1. Interchange of energy by means of electromagnetic waves without a change in the temperature of the medium between the two bodies involved is

1. Conduction
2. Natural convection
3. Radiation
4.Forced convection

Ans: 3

2. Hydrocarbons which have benzene ring structures are called

1. Paraffins
2. Naphthenes
3. Olefins
4. Aromatics

Ans: 1

3. Sunlight when reacts with hydrocarbons and nitrogen oxides in the atmosphere results in

1. Fog
2. Smog
3. Photochemical smog
4.Particulates

Ans: 4

4. Severe agitation of water level in a boiler due to dirty or impure water is called

1. Foaming
2. Fouling
3. Blowing off
4. Blanking up

Ans: 1. (Surface blow-off is the process of removing foam, water and other matter from a particular surface or water level, such as in a boiler.)

5. Partial admission of steam occurs in

1. Impulse turbine
2. Reaction turbine
3. Radial flow turbine
4. Low pressure turbine

Ans: 4

6. The lightest of the following commercial metal is

1. Tin
2. Aluminium
3. Copper
4.Magnesium

Ans: 4

7. The inorganic material, which is hydrated magnesium silicate is

1. Asbestos
2. Mica
3. Cermics
4. Carbides

Ans: 2

8. In a centrifugal compressor, the deliberate introduction in the direction of rotation, of a tangential component of absolute velocity is called

1. Slip factor 2. Aspect ratio 3. Diagram factor 4.Prewhirl

Ans: 4

9. A four stroke I.C. engine crankcase has a breather so as to
   1. Let out (unburned) air fuel mixuture
   2. Let out blowby gas and oil vapour
   3. Cool lubricating oil
   4. Cool bottom portion of the cylinder

   Ans: 2

10. Due to the centrifugal force acting on the rim, the fly wheel arms will be subjected to
    1. Shear stress 2. Compressive stress 3. Tensile stress
    4. Not at all stressed

    Ans: 2

11. The exhaust gas temperature, in a IC engine, is best measured by
    1. Bimetal thermometer 2. Thermocouple 3. Radiation pyrometer
    4. Thermistor

    Ans:2

12. In a 4 stroke Diesel engine, RPM of the crank shaft is 1000 RPM, the cam shaft RPM is
    1. 1000 2. 500 3. 1500 4. 2000

    Ans:2 (the crank shaft rpm is 2 times the revolution of the cam shaft)

13. The functions of flywheel and governor are respectively
    1. to increase power, to reduce speed
    2. to balance the engine, to save fuel
    3. to even out the power output, to maintain constant speed at a particular load
    4. to decrease the power, to increase the speed

    Ans:3

14. Choose the odd man out
    1. Lapping - Valve seat
    2. Connecting rod bearing - Needle bearing
    3. Valve levers - Tappet clearance
    4. Cylinders - Honing

Ans:3 (Right ans is journal brg)

15. Firing order of a 4 cylinder - 4 stroke engine is
    1. 1, 3, 4, 2
    2. 1, 2, 4, 3
    3. 1, 2, 3, 4
    4. 1, 3, 2, 4

    Ans:1

16. In a diesel engine power is transfer in the following sequence
    1. Connecting rod - piston - Crankshaft
    2. Crankshaft - piston - connecting rod
    3. Piston - connecting rod- crank shaft
    4. Cylinder head - piston - connecting rod

    Ans:3

17. For the same compression ratio and heat input, the more efficient cycle is
    1. Diesel cycle
    2. Otto cycle
    3. Carnot cycle
    4. Duel cycle

    Ans:2

18. In a two stroke engine, there is a power stroke for
    1. Every revolution of crank shaft
    2. 2 revolutions of crank shaft
    3. 4 revolutions of crank shaft
    4. None

    Ans:1

19. In a 4 stroke engine, there is a power stroke for

    1. Every revolution of crank shaft

    2, Two revolutions of crank shaft

    3.Four revolutions of crank shaft

    4. None

    Ans:2

23. In an electrical circuit, a fuse is connected

1. in the live wire
2. in the neutral wire
3. in the earth wire
4. any where – it makes no difference

Ans: 1

24. Bar is the unit of:

1. power
2. energy
3. pressure
4. entropy

Ans: 3

25. An electric bulb (now phased out)has a filament made of:

1. Copper
2. Iron
3. Lead
4. Tungsten

Ans: 4

26. Choose the wrong combination:

1. Thermal efficiency of IC engine is of the order of - 30 to 35%
2. Governor – Hunting
3. Compression ratio for diesel engine – 16 to 20
4. Knock – Low calorific value of the fuel

Ans:4

Knocking, in an internal-combustion engine, sharp sounds caused by premature combustion of part of the compressed air-fuel mixture in the cylinder. In a properly functioning engine, the charge burns with the flame front progressing smoothly from the point of ignition across the combustion chamber. However, at high compression ratios, depending on the composition of the fuel, some of the charge may spontaneously ignite ahead of the flame front and burn in an uncontrolled manner, producing intense high-frequency pressure waves. These pressure waves force parts of the engine to vibrate, which produces an audible knock.

