRI VINAYAHA COLLEGE OF ENGINEERING AND TECHNOLOGY

THOTTIAM

DEPARTMENT OF MECHANICAL ENGINEERING

GE6251-BASIC CIVIL AND MECHANICAL ENGINEERING

PART-A IMPORTANT QUESTIONS WITH ANSWERS

UNIT-1 SURVEYING AND CIVIL ENGINEERING MATERIALS

1. What are the objectives 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 work like buildings, roads, bridges etc. which involves surveying.

2. What is the advantage of reinforced concrete compared to plain concrete?

- It has good resistance to fire, temperature and weathering actions.
- Reinforced concrete is a versatile building material and can be used for casting members of any shape.
- R.C.C is tough and durable.
- With proper cover, R.C.C. can be made free from rusting and corrosion.

3. What are the different types of steel?

- i) Mild steel or Low carbon steel – carbon content from 0.10 to 0.25 percent.
- ii) Medium hard steel or medium carbon steel – Carbon content 0.25 to 0.6 percent.
- iii) Hard steel or high carbon steel – Carbon content from 0.60 to 1.5 percent.

4. What is meant by leveling?

It is defined as the art of determining the relative heights of points on the earth's surface. This technique of surveying deals with measurements in vertical planes.

5. What are the types of surveying?

- i) Plane surveying.
- ii) Geodetic surveying.

6. Write any four types of cement.

- i) Acid-resistant cement.
- ii) Low heat cement.
- iii) Pozzolana cement.
- iv) Quick setting cement.

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

Map is a representation of a large area to a small scale. Ex- Map of India, map of Tamil Nadu.

Plan is a representation of a relatively small area to a small scale. Ex- Plan of a building.

8. List down the commercial forms of steel sections used in the construction.

- i) Round bars. ii) Square bars. iii) Tor or ribbed steel. iv) Plates. v) Flat bars. vi) Angle sections.
- vi) Channel sections vi) I-sections.

9. What are the raw materials used for the manufacturing of cement?

i) Lime (CaO) - 62% ,ii) Silica (SiO₂) - 22% ,iii) Alumina - 5% ,iv) Calcium Sulphate- 4% ,v) Iron Oxide- 3% .vi) Magnesia - 2% ,vii) Sulphur - 1% viii) Alkalies - 1% .

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. Name any two methods to determine the area of a particular construction site.

- i) Trapezoidal rule ii) Simpson's rule

13. What are the constituents of brick?

- i) Alumina.
- ii) Silica.
- iii) Lime.
- iv) Oxide of iron.
- v) Magnesia.

14. What is the need for reinforcement in RCC?

When load is applied to the beam, it deflects a little. At certain stage it cannot resist tensile stress at the lower portion, so it breaks. In order to resist tensile stress a reinforcement is required at the lower portion of the beam to resist the applied load.

15. Mention the Advantages and disadvantages of chain surveying?

Advantages: • It is simple • It does not require any costly equipment • It is adopted for preparing plans for small area

Disadvantages: • It cannot be used for large areas • It cannot be used in thick bushy areas with up sand downs. • Chain surveying is not always accurate.

UNIT-II BUILDING COMPONENTS AND STRUCTURES

1. Define Objectives of foundation.

- To distribute the total load coming on the structure on a larger area To support the structures
- To give enough stability to the structure against various disturbing forces, such as wind and rain.

2. What is meant by Deep foundation?

Deep foundation consists of pile and pier foundation. Pier foundations are rarely used for buildings. This consists in carrying down through the soil a huge masonry cylinder which may be supported on solid rock.

3. How the foundations are classified?

i) Shallow foundation ii) Deep foundation.

4. Define bearing capacity of soil.

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

5. Define safe bearing capacity of soil.

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

Safe bearing capacity=Ultimate bearing capacity/Factor of safety.

6. State the purpose of plastering.

- i) To provide an even and smooth surface to improve the appearance.
- ii) To cancel defects in workmanship and use of inferior material.
- iii) To provide a base for whitewashing, colour washing painting or distempering.

