1. A universal motor runs in

(1) DC (2) AC **(3) Both AC and DC** (4) None

Ans(3)

2. A motor car starting from rest ravels a distance of 64 metres in 8 seconds. What is its acceleration?

(1)2m/sec^2 (2) 4m/sec^2 (3) 11.2 m/sec^2 (4) 0.5 m/sec^2

Ans(3)

3. The voltage applied across the lamp of a 3 cell (dry cell) torch will be –

(1) 1.5 volt (2) 3 volt (3) 4.5 volt (4) 6 volt

Ans(3)

4. Brass is an alloy of –

(1) Copper and Tin (2) Lead and Tin (3) Zinc and Tin (4) Copper and Zinc

Ans(4)

5. Plasmodium germs causes –

(1) Malaria (2) Sleeping sickness (3) Cholera (4) None of the above

Ans(1)

6. Pascal is a unit of:

(1) Temperature (2) Power (3) Pressure (4) Energy

Ans(3)

7. A woman pulls a car 150kg and produces an acceleration of 4m/s^2. Find the force exerted by the man-

(1) 600 N (2) 600 Dynes (3) 150 N (4) 150 Dynes

Ans(1)

8. The unit of magnetic flux is:

(1) Weber (2) Henry (3) Coulomb (4) Tesla

Ans(4)

Note: Magnetic flux density has the dimension mass per time squared electric current. The SI derived **unit of magnetic flux** density is the tesla, which is defined as a volt second per square meter.

9. What is the voltage of an electrical circuit with 3 ampere current and 60 ohms resistance?

(1) 20 volt (2) 180 volt (3) 30 volt (4) 90 volt

Ans(2)

10. Identify the type of motor recommended for locomotive drive –

(1) D.C. Series motor
(2) D.C. Compound Motor
(3) D.C. Shunt motor
(4) Synchronous motor (Nowadays)

Ans(1 and 4)

11. Avogadro number N is a

(1) Constant at constant temperature (2) Constant at constant pressure
(3) Constant at constant volume (4) Universal constant

Ans(4)

Note: Avogadro's number is defined here as a number, i.e., a dimensionless quantity. Its latest numeric value is $N_A = 6.022\ 141\ 79 \times 10^{23}$. The SI definition of Avogadro's constant (also designated N_A) is: the number of entities (such as atoms, ions, or molecules) per mole.The units may be the number of electrons, atoms, ions, or molecules, depending on the nature of the substance and the character of the reaction (if any).

12. A rod 80 cm long is suspended by a string such that one side is having 30 cm and the other side is having 50 cm. The rod is balanced with a weight of 2kg is suspended from the end having 30 cm from the suspension point. What weight is suspended from the other end?

(1) 12kg (2) 1.2 kg (3) 3.33 kg (4) 2 kg

Ans(2)

Note; 30 x 2 = 50x X

13. In which state is Silent Valley located?

(1) Tamil Nadu (2) Kerala (3) Assam (4) Arunachal Pradesh

Ans(2)

14. The process of coating of Zinc on iron is _____.

(1) Electroplating (2) Cladding (3) Galvanizing (4) Metal coating

Ans(3). Anti rusting coating of steel pipes.

15. Cooling of water in an earthen pot is an example of

(1)Water jet refrigeration (2)Evaporation refrigeration

(3)Vapour absorption refrigeration (4)Vapour compression refrigeration

Ans(2)

16. In a series RLC circuit at resonance:

(1) Current is maximum, pf is zero (2) Current is Maximum, pf is unity

(3) Current is minimum, pf is unity (4) None of these

Ans(2)

Electrical impedance, measure of the total opposition that a circuit or a part of a circuit presents to electric current. Impedance includes both resistance and reactance (***qq.v.***). The resistance component arises from collisions of the current-carrying charged particles with the internal structure of the conductor. The reactance component is an additional opposition to the movement of electric charge that arises from the changing magnetic and electric fields in circuits carrying alternating current. Impedance reduces to resistance in circuits carrying steady direct current.

The magnitude of the impedance ***Z*** of a circuit is equal to the maximum value of the potential difference, or voltage, ***V*** (volts) across the circuit, divided by the maximum value of the current ***I*** (amperes) through the circuit, or simply ***Z*** = ***V***/***I.*** The unit of impedance, like that of resistance, is the ohm. Depending on the nature of the reactance component of the impedance (whether predominantly inductive or capacitive), the alternating current either lags or leads the voltage. The reciprocal of the impedance, 1/***Z,*** is called the admittance and is expressed in terms of the unit of conductance, the mho unit (ohm spelled backward).

Britannica, The Editors of Encyclopaedia. "Electrical impedance". *Encyclopedia Britannica*, 27 Jun. 2008, https://www.britannica.com/science/electrical-impedance. Accessed 22 September 2021.