Knocking can cause overheating of the spark-plug points, erosion of the combustion chamber surface, and rough, inefficient operation. It can be avoided by adjusting certain variables of engine design and operation, such as compression ratio and burning time; but the most common method is to burn gasoline of higher octane number.

Britannica, The Editors of Encyclopaedia. "Knocking". ***Encyclopedia Britannica***, 15 Jun. 2015, https://www.britannica.com/technology/knocking-internal-combustion-engine. Accessed 15 October 2021.

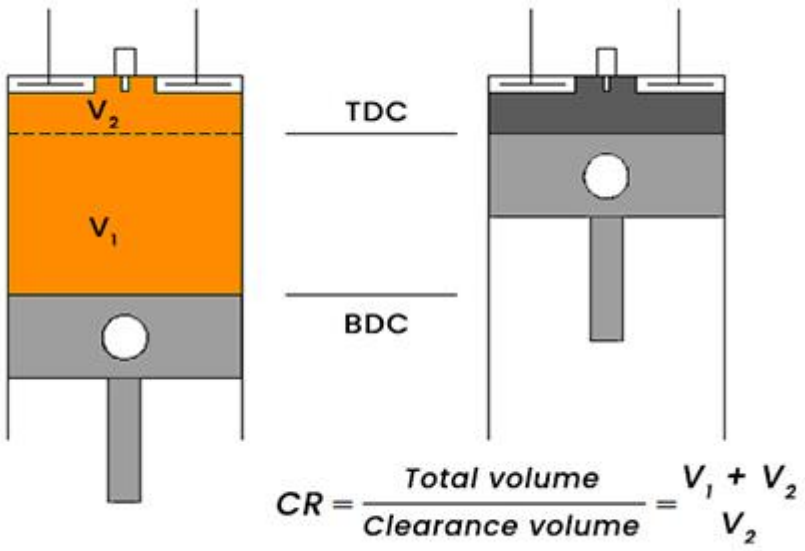
27. Choose the incorrect combination:

1. Turbocharged engine - Intake air is compressed
2. Naturally aspirated engine - Intake air is not compressed
3. Natural cooling of cylinder

and cylinder head - through fins

4. Compression ratio for petrol engine - 16 to 20

Ans:4 (Compression ratio of petrol engine is about 8-10)



https://theunboxfactory.com/compression-ratio-petrol-and-diesel-engine/

What Is Compression Ratio?

Compression ratio is the ratio of the cylinder volume when the piston is at the BDC to the volume when the piston is at the TDC. It is this ratio that determines the degree of compression of the air-fuel mixture before ignition.

Every engine has a specific **compression ratio**. However, diesel and gasoline engines differ significantly in respect of compression ratio.

Compression Ratio in Petrol Engines

The **compression ratio** in petrol engines, over the last two decades, has always ranged from 8:1 to 12:1. However, there have been cases in the history of car production where automakers have gone higher than this ratio.

The reason why it's not advisable to have a **high compression ratio** in engines that use low-octane fuel is that high CR could cause knocking. Also known as pre-ignition or detonation, this is when fuel auto-ignites and leads to uncontrolled combustion. Knocking lowers the combustion efficiency and can cause severe

damage if knock sensors aren't installed to adjust the timing.

COMPRESSION RATIO IN DIESEL ENGINES

Direct injection diesel engines have **compression ratios** ranging from 14:1 to 23:1. Indirect injection diesel engines have compression ratios starting at 18:1 and go as high as 23:1.

https://theunboxfactory.com/compression-ratio-petrol-and-diesel-engine/

28. Choose the incorrect statement:
    1. Carburator - To maintain correct air fuel ratio
    2. Oil filter - To filter dirt in oil
    3. Injector - To compress the fuel
    4. Valves - To admit fresh air/charge into cylinder(s) and for exhaust

    Ans:3 (Injector is to spray atomized fuel into the combustion chamber)

29. The sequence of various strokes of a 4 stroke IC engine
    1. Suction - Compression - Exhaust - Expansion
    2. Suction - Expansion - Compression - Exhaust
    3. Suction - Compression - Expansion - Exhaust
    4. Exhaust - Expansion - Compression - Suction

    Ans:3

30. Choose the odd man out:
    1. Clutch, propeller shaft, differential
    2. Pump, filter, injector
    3. Piston, gudgeon pin, connecting rod
    4. Muffler, compressed air, tyres

