

500+ MCQ's on physics

1. A current carrying coil is subjected to a uniform magnetic field. The coil will orient so that its plane becomes ?

- (a) inclined at 45° to the magnetic field
- (b) inclined at any arbitrary angle to the magnetic field
- (c) parallel to the magnetic field
- (d) perpendicular to magnetic field

Ans:c

2. Tesla is the unit of

- (a) magnetic flux
- (b) magnetic field
- (c) magnetic induction
- (d) magnetic moment

Ans:b

3. Energy in a current carrying coil is stored in the form of ?

- (a) electric field
- (b) magnetic field
- (c) dielectric strength
- (d) heat

Ans:b

4. The total charge induced in a conducting loop when it is moved in magnetic field depends on?

- (a) the rate of change of magnetic flux
- (b) initial magnetic flux only
- (c) the total change in magnetic flux
- (d) final magnetic flux only.

Ans:c

5. The magnetic induction at a point P which is at the distance of 4 cm from a long current carrying wire is 10^{-3} T. The field of induction at a distance 12 cm from the current will be ?

- (a) 3.33×10^{-4} T
- (b) 1.11×10^{-4} T
- (c) 3×10^{-3} T
- (d) 9×10^{-3} T

Ans:a

6. A charge moving with velocity v in X-direction is subjected to a field of magnetic induction in negative X-direction. As a result, the charge will

- (a) remain unaffected
- (b) start moving in a circular path in Y—Z plane
- (c) retard along X-axis
- (d) moving along a helical path around X-axis

Ans:a

7. A uniform magnetic field acts right angles to the direction of motion of electrons. As a result, the electron moves in a circular path of radius 2cm. If the speed of electrons is doubled, then the radius of the circular path will be ?

- (a) 2.0 cm
- (b) 0.5 cm
- (c) 4.0cm
- (d) 1.0cm

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Ans:c

8. A deuteron of kinetic energy 50 keV is describing a circular orbit of radius 0.5 metre in a plane perpendicular to magnetic field B. The kinetic energy of the proton that describes a circular orbit of radius 0.5 metre in the same plane with

the same B is

- (a) 25 keV
- (b) 50 keV
- (c) 200 keV
- (d) 100 keV

Ans:d

9. A straight wire of length 0.5 metre and carrying a current of 1.2 ampere is placed in uniform magnetic field of induction 2 Tesla. The magnetic field is perpendicular to the length of the wire. The force on the wire is ?

- (a) 2.4N
- (b) 1.2N
- (c) 3.0 N
- (d) 2.0 N

Ans:b

10. To convert a galvanometer into an ammeter, one needs to connect a ?

- (a) low resistance in parallel
- (b) high resistance in parallel
- (c) low resistance in series
- (d) high resistance in series.

Ans:a

11. A coil carrying electric current is placed in uniform magnetic field

- (a) torque is formed
- (B) e.m.f is induced
- (c) both (a) and (b) are correct
- (d) none of the above

Ans:a

12. The magnetic field at a distance 'r' from a long wire carrying current 'I' is 0.4 Tesla. The magnetic field at a distance '2r' is ?

- (a) 0.2Tesla
- (b) 0.8 Tesla
- (c) 0.1 Tesla
- (d) 1.6 Tesla

Ans:a

13. A electron enters a region where magnetic (B) and electric (E) fields are mutually perpendicular, then ?

- (a) it will always move in the direction of B
- (b) it will always move in the direction of E
- (c) it always possesses circular motion
- (d) it can go un deflected also.

Ans:d

14. A straight wire of diameter 0.5 mm carrying a current of 1 A is replaced by another wire of I mm diameter carrying same current. The strength of magnetic field far away is?

- (a) twice the earlier value
- (b) same as the earlier value
- (c) one-half of the earlier value
- (d) one-quarter of the earlier value

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Ans:b

15. At what distance from a long straight wire carrying a current of 12 A will the magnetic field be equal to 3×10^{-6} Wb/metre Square

- (a) 8×10^{-2} m
- (b) 12×10^{-2} m
- (c) 18×10^{-2} m
- (d) 24×10^{-2} m

Ans:a

16. An electron moves in a circular orbit with a uniform speed v . It produces a magnetic field B at the centre of the circle. The radius of the circle is proportional to ?

- (a) $\sqrt{B/v}$
- (b) B/v
- (c) $\sqrt{v/B}$
- (d) v/B

Ans:d

17. A 10 eV electron is circulating in a plane at right angles to a uniform field at magnetic induction 10^{-4} Wb/m² (= 1.0 gauss). The orbital radius of the electron is ?