17. Thermionic emission of electrons from a heated electrode is due to

(1)electromagnetic field (2)electrostatic field
(2)high temperature (4)photo electric effect

Ans(2)

18. Five people must be lifted in an elevator over a height of 100 m. The work is found to be 341.2 KJ and the gravitational acceleration is 9.75m/sec^2. the average mass per person is

(1)65kg (2) 72kg (3) 70kg (4) 67.5kg

Ans(3)

Note: Word done = mgh→ 341.2 x 1000 = 5xm x9.81x100

19. The internal energy of an ideal gas is

(1)a function of temperature alone (2) a function of pressure
(3)a function of volume (4) (1) and (2) above

Ans(1)

Note: And **the internal energy of an ideal gas** is independent of volume at constant temperature. **The enthalpy** and **internal energy of an ideal gas** were asserted to be **functions** of temperature only.

20. One micron is equal to –

(1) 0.1 mm (2) 0.01 mm (3) 0.0001 mm (4)10^{-6}m

Ans.(4)

21. Which class of amplifiers operates with least distortion?

(1)Class A (2)Class B (3)Class C (4)Class AB

Ans(1)

Note: Class A **amplifier** has the highest linearity and the **lowest distortion**. The amplifying element is always conducting and close to the linear portion of its transconductance curve.

22. The passage of current in an electrolyte is due to the movement of

(1)electrons (2)molecules (3)atoms (4)ions

Ans(4)

23. FM broadcast is done using

(1)medium waves (2) short waves
(3) VHF and UHF waves (4) micro waves

Ans(3)

24. The force equal in magnitude and opposite in direction to the resultant is known as the

(1)parallel force (2) equilibrant
(3)downward force (4) gravitational force

Ans(2)

25. A gas does not have a definite shape or fixed volume, because the molecules are

(1) at rest (2). in linear motion
(3) in oscillator motion (4) in random motion

Ans(4)

26. In electroplating the desired metal to be coated (like nickel, gold, silver etc) on an object is taken as the

(1) electrolyte (2)cathode (3)anode (4)None

Ans(3)

27. In electroplating the article to be coated is taken as the

(1)electrolyte (2)cathode (3)anode (4)None

Ans(2)

Note: A Zener diode is a semiconductor device that permits current to flow in either a forward or reverse direction. The diode consists of a special, heavily doped p-n junction, designed to conduct in the reverse direction when a certain specified voltage is reached.

The Zener diode has a well-defined reverse-breakdown voltage, at which it starts conducting current, and continues operating continuously in the reverse-bias mode without getting damaged. Additionally, the voltage drop across the diode remains constant over a wide range of voltages, a feature that makes Zener diodes suitable for use in voltage regulation.

Zener diode applications

Zener diodes are used for voltage regulation, as reference elements, surge suppressors, and in switching applications and clipper circuits.

https://www.digikey.in/en/maker/blogs/zener-diode-basic-operation-and-applications

28. The primary function of a filter capacitor in a power supply is to

(1)minimize the A.C. input variation
(2)suppress the variation of the output voltage
(3)stabilize the D.C. level of the output voltage
(4)remove ripples from the rectified output

Ans(4)

29. Cryogenics is

(1)study of crystal
(2) study of genetics
(3)science of very low temperature
(4) study of colours

Ans(3)

30. The main purpose of using core in a transformer is to

(1) decrease iron losses
(2) prevent eddy current loss
(3) eliminate magnetic hysteresis
(4) decrease reluctance of the common magnetic flux path

Ans(4)

31. Heat flows through liquids and gases by:

(1) conduction (2) convection

(3) radiation (4) a combination of these

Ans(2).

32. Heat flows through solids by:

(1) conduction (2) convection

(3) radiation (4) a combination of these

Ans(1).

33. Heat flows for 2 bodies separated by a distanceby:

(1) conduction (2) convection

(3) radiation (4) a combination of these

Ans(1).

34. A machine weighs 4 tons. It is loaded on rollers and pushed by men. The co-efficient friction between rollers and ground is 0.25. If each man can exert a force of 75 kgf. Minimum how many men are required to push the machine?

(a) 12 (b) 11 (c) 14 (d) None

Ans:(c) (4000 x 0.25/75 = 13.33)

35. Measure of resistance to wear of material is indicated by its

(a) Tensile strength (b) Hardness

(c) Shear strength (d) Toughness

Ans:(b)

Note: Material hardness is the property of the **material** which enables it to resist penetration orindentation. In mineralogy, hardness is normally described as the resistance of a material to being scratched by another material. The ability of materials to resist scratching by another material can be ranked by referring to the Mohs scale which assesses relative hardness of the materials.