    Ans:4

    Option 1- pertains to power transmission system from engine to wheels

    Option 2 – pertains to fuel injection system

    Option 3 – pertains to power transfer from combustion chamber to crank shaft

    Option 4 – pertains to few parts

31. The rate of change of displacement of a body

    1. Acceleration 2. Velocity 3. Momentum 4. Impulse

Ans: 2

32. The rate of change of velocity of a body is

1. Acceleration 2. Velocity 3. Momentum 4. Impulse

Ans: 1

33. Impulse is given by

(1) Force x time (2) Work done/time
(2) Force/time (4) None

Ans: 1

34. Identify the type of motor recommended for electric/diesel electric locomotive drive is

1. D.C. series motor 2. D.C. compound motor
3. D.C. shunt motor 4. Synchronous motor

Ans: 1

35. Two capacitors of capacitance C mid each are connected in parallel. The effective capacitance will then be

1. 2C 2. C^2 3. C/2 4. None of these

Ans:1 (if connected in series, C/2)

36. An inductor stores energy in:

1. electrostatic field 2. electromagnetic field
3. magnetic field 4. core

Ans: 3

37. A capacitor (condenser) is used in an electrical circuit to :

1. Steps down voltage
2. Store-up-voltage
3. Store electric charge
4. Produce electric charge

Ans: 3

38. The sides of a right-angled triangle are 3 and 5 (hypotenuse) units in length. The other side is

1. 7 units
2. 4 units
3. 6 units
4. None of these

Ans:2

39. In a series motor, if the flux is reduced to half the valve other factors remaining same, the speed will

1. be doubled
2. remain same
2. reduce by half
4. none of these

Ans:1.

The **speed of a DC motor** (N) is equal to:

$$N = \frac{V - I_a R_a}{k\phi}$$

Therefore speed of the 3 types of DC motors – shunt, series and compound – can be controlled by changing the quantities on the right-hand side of the equation above.

Hence the speed can be varied by changing:

1. The terminal voltage of the armature, V.
2. The external resistance in armature circuit, R_a.
3. The flux per pole, φ.

https://www.electrical4u.com/speed-control-of-dc-motor/

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40. The work done in a compressor will be least when suction air is taken from

1. Atmosphere
2. Source of low temperature air
3. Source of high temperature air
4. None of these

Ans: 2

41. Which of the following does not use ambient air for propulsion?

1. Turbojet
2. Rocket
3. Turboprop
4. Gasturbine

Ans: 2

42. In Bomb-calorimeter the fuel to be tested is burnt:

1. at constant volume
2. at constant pressure
3. at constant temperature
4. in open atmosphere

Ans: 1

43. Which of the following is not a positive displacement compressor?
1. Centrifugal compressor
2. Roots blower
3. Double acting reciprocating compressor
4. Single acting reciprocating compressor

44. It takes much longer to cook things in the hills than in the plains, because

(1) Due to the low atmospheric pressure in the hills, the boiling point of water is raised and therefore water take longer to boil
(2) In the hills, the atmospheric pressure is lower than that in the plain and therefore water boils at lower temperature.
(3) In the hills, the atmospheric pressure is low and therefore a lot of heat is lost to the atmosphere.
(4) In the hills, the humid atmosphere absorbs a lot of heat, leaving very little for the cooking.

Ans:1

45. Sounds cannot travel through

(1) Vacuum (2) water (3) steel (4) inert gases

Ans:1

46. The gas used in a refrigerator to cool water is

(1) Nitrogen (2) Carbon dioxide (3) Methane (4) Ammonia gas

Ans:4

47. During photosynthesis in plants, the gas evolved is

(1) Carbon dioxide (2) nitrogen (3) oxygen (4) hydrogen.

Ans:3

48. During photosynthesis in plants, the gas absorbed is

(1) Carbon dioxide (2) nitrogen (3) oxygen (4) hydrogen.

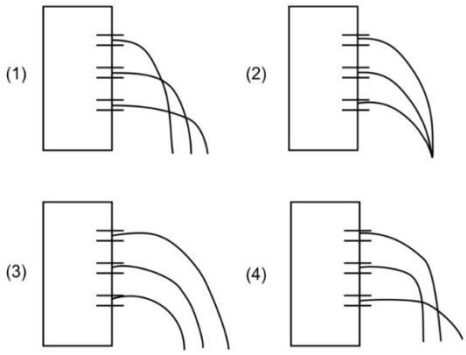
Ans:1

49. A steel piece after hardening is heated to 300^{o}C and then cooled in oil. The property imparted to the steel piece by this is:

1. Softness
2. Toughness
3. Hardness
4. None of these

Ans: 2

49.1. Which of the diagrams below represents flow of water a tank with 3 holes in a row :



Ans:1

50. Die sinking is a process of:

1. hardening Dies
2. scraping of Dies
3. cutting die impression
4. none of these

Ans: 3 (**Diesinking**, process of machining a cavity in a steel block to be used for molding plastics, or for hot and cold forging, die-casting, and coining, etc.)