7. Which types of Failures occur in foundation?

1. Unequal settlement of soil.
2. Unequal settlement of masonry.
3. Withdrawal of moisture from sub soil.

8. Define Superstructure.

Super structure mainly consists of walls, doors windows and lintels. The purpose of superstructure is to provide the necessary utility of the building, structural safety, fire safety, sanitation and ventilation.

9. What are the remedial measures for the failure of foundation?

- i) Foundation should be taken down to a depth where no ground water movement occurs.
- ii) The soil moisture content is maintained constant.
- iii) The sides of the foundation should be protected by proper drainage.

10. Mention the different types of deep foundation?

i) Pile foundation i) Pier foundation i) Wel foundation.

11. How to improve the bearing capacity of soil?

i) By increasing depth of foundation i) By cement grating i) By draining the subsoil water iv) By compacting the soil.

12. How to select the site for foundation?

- i) Soil at the building site should not be of artificially made-up type.
- ii) Site should not be undulating since this leads to increase in cost for leveling the ground.
- iii) The site should have its general slope and the ground water table in the site should not be high.

13. What is meant by 1:2:4 concrete mixes?

In 1:2:4 concrete mix, the materials are measured by the mass like 1 part of cement, 2 parts of fine aggregate 9 sand and 4 parts of coarse aggregate.

14. What are the different types of dam?

i) Rigid Dams ii) Solid gravity dam iii) Arch Dam iv) Butres dam v) Timber and steel dam vi) Nonrigid dams. Vii) Earth Dams viii) Rockfills dams

15. Define English Bond:

English bond consists of headers and Stretchers in alternative courses of elevation. A queen closer is placed next to the qinheader in each header course to the ful thickness of wal. Each alternative header lies centrally over a stretcher of the stretcher course.

16. Give a list of types of bonds in brick work.

i) Stretcher bond ii) English bond iii) Garden wall bond iv) Dutch bond. v) Header bong vi) Felmish bond

17. When combined foots are used?

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

18. What are the reasons for carrying foundation below the ground level?

- i) To distribute the non-uniform load of the superstructure evenly to the subsoil.
- ii) To prevent or minimize cracks due to movement of moisture in case of weak or poor soils etc.
- iii) To avoid cavities below the ground level, that could be created by erosion, by animals etc.

19. What are the different types of bridges?

i) Permanent bridges ii) Back bridges iii) Through bridges iv) Semi throughbridges v) Straight bridges vi) Skew bridge vii) Arch Bridge viii) Slab Bridge ix) Tbeam and slab bridge x) Bow string and girder bridge xi) Steel Arch bridge

20.Explain about pre stresses concrete bridge.

After the concrete structured is formed,the stress is transformed to the concrete through the bond between wires and concrete .It is prepared somewhere and the concrete members are transferred to the work site. It is used for construction of bridges and highways bridges.

UNIT-III POWER PLANT ENGINEERING

1.What is a prime mover?

Prime mover is a device used for converting different forms of energy into mechanical energy in the form of rotation. *Example: Steam turbine*

2.What is fuction of converter?

Condenser is a device which cools the steam and converts it back to water. The condensed water can be used as feed (*input*) water to the boiler (*steam generator*).

3. What are the various factors to be considered in selecting site for a thermal power plant?

- (a)Availability of coal
- (b) Availability of water
- (c) Transportation facilities
- (d) Type of land
- (e) Distance from residential area

4. List the various merits of steam (thermal) power plant.

- (a) The cost of fuel is cheap
- (b) Plant can be located near the fuel and water source
- (c) Less construction space is required
- (d) Installation cost is lesser when compared to hydroelectric power plant
- (e) The construction, erection and commissioning of thermal power plant requires less period of time than a hydel (**hydroelectric**) power plant.

5. State the demerits of a steam (thermal) power plant.

- (a) Steam power plant produces smoke, which affects environment. (b) Cost of power generation is more compared to other power plants
- (c) If the plant is located far away from distribution area, then cost of transmission is more. (d) The power plant cannot be used during peak load
- (e) Stand by losses is more, because the boiler continues to work even after the turbine is switched off.

6. State the working principle of hydroelectric (hydal) power plant.

Hydroelectric power plant utilizes the potential energy of water when it is stored in a dam built across the river. The potential energy of stored water is converted into kinetic energy by passing it through a pipe called penstock. The kinetic energy of water is then converted into mechanical energy in a water turbine.