36. A pressure of 100 pounds per square inch (psi) is approximately = ... kg/cm^2

(a) 5 (b) 6 (c) 8 (d) 6.9

Ans:(d) (100/14.5=6.9, since 1 kg/cm2 = 14.5 psi)

37. The machine element which engages and disengages the drive is

(a) Motor (b) Brake (c) Engine (d) Clutch

Ans: (d)

Note: A clutch is a mechanical device that **engages and disengages** power transmission, especially from **driving** shaft to driven shaft. In the simplest application, clutches connect and disconnect two rotating shafts **drive** shafts or line shafts

38. Which of the following is the most important property of lubricant?

(a) Smell (b) Colour (c) Viscosity index (d) Density

Ans:(c)

39. The hearth of a furnace is built by

(a) Cement (b) Clay (c) Refractory bricks (d) Sand

Ans:(c)

40. A pressure of 5 kg/cm^2 is acting on a square plate of side 10 cm. What is the thrust?

(a) 500 kgf (b) 50 kgf (c) 10 kgf (d) None of these

Ans:(a)

41. The hardness of rubber is measured in

(a) BHN (b) Shore hardness (c) Vickers (d) Rockwell

Ans:(b)

Note: The Shore durometer is a device for measuring the hardness of a material, typically of polymers, elastomers, and rubbers. Higher numbers on the scale indicate a greater resistance to indentation and thus harder materials. Lower numbers indicate less resistance and softer materials.
A durometer scale is a type of measurement for rubber material hardness. Generally, most rubber materials fall under the rubber durometer scale of Shore A

42. One micron is equal to

(a) 0.1 mm (b) 1 mm (c) 0.01 mm (d) 0.001 mm

Ans:(d) Also 10^{-6} m.

43. Choose the hardest material

(a) Aluminium (b) Copper (c) Mild steel (d) Diamond

Ans:(d)

44. Which of the following is a good conductor of electricity?

(a) Copper (b) Glass (c) Rubber (d) Teflon

Ans:(a)

45. The screw of the micrometer has a pitch of 1 mm. If the rim of the thimble is divided into 50 divisions, the least count of the micrometer is ....mm

(a) 0.05 (b) 0.02 (c) 0.005 (d) None

Ans: (b)

46. The tendency of a metal to fail under repeated cyclic stressing is known as

(a) Toughness (b) Fatigue (c) Poisson's ratio (d) Permanent set

Ans: (c)

Note – Mechanical

ndurance limit, and **fatigue strength** are used to describe the amplitude (or range) of cycli**properties of materials**

Definition

Fatigue - when a material is subjected to repeated cycles of stress or strain and its structure breaks down and ultimately leads to fracture

Creep - when a material is subjected to a load for a very long time it may continue to deform until a sudden fracture occurs

Fatigue - Fractures due to fatigue is common in cyclic loaded parts like connecting rods, crankshafts, turbine blades, railroad wheels and so on. Fractures occur at stress less than the material yield stress. Yield strength is defined in engineering as the amount of stress (up to yield point) that a material can undergo before moving from elastic deformation into plastic deformation. Most steels have an endurance or fatigue limit about half the tensile strength.

Tensile Strength - *(Ultimate Tensile Strength)* - of a material is the limit stress at which the material actually breaks, with sudden release of the stored elastic energy.

CREEP. THE TIME DEPENDENT DEFORMATION DUE TO HEAVY LOAD OVER TIME IS KNOWN AS CREEP.

In general both stress and temperature influence on the rate of creep.Normally creep strength decreases with temperature.Allowable creep strain can be specified - typical ***0.1 %/year*** for steel bolts and piping

Fatigue limit, ec stress that can be applied to the material without causing fatigue failure.

https://www.engineeringtoolbox.com/steel-endurance-limit-d_1781.html

47. Cast iron contains about ... % of carbon

(a) 1 to 2 (b) 0.5 (c) 10 (d) 2 to 4

Ans:(d)

Note: Cast iron, an alloy of iron that contains 2 to 4% carbon, along with varying amounts of silicon and manganese and traces of impurities such as sulfur and phosphorus. It is made by reducing iron ore in a blast furnace. The liquid iron is cast, or poured and hardened, into crude ingots called pigs, and the pigs are subsequently remelted along with scrap and alloying elements in cupola furnaces and recast into molds for producing a variety of productsand waviness.

48. One micron is equal to

(a) 10^{-6} cm (b) 10^{-6} mm (c) 10^{-6} m (d) None of these

Ans:(c)

49. Paint dry film thickness is measured by

(a) Feeler gauge (b) Micrometer (c) Elcometer (d) Profilometer

Ans:(c)

Note: The Elcometer coating thickness gauge is available with a wide range of interchangeable probes; providing greater coating thickness measurement flexibility on metal substrates.

50. The stress at the elastic limit of the material is called ... strength

(a) Yield (b) Crushing (c) Compressive (d) Tensile

Ans:(a)