- (a) 12cm
- (b) 16cm
- (c) 11cm
- (d) 18cm

Ans:c

18. A galvanometer acting as a voltmeter will have?

- (a) a low resistance in series with its coil.
- (b) a high resistance in parallel with its coil
- (c) a high resistance in series with its coil
- (d) a low resistance in parallel with its coil

Ans:c

19. A beam of electrons is moving with constant velocity in a region having simultaneous perpendicular electric and magnetic fields of strength 20 Vm^{-1} and 0.5 T respectively at right angles to the direction of motion of the electrons. Then the velocity of electrons must be?

- (a) 8m/s
- (b) 20 m/s
- (c) 40m/s
- (d) 1/40 m/s

Ans:c

20. A galvanometer of resistance 20 Ohms gives full scale deflection with a current of 0.004 A. To convert it into an ammeter of range 1 A, the required shunt resistance should be?

- (a) 0.38 Ohms
- (b) 0.21 Ohms
- (c) 0.08 Ohms
- (d) 0.05 Ohms

Ans:c

21. A long solenoid carrying a current produces a magnetic field B along its axis. If the current is doubled and the number of turns per cm is halved, the new value of the magnetic field is ?

- (a) $4B$
- (b) $B/2$

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- (c) B
 - (d) 2B
- Ans:c

22. A positively charged particle moving due east enters a region of uniform magnetic field directed vertically upwards. The particle will

- (a) continue to move due east
- (b) move in a circular orbit with its speed unchanged
- (c) move in a circular orbit with its speed increased
- (d) gets deflected vertically upwards.

Ans:b

23. Two long parallel wires are at a distance of 1 metre. Both of them carry one ampere of current. The force of attraction per unit length between the two wires is?

- (a) 2×10^{-7} N/m
- (b) 2×10^{-8} N/m
- (c) 5×10^{-8} N/m
- (d) 10^{-7} N/m

Ans:a

24. A galvanometer having a resistance of 8 ohms is shunted by a wire of resistance 2 ohms. If the total current is 1 amp, the part of it passing through the shunt will be?

- (a) 0.25 amp
- (b) 0.8 amp
- (c) 0.2 amp
- (d) 0.5 amp

Ans:b

25. A coil of one turn is made of a wire of certain length and then from the same length a coil of two turns is made. If the same current is passed in both the cases, then the ratio of the magnetic inductions at their centres will be?

- (a) 2:1
- (b) 1:4
- (c) 4:1
- (d) 1:2

Ans:b

26. Magnetic field intensity in the centre of coil of 50 turns, radius 0.5 m and carrying a current of 2A is ?

- (a) 0.5×10^{-5} T
- (b) 1.25×10^{-4} T
- (c) 3×10^{-5} T
- (c) 4×10^{-5} T

Ans:b

27. When a proton is accelerated through 1 V, then its kinetic energy will be?

- (a) 1840 eV
- (b) 13.6eV
- (c) 1 eV
- (d) 0.54eV

Ans:c

28. If a long hollow copper pipe carries a current, then magnetic field is produced

- (a) inside the pipe only
- (b) outside the pipe only

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- (c) both inside and outside the pipe
- (d) no where

Ans:b

29. A charged particle moves through a magnetic field in a direction perpendicular to it. Then the

- (a) velocity remains unchanged
- (b) speed of the particle remains unchanged
- (c) direction of the particle remains unchanged
- (d) acceleration remains unchanged

Ans:b

30. Two long parallel wires P and Q are both perpendicular to the plane of the paper with distance of 5 m between them. If P and Q carry current of 2.5 amp and 5 amp respectively in the same direction, then the magnetic field at a point half-way between the wires is ?

- (a) $3\mu/2\pi$
- (b) μ/π
- (c) $\sqrt{3}\mu/2\pi$
- (d) $\mu/2\pi$

Ans:a

31. A proton moving with a velocity 3×10^5 m/s enters a magnetic field of 0.3 Tesla at an angle of 30° with the field. The radius of curvature of its path will be (e/m for proton $- 10^8$ C/kg)

- (a) 2cm
- (b) 0.5 cm
- (c) 0.02 cm
- (d) 1.25 cm

Ans:b

32. A charged particle of charge q and mass m enters perpendicularly in a magnetic field B . Kinetic energy of the particle is E ; then frequency of rotation is?