7. What are the various classifications of hydroelectric power plant?

High head power plant – When the water exceeds 70 m the hydroelectric power plant is said to be high head power plant. The *Pelton wheel turbine* is used as the prime mover.

Medium head power plant – When the head water ranges between 15 m to 70 m, then the hydroelectric power plant is said to be medium head power plant. The plant uses *Francis turbine* as the prime mover.

Low head power plant – When the head of water is less than 15 m, then the hydro electric power plant is said to be low head power plant. The plant uses *Kaplan turbine* as the prime mover.

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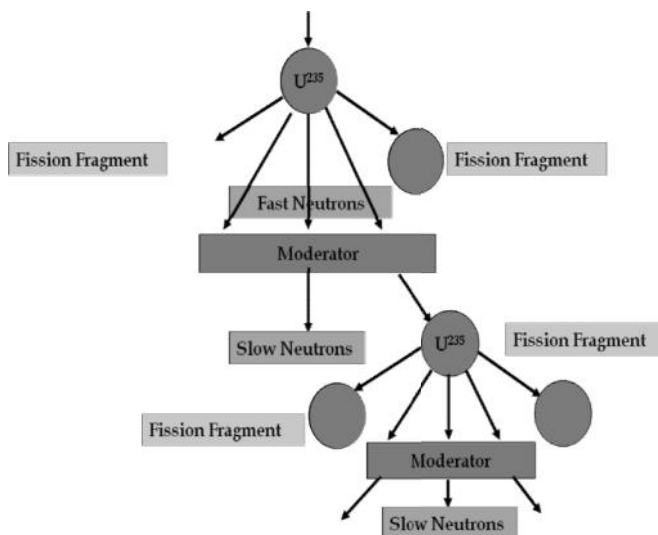
12. State the working principle of nuclear power plant.

A nuclear power plant differs from a thermal power plant only in the steam generating part. In thermal (steam) power plant, the source is coal but in a nuclear power plant the source is a nuclear fuel (Uranium). The heat produced by the nuclear fission reaction of the nuclear fuel is used to convert water into steam. The steam with high energy content is used to drive the prime mover which is coupled which generator.

As per the statement of scientists, *“One kg of U^{235} can produce as much as energy can be produced by burning of 4500 tonnes of high grade coal”*.

13. Write short notes on chain reaction.

A chain reaction produces enormous amount of heat which is used to produce steam. (*The chain reaction under uncontrolled conditions can release extremely large amount of energy causing atomic explosion*).



- It is a process of splitting up of nucleus of fissionable material like uranium into two or more fragments with release of enormous amount of energy.
- The nucleus of U^{235} is bombarded with high energy neutrons
- The neutrons produced are very fast and can be made to fission other nuclei of U^{235} , thus setting up a chain reaction.
- Out of 2.5 neutrons released one neutron is used to sustain the chain reaction.
- $U^{235} + {}_0^1n \longrightarrow Ba^{141} + Kr^{92} + 2.5{}_0^1n + 200 \text{ MeV energy}$
 $1 \text{ eV} = 1.6 \times 10^{-19} \text{ joule.}$
 $1 \text{ MeV} = 10^6 \text{ eV}$

14. What are the various disposal methods for solid, liquid and gaseous waste from power plants?

Gaseous wastes are discharged to the atmosphere through high stacks. Moderate liquid wastes, after a preliminary treatment is discharged to deep pits. Active liquids are kept in concrete tanks. These tanks are buried in the ground till their radioactivity decays up to a safe level for disposal.

Solid wastes are classified into combustible wastes and non combustible wastes. Combustible wastes can be reduced to ashes by putting them into fire. Land burial is the best method employed for solid waste disposal.

15. What are gas turbines?

Gas turbines are mainly used for electric power generation and also in jet engines of air craft. It is also used in turbochargers of internal combustion (IC) engines. They have limited application in marine engines.

Gas turbines have a unique advantage of using any type of fuel. i.e., Solid, liquid or gas. Gas turbine operates either on an open cycle or closed cycle.

16. List the demerits of gas turbines

- Operating temperature is high in the combustion chamber; hence special high temperature alloys should be used.
- Thermal efficiency is very low.
- Not suitable for low capacity.
- Large size exhaust duct due to increased requirement for air for cooling and combustion.

17. What is the method can be adopted to improve the thermal efficiency of gas turbine power plant.

- By using a multistage compressor and inter-cooling to reduce the work of compression.
- By using a multistage turbine to reduce the temperature of the exhaust gases before leaving the turbine.
- By using a generator, to further reduce the temperature waste gases.

18. What are the advantages of a diesel power plant?

- (a) Plant layout is simple
- (b) Installation and commissioning is easy
- (c) Quick starting and easy of pickup of loads

22. What is the use of surge tank in a hydraulic power plant?

1. To safe guard the penstock from the water hammer effects.
2. To serve as a storage tank as well as a supply tank, according to the changes in load conditions.

23. What is a pump? State its application.

Pump is a device that is used to raise or transfer the fluids (liquids, slurries and gases). It is also used to maintain constant flow rate or constant pressure. The various applications of a pump are treatment of sewage, irrigation. Medical industries and chemical industries use pumps for transfer of fluids.

24. What are the various classifications of pumps?

Pumps are mainly classified into positive displacement pumps and rotodynamic pumps. In positive displacement pumps the fluid is drawn or forced into a finite space and then sealed by mechanical means. Then the fluid is forced out to a higher level.

Example: Reciprocating pump

In rotodynamic pumps there is a free passage between the inlet and outlet without any intermittent sealing.

Example: Centrifugal pump

25. Write short notes on priming.

Priming is a process used to drive out the air occupied in the casing by filling it with water. Before starting the centrifugal pump, priming is performed. Priming means filling suction pipe and casing with water. When the pump is switched on the pump, sends away the water filled in the casing and the suction is created.

26. What are the types of reciprocating pump?

Reciprocating pumps are classified into single acting reciprocating pump and double acting reciprocating pump.

27. Differentiate between single acting reciprocating pump and double acting reciprocating pump.

S. No.	Single acting reciprocating pump	Double acting reciprocating pump
1.	Fluid is pumped during delivery stroke of the piston	Fluid is delivered during forward and return stroke of the piston
2.	Volume of fluid pumped is low.	High volume of fluid can be pumped
3.	Idle stroke is present	No idle stroke
4.	Less efficient in terms of volume of flow	Highly efficient in terms of volume of flow
5.	Weight is less	Weight is more when compared to single acting reciprocating pump
6.	Less initial cost	High initial cost
7.	Maintenance cost is less	High maintenance cost

28. What are the various applications of a centrifugal pump?

- (i) It is used in drainage
- (ii) It is used in marine applications.
- (iii) It is used for irrigation in agriculture
- (iv) It is used for large discharges and high heads.

29. Differentiate between centrifugal pump and reciprocating pump.

S. No.	Reciprocating pump	Centrifugal pump
1.	It is heavy	Compact in design and it is light
2.	Discharge is not smooth	Discharge is smooth
3.	Less efficient in low heads	Highly efficient in low heads
4.	Discharge is less	Discharge is more
5.	Used for high heads	Used for low heads
6.	Maintenance cost is high	Less maintenance cost

30. Write short notes on multistage centrifugal pumps.

A centrifugal pump having more than one impellers is known as a multistage centrifugal pump. Multistage centrifugal pumps are used for high head and large quantity of discharge.

For high head of discharge, the impellers are mounted on the same shaft. (*Pump in series*) For high discharge, the impellers are mounted on different shafts. (*Pumps in parallel*).

31. What is the purpose of a foot valve?

Foot valve is a one way non return valve fitted with a strainer, to prevent the foreign matter to enter into the pump. The pumping should be stopped when water level is just above the foot valve, otherwise air particles will enter the suction pipe causing air locking.

32. Write short notes on a turbine.

Turbine is also known as a **prime mover**, as it drives the generator in a power plant. It is a rotary engine, which is being driven by pressurized fluid, steam with high energy content or gas. The working fluid possesses pressure energy and kinetic energy. The turbine converts potential and kinetic energy of working fluid into mechanical energy.