- (a) $qB/m\pi$
- (b) $qB/2m\pi$
- (c) $qBE/2m\pi$
- (d) $qB/2E\pi$

Ans:b

33. A galvanometer can be converted into a voltmeter by connecting?

- (a) A high resistance in parallel
- (b) A low resistance in series
- (c) A high resistance in series
- (d) A low resistance in parallel

Ans:c

34. A wire carries a current. Maintaining the same current it is bent first to form a circular plane coil of one turn which produces a magnetic field B at the centre of the coil. The same length is now bent more sharply to give a double loop of smaller radius. The magnetic field at the centre of the double loop, caused by the same current is ?

- (a) $4B$
- (b) $B/4$
- (c) $B/2$
- (d) $2B$

Ans:a

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35. A bar magnet is oscillating in earth's magnetic field with a period T . What happens to its period of motion, if its mass is quadrupled ?

- (a) Motion remains simple harmonic with new period $=T/2$
- (b) Motion remains simple harmonic with new period $= 2 T$
- (c) Motion remains simple harmonic with new period $=4T$
- (d) Motion remains simple harmonic and the period stays nearly constant

Ans:b

36. The work done in turning a magnet of magnetic moment M by an angle of 90° from the meridian, is n times the corresponding work done to turn it through an angle of 60° .

The value of n is given by

- (a) 2
- (b) 1
- (c) 0.5
- (d) 0.25

Ans:a

37. For protecting a sensitive equipment from the external electric arc, it should be ?

- (a) Wrapped with insulation around it when passing current through it
- (b) Placed inside an iron can
- (c) Surrounded with fine copper sheet
- (d) Placed inside an aluminium can

Ans:b

38. If a diamagnetic substance is brought near north or south pole of a bar magnet, it is?

- (a) attracted by the poles
- (b) repelled by the poles
- (c) repelled by north pole and attracted by the south pole
- (d) attracted by the north pole and repelled by the south pole

Ans:b

39. Current i is flowing in a coil of area A and number of turns N , then magnetic moment of the coil is $M= ?$

- (a) NiA
- (b) Ni/A
- (c) Ni/\sqrt{A}
- (d) N^2Ai

Ans:a

40. Two magnets of magnetic moments M and $2M$ are placed in a vibration magnetometer, with the identical poles in the same direction. The time period of vibration is T_1 . If the magnets are placed with opposite poles together and vibrate with time period T_2 then ?

- (a) T_2 is infinite
- (b) $T_2=T_1$
- (c) $T_2>T_1$
- (d) T_2 is less than T_1

Ans:c

41. A diamagnetic material in a magnetic field moves

- (a) perpendicular to the field
- (b) from stronger to the weaker parts of the field
- (c) from weaker to the stronger parts of the field
- (d) in none of the above directions

Ans:b

42. According to Curie's law, the magnetic susceptibility of a substance at an absolute temperature T is proportional to?

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- (a) T^2
- (b) $1/T$
- (c) T
- (d) $1/T^2$

Ans:b

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इस ब्लॉग्स का सृजन भारत वर्ष में आयोजित होने वाली समस्त प्रकार की प्रतियोगी एवं भर्ती परीक्षाओं में सभी प्रकार के प्रतिभागियों को संतुष्ट करते हुए वांछित पाठ्य विषय वस्तु का संपादन और संग्रहण किया गया है , सभी विषय वस्तुएँ सर्वाधिकार सुरक्षित हैं , न लाभ न हानि पर संचालित कि जा रही , इन सभी विषय वस्तुएँ को भारत वर्ष में हिंदी , गुजराती , मराठी , कन्नड़ , तमिल , तेलगु , बांग्ला , उर्दू , आदि में अनूदित कर के देखा जा सकता है , सभी को भविष्य कि हार्दिक शुभकामना सहित सुझाव सादर आमंत्रण इसका संपूर्ण कार्य क्षेत्र विश्व ज्ञान समुदाय है , जो सभी प्रतियोगियों के कैरिअर निर्माण महत्त्वपूर्ण योगदान देगा , आप अपने सुझाव इस मेल पत्ते पर भेज सकते हैं - chandrashekhhar.malav@yahoo.com

इस ब्लॉग का संग्रहण एवं संपादन कर्ता -चंद्रशेखर मालव

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MCQ IN PHYSICS - 1

Free Solved objective practice Questions on thermodynamics in Physics

Solved Sample Problems Based on Thermodynamics Multiple Choice Practice set on Thermodynamics