33. Write short notes on gas turbines.

Gas turbines are used for power generation and also in jet engines in an aircraft and in turbochargers of internal combustion engines. Gas turbines have the flexibility of using any type of fuel such as liquid or gaseous fuel.

34. Write short notes on steam turbines.

It is a device which converts the pressure energy of steam into kinetic energy. The kinetic energy is then converted into mechanical energy. The major parts of a steam turbine are fixed nozzle, rotor, fixed and moving blades, casing etc.

35. Write short notes on reaction turbine.

- The high pressure steam from the boiler is passed through the nozzles.
- When the steam comes out through these nozzles, the velocity of steam increases relative to the rotating disc.
- The resulting force of steam on nozzle gives the rotating motion to the disc and the shaft.
- The shaft rotates in opposite direction of the steam.

E.g Francis Turbine, Kaplan Turbine.

35. What are the various losses occur in a centrifugal pump? Mechanical

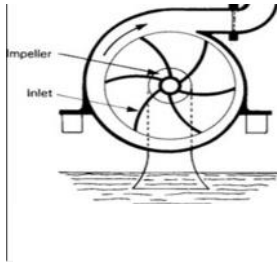
Losses

- Losses due to disc friction between the impeller and the liquid which fills the clearance spaces between the impeller and casing
- Losses pertaining to friction of the main bearing and glands.

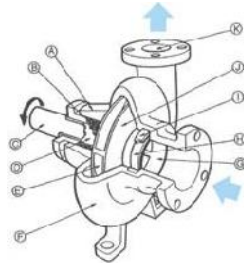
Hydraulic Losses:

- Shock or eddy losses at the entrance to and exit from the impeller
- Losses due to friction in the impeller
- Friction and eddy losses in the guide vanes/diffuser and casing

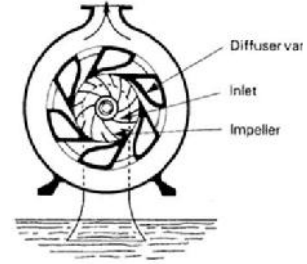
36. What are the various types of casing in centrifugal pump?



Volute casing



Vortex casing



Diffuser casing

Volute Casing: In this type of casing the area of flow gradually increases from the impeller outlet to the delivery pipe.

Vortex Casing: If a circular chamber is provided between the impeller and volute chamber the casing is known as Vortex Chamber.

Diffuser Casing :

- The impeller is surrounded by a diffuser.
- The guide vanes are designed in such a way that the water from the impeller enters the guide vanes without shock.
- It reduces the vibration of the pump.
- Diffuser casing, the diffuser and the outer casing are stationary parts.

37. Write short notes on priming.

- The operation of filling the suction pipe, casing and a portion of delivery pipe with the liquid to be raised, before starting the pump is known as Priming
- It is done to remove any air, gas or vapour from these parts of pump.
- If a Centrifugal pump is not primed before starting air pockets inside impeller may give rise to vortices and causes discontinuity of flow

38. Write short notes on air vessels.

Air vessel is a closed chamber containing compressed air in the upper part and liquid being pumped in the lower part.

Purpose of air vessel:

- To get continuous supply of liquid at a uniform rate.
- To save the power required to drive the pump (By using an air vessel the acceleration and friction heads are considerably reduced)
- To run the pump at much higher speed without any danger of separation

39. Write short notes on cavitation.

When a liquid is subjected to a pressure lower than its vapour pressure, it boils. Hence, vapour bubbles are produced. These bubbles collapse violently when subjected to high pressure. If the collapse of bubbles is near to a solid surface, then difference in localised pressures, noise and vibrations are produced. This corrodes the metal where it occurs. This is known as cavitation.

UNIT-IV IC ENGINES

1. How boilers are classified?

(i) According to flow of water and gases

(a) Fire tube boiler (b) Water tube boiler

(ii) According to pressure

(a) Low pressure boiler (b) High Pressure

(iii) According to method of firing

(a) Internally fired boiler (b) Externally fired boiler

2. List out the advantages of high pressure boiler.

(i) Heat energy per kg of steam is increased at high pressure

(ii) Production rate of steam is high.

(iii) Superheated steam can be produced.

3. What are the various applications of steam boilers?

(i) Steam produced by the boiler is used for driving steam turbines for power generation

(ii) Steam is used in steam engine in railway locomotives. (iii) Steam boiler is also used in industrial applications.

4. What is the purpose of an economizer in boilers?

The purpose of an economizer in a steam boiler is used to preheat the feed water from the tank, before it enters the boiler.

5. What is the purpose of superheater in boiler?

A superheater is used to increase the temperature the steam to convert the dry steam into super heated to steam. Superheated steam with high energy content is used to drive the turbine.

6. What is meant by forced circulation boiler?

In forced circulation boiler, water is circulated with high pressure by a pump driven by the motor. *Example: Lamont boiler.*

7. What is the purpose of a man hole in the boiler?

A man hole is a provision for a skilled personnel to enter into the boiler shell for cleaning, inspecting or for attending any repairs in the boiler.

8. What is meant by scaling in the boiler? What is its effect?

The impurities that are left behind when water is transformed into steam, forming a thin layer is called scaling in the boiler. When the scaling is more around in a water tube boiler, it leads to poor heat transfer.

9. At what pressure do the modern high pressure boilers produce steam?

Modern high pressure boilers produce steam at a pressure of 200 bar.

10. What is a grate in the boiler?

A grate is a part of the boiler over which solid fuel is burnt.

12. List out the advantages of high pressure boiler.

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11. What are IC engines? Give examples.

IC engines are internal combustion engines. The combustion of the fuel takes place in the combustion chamber. *Examples: Two wheelers, trucks, cars etc.*

12. What are EC engines? Give example.

EC engines are External combustion engines. The steam produced separately in the boiler, and the steam is supplied the cylinder in which the piston reciprocates. *Example. Steam engine.*

13. What are the various classifications of IC engines?

According to the type of fuel used

(a) Petrol engine (b) Diesel engine (c) Gas engine

According to the cooling system

(a) Air cooled engine (b) Water cooled engine

According to the cycle of operation

(a) Otto cycle (b) Diesel cycle (c) Dual combustion cycle

According to the number of cylinder

(a) Single cylinder (b) Multi cylinder engine.

According to the number of strokes

(a) Two stroke (b) Four stroke

14. What is the function of a carburetor?

The main function of a carburetor is to evaporate the liquid petrol and to mix with the correct of air and supply the air fuel mixture I the desired ratio at all speeds and loads.

15. What is the function of a spark plug?

In petrol engine, as the temperature at the end of compression is not enough to ignite the petrol air mixture a spark is provided at the right time by means of a spark plug. Hence a spark plug ignites the fuel at the end of compression and starts the combustion.

16. Write down the differences between air cooling and water cooling system.

S. No.	Air cooling system	Water cooling system
1	Design is simple	System is complicated
2	Weight of engine is less	Weight of engine is more
3	Cost of engine is less	Cost of engine is more
4	Since water is not used, no leakage of water	Possibility of leakage of water
5	More noise from the engine	Less noise, as water dampers the vibration
6	Control of temperature is difficult	Temperature can be controlled by thermostat

17. What are the main functions of a lubrication system in IC engines?

- (i) To reduce the friction between moving parts and to reduce the wear and tear
- (ii) To reduce the temperature produced due to friction
- (iii) To reduce noise between the moving parts
- (iv) To act as a sealing between the cylinder and piston and to prevent the leakage of gases

18. What are the various types of lubrication used in IC engines?

- (i) Splash lubrication
- (ii) Pressure lubrication
- (iii) Petroil method

19. What is the major function of a fuel injector?

Fuel injector is used in Diesel engine, to spray the fuel as tiny droplets on the hot compressed air, at the end of compression stroke. When the diesel rushes out through the fine hole of the injector, it gets atomized and mixes with compressed air in the combustion chamber.

21. Write down the differences between diesel injection and petrol injection.

S.No.	Diesel Injection	Petrol Injection
1	Fuel is directly injected into the cylinder	Fuel is injected in the inlet manifold
2	High injection pressure	Injection pressure is low
3	Fuel is injected at the end of compression stroke	Fuel is injected during the induction stroke

22. Write short notes on scavenging.

Scavenging is the process of cleaning or removing the burnt exhaust gas by the incoming compressed air-fuel (*petrol*) mixture.