1. General gas equation is

- (a) $PV = RT$
- (b) $PV = mRT$
- (c) $PV = \text{Constant}$
- (d) $\rho = \text{constant}$

ANSWER: (a)

2. An isolated system is one, which

- (a) Permits the passage of energy and matter across the boundaries
- (b) Permits the passage of energy only
- (c) Does not permit the passage of energy and matter across it
- (d) Permits the passage of matter only

ANSWER: (b)

3. In an isolated system, boundary of the system is crossed by

- (a) Heat
- (b) Work
- (c) Mass
- (d) Both (a) and (b) above

ANSWER: (d)

4. The characteristic of a control volume is/are

- (a) The volume, shape and position with respect to an observer are fixed
- (b) Material flow across the boundary
- (c) Both (a) and (b) above
- (d) None of the above

ANSWER: (c)

5. Specific heat is the amount of heat required to raise the temperature

- (a) By unit degree of a substance
- (b) By unit degree of a unit mass
- (c) Of a unit mass by 10°
- (d) None of the above

ANSWER: (b)

6. Internal energy of a perfect gas depends upon

- (a) Temperature only
- (b) Temperature and pressure
- (c) Temperature, pressure and specific heats
- (d) None of the above

ANSWER: (a)

7. With rise of temperature, the specific heat of water

- (a) Increases
- (b) Decreases

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- (c) First decreases to minimum then increases
- (d) Remains constant

ANSWER: (c)

8. For a closed system, difference between the heat added to the system and work done by the gas, is equal to the change in

- (a) Enthalpy
- (b) Entropy
- (c) Internal energy
- (d) Temperature

ANSWER: (c)

9. Specific heat of water is

- (a) 1
- (b) 0.1
- (c) 0.97
- (d) None of the above

ANSWER: (a)

10. Properties of the system, whose value for the entire system is equal to the sum of their values for individual parts of the system, are known as

- (a) Thermodynamic properties
- (b) Extensive properties
- (c) Intensive properties
- (d) None of the above

ANSWER: (b)

1. The extensive property of a thermodynamic system is

- (a) Viscosity
- (b) Surface tension
- (c) Refractive index
- (d) Heat capacity

ANSWER: (d)

12. Thermal equilibrium between two or more bodies exists, when they are brought together; there is no change in

- (a) Density
- (b) Pressure
- (c) Temperature
- (d) All of the above

ANSWER: (c)

13. When two bodies are in thermal equilibrium with a third body, they are also in thermal equilibrium with each other This statement is

- (a) Zero the law of thermodynamics
- (b) First law of thermodynamics
- (c) Second law of thermodynamics
- (d) None of the above

ANSWER: (a)

14. First law of thermodynamics deals with conservation of

- (a) Mass
- (b) Heat
- (c) Momentum
- (d) Energy

ANSWER: (d)

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15. According to first law of thermodynamics

- (a) total energy of a system remains constant
- (b) total energy of a system during a process remains constant
- (c) enthalpy entropy and total energy remains constant
- (d) none of the above

ANSWER: (a)

16. For the measurement of thermodynamic property known as temperature, is based on

- (a) Zeroth law of thermodynamics
- (b) First law of thermodynamics
- (c) Second law of thermodynamics
- (b) Third law of thermodynamics

ANSWER: (a)

17. Energy can neither be created nor destroyed but only converted from one form to another. This statement is

- (a) Zeroth law of thermodynamics
- (b) First law of thermodynamics
- (c) Second law of thermodynamics
- (d) None of the above

ANSWER: (b)

18. Kelvin-Plank's law' deals with

- (a) Conversion of work into heat
- (b) Conversion of heat into work
- (c) Conservation of work
- (d) Conservation of heat

ANSWER: (b)

19. A perpetual motion machine of the first kind is a machine which produces power without consuming any energy is,

- (a) Possible according to first law of thermodynamics
- (b) Impossible according to first law of thermodynamics
- (c) Impossible according to second law of thermodynamics
- (d) Possible according to second law of thermodynamics

ANSWER: (b)

20. Heat flows from cold substance to hot substance with the aid of external work This statement is given by

- (a) Kelvin
- (b) Joule
- (c) Gay Lussac
- (d) Clausius

ANSWER: (d)

21. The fastest moving gas molecules are of

- (a) Oxygen
- (b) Hydrogen
- (c) Chlorine
- (d) Nitrogen

ANSWER: (b)