23. What are the major functions of a fuel supply system?

- (i) To supply required amount of fuel at the correct time.
- (ii) To properly atomize the fuel for a homogeneous mixing with atmospheric air.
- (iii) To maintain sharp beginning and closing of the injection.

24. What are the requirements of good lubricating oil?

- (i) Non corrosive.
- (ii) Good detergent quality to keep the rubbing surfaces clean.
- (iii) Able to maintain the thin film of oil even at high load.
- (iv) High flash point and low pour point temperatures.

UNIT-V REFRIGERATION AND AIR CONDITONING SYSTEM

1. Define refrigeration.

It is a science of providing and maintaining the temperature below that of the surrounding temperature.

2. Define Ton of Refrigeration

Ton of refrigeration is defined as the quantity of heat to be extracted to produce one ton of ice at 0°C , within 24 hours when the initial condition of water is also at 0°C . In SI units 1 TR is equivalent to 210 kJ/in or 3.5 kW.

3. Define Coefficient of Performance (COP).

Coefficient of performance is defined as the ratio between the quantity of heat extracted to Work done by the system.

4. What are the various applications of refrigeration?

- (i) Used in water coolers for supplying cold water.
- (ii) For preservation of food, vegetables, milk, ice cream etc., refrigeration system is used.
- (iii) For preservation of perishables like fish, mutton, chicken etc.,

5. What are the various properties of refrigerants?

- (i) Low boiling point, low freezing point, high latent heat of evaporation.
- (ii) Low specific heat and low viscosity.
- (iii) Refrigerants should be easy to liquefy.
- (iv) Chemical stability
- (v) Non flammable.

6. Differentiate between vapour compression refrigeration and vapour absorption refrigeration system.

S.No.	Vapour compression refrigeration system	Vapour absorption refrigeration system
1	Smaller in use	Very large in size
2	COP is higher	COP is lesser
3	System produces noise	Silent in operation
4	Maintenance cost is high	Maintenance cost is low
5	Refrigerant used is R134 a	Refrigerant used is ammonia

7. What are the various applications of air conditioning?

- (i) Airconditioning of houses, hotels, theatres etc.,
- (ii) For comfort of passengers in cars, buses, trains, ships and aircrafts.
- (iii) Airconditioning is used textile industries, printing and machine tools etc.

8. Define the following. (i) Dry air (ii) Moist air (iii) Dry bulb temperature (iv) Wet bulb temperature.

- (i) **Dry air** : Air without water vapour or moisture
- (ii) **Moist air** : It is a mixture of dry air and moisture
- (iii) **Dry bulb temperature**: Actual temperature of a gas, measured by a standard mercury thermometer
- (iv) **Wet bulb temperature** : The temperature measured by a mercury thermometer, when the bulb is covered by a moistened cloth.

9. What are the various applications of centralized air conditioning?

The central air conditioning system is adopted for large buildings, hotels, hospitals, cinema theatres etc. This system is used only for heavy loads of about 20 tons or more.

10. What is meant by dry ice refrigeration?

Dry ice is *solid carbon dioxide*. It may be pressed into various sizes and shapes, blocks, or slabs. As it absorbs heat, it changes directly from a solid to a vapor. It does not go through the liquid state. This change from solid to vapor is called sublimation. At atmospheric pressure, solid carbon dioxide vaporizes at -109°F (-78°C).

PART – B
UNIT-1 SURVEYING AND CIVIL ENGINEERING MATERIALS

1. Give an elaborate account on the instruments used in leveling.(16)
2. The following series of perpendicular offsets were taken from a chain line to a curved boundary line at 5 meters intervals : 0,3.25,4.10,6.45,8.90,5.76,8.50 and 0. Determine the area enclosed between the survey line and the boundary line by
 - i) Trapezoidal rule
 - ii) Simpsons rule.(16)
3. Explain the differential leveling with neat sketches.(8)
4. What are the different forms of steel sections used in structural works? also state their specific applications.(8)
5. State the rules that are followed to calculate the area . Explain any one rule in details .(8)
6. What are the different forms of building stones? Also give the characteristics of a good building stone.(8)
7. Briefly explain the procedure of check leveling.(8)
8. Explain in detail about any four commonly used construction material .(16)
9. Classify surveying based on the instrument used .Discuss any two methods in detail.(16)
10. Discuss qualities and uses of any three building material(16)
11. Describe the different types of concrete.(16)
12. Explain the classification, qualities and constituents of brick.(16)
13. What are the qualities of stone.(8)
14. What cement concrete and what are the tests carried out in cement concrete.(16)
15. Explain the sand and its types.(16)
16. Explain about the steel sections.(16)

UNIT-II BUILDING COMPONENTS AND STRUCTURES

1. What are the types of foundation? Write down the requirements of good foundation.(16)
2. Compare the brick masonry with stone masonry.(10)
3. Define stress and strain.(6)
3. What do you understand by foundation ? Draw sketch to show various types of shallow foundations.(16)
4. What are the factors influencing the selection of dams? Explain with neat diagram any one type of dam.(16)
5. Explain various kinds of rubble masonry with sketches.(8)
6. Write short notes on columns.(8)
7. Discuss in detail about the foundation for machinery.(16)
8. Derive the relation between young's modulus(E) and bulk modulus(k) of material.(8)
9. State the requirements of good foundation for a building.(8)
10. Briefly explain the importance of bearing capacity of soil foundation in engineering.(8)
11. Explain the stepped footing foundation with a neat sketch. Also explain how width and depth of footing are calculated?(8)
12. List the objectives of plastering. Give the names of different types of plasters. Also state the common defects that occur in plasters.(8)
13. What is roof ? Explain the constructional features of R.C.C roofs.(8)
14. Briefly explain about lintels.(16)
15. Explain the types of footing with neat sketch.(16)
16. Write briefly explain about types of flooring.(8)

UNIT-III POWER PLANT ENGINEERING

1. Sketch schematically the arrangement of diesel power plant for electric power generation and explain the function of its main components.(16)
2. Explain the working of a single stage and double reciprocating pump with neat sketches.(16)
3. Describe the working of steam power plant with neat line diagram.(16)
4. Explain the working of gas turbine power plant. Also state the advantages of gas turbine power plant.(16)
5. Explain the working principle of centrifugal pumps with help of diagram.(16)
6. Explain briefly about the circuits of the steam power plant.(16)
7. Draw a neat block diagram of nuclear power plant and explain it briefly.(16)
8. Explain the working of hydro electric power plant.(16)
9. Sketch and explain the types of casing.(8)
10. Describe the working of Pelton wheel (impulse turbine).(16)
11. Describe the working of reaction turbine.(16)

UNIT-IV IC ENGINES

1. Sketch and explain the working of a diesel fuel pump.(16)
2. Draw a neat sketch of pressure lubrication system of an IC engine.(16)
3. Describe the different cycle of operations of two stroke petrol engine with neat sketches.(16)
4. What is carburetor? State the functions of the carburetor.(8)
5. Give the sketch of four stroke IC engine to show the various components of it and indicate the parts. Explain each of them.(8)
6. Describe the different cycle of operations of four stroke petrol engine with neat sketches.(16)
7. Comparison between two stroke and four stroke engine.(16)
8. Comparison between petrol engine and Diesel engine with neat sketch.(10)
9. Briefly explain about the water tube boiler with neat sketch.(16)
10. Explain the working principle of fire tube boiler.(8)
11. Briefly explain about the types of High pressure boiler with neat sketch.(16)
12. Write briefly about the fuel supply system used in S.I engine.(8)

UNIT-IV IC ENGINES

1. State the principle of refrigeration. Write down the properties of an ideal refrigerant.(16)
2. Classify the air conditioning systems and explain them briefly.(16)
3. Explain with neat sketch of domestic refrigerator.(16)
4. Describe with help of suitable diagram, vapour compression refrigeration system.(16)
5. Describe with help of suitable diagram, vapour absorption refrigeration system.(16)
6. Explain window air conditioner with neat diagram.(16)
7. Show the arrangement of split type air conditioning system with neat sketch.(8)
8. Comparison between vapour compression and vapour absorption system.(8)