22. In actual gases, the molecular collisions are

- (a) Elastic
- (b) Plastic
- (c) Inplastic
- (d) Inelastic

ANSWER: (d)

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23. If a perfect gas, undergoing any change in the variable, which control physical properties, it's behaviour is governed by

- (a) Boyle's law
- (b) Charles's law
- (c) Gay Lussac law
- (d) All of the above

ANSWER: (d)

24. According of Boyle's law at constant temperature $PV = C$. In this relation value of C depends upon

- (a) Atmospheric pressure
- (b) Quantity Of the gas
- (c) Molecular weight of the gas
- (d) All of the above

ANSWER: (b)

25. Change of internal energy is proportional to the change of temperature. This is

- (a) Boyle's law
- (b) Charles's law
- (c) Joule's law
- (d) Gay Lussac law

ANSWER: (c)

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Solved Objective MCQ test on Fluid mechanics

1. In Red wood viscometer

- (a) Absolute value of viscosity is detemiined
- (b) Part of the head of fluid is utilized in Overcoming friction
- (c) Fluid discharges through orifice with negligible velocity
- (d) Comparison of viscosity is done.

ANSWER: (d)

2. Centre of buoyancy is

- (a) The point of intersection of buoyant force and centre line of the body
- (b) Centre of gravity of the body
- (c) Centric of displaced volume fluid
- (d) Midpoint between C.G. and metacentric.

ANSWER: (c)

3. In isentropic flow; the temperature

- (a) Cannot exceed the reservoir temperature
- (b) Cannot drop and again increase downstream
- (c) Is independent of Match number
- (d) Is a function of Match number only

ANSWER: (a)

4. A stream line is

- (a) The line of equal velocity in a flow
- (b) The line along which the rate of pressure drop is uniform
- (c) The line along the geometrical centre of the flow
- (d) Fixed in space in steady flow.

ANSWER: (d)

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5. The flow of water in a pipe of diameter 3000 mm can be measured by

- (a) Venturimeter
- (b) Rotameter
- (c) Pilot tube
- (d) Orifice plate.

ANSWER: (c)

6. Apparent shear forces

- (a) Can never occur in frictionless fluid regardless of its motion
- (b) Can never occur when the fluid is at rest
- (c) Depend upon cohesive forces
- (d) All of the above

ANSWER: (d)

7. Weber number is the ratio of

- (a) Inertial forces to surface tension
- (b) Inertial forces to viscous forces
- (c) Elastic forces to pressure forces
- (d) Viscous forces to gravity

ANSWER: (a)

8. A small plastic boat loaded with pieces of steel rods is floating in a bath tub. If the cargo is dumped into the water allowing the boat to float empty, the water level in the tub will

- (a) Rise
- (b) Fall
- (c) Remains same
- (d) Rise and then fall

ANSWER: (b)

9. A flow in which each liquid particle has a definite path and their paths do not cross each other, is called

- (a) Steady flow
- (b) Uniform flow.
- (c) Streamline flow
- (d) Turbulent flow

ANSWER: (c)

10. Buoyant force is

- (a) Resultant of up thrust and gravity forces acting on the body
- (b) Resultant force on the body due to the fluid surrounding it
- (c) Resultant of static weight of body and dynamic thrust of fluid
- (d) Equal to the volume of liquid displaced by the body

ANSWER: (d)

11. Cavitations is caused by

- (a) High velocity
- (b) Low barometric pressure
- (c) High pressure

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(d) Low pressure

ANSWER: (d)

12. The general energy equation is applicable to

(a) Steady flow

(b) Unsteady flow

(c) Non-uniform flow

(d) Turbulent flow

ANSWER: (a)

13. The friction resistance in Pipe is proportional
To Square of V , according to

(a) Froude number

(b) Reynolds-Weber

(c) Darcy-Reynolds

(d) Weber-Froude

ANSWER: (a)

14. Pitot tube is used to measure the velocity head of

(a) Still fluid

(b) Laminar flow

(c) Turbulent flow

(d) Flowing fluid

ANSWER: (d)

15. In equilibrium condition, fluids are not able to sustain

(a) Shear force

(b) Resistance to viscosity

(c) Surface tension

(d) Geometric similitude

ANSWER: (c)

16. Flow occurring in a pipeline when a valve is
being opened is

(a) Steady

(b) Unsteady

(c) Laminar

(d) Vortex

ANSWER: (b)

17. Total pressure on 1 m x 1 m gate immersed vertically at a depth of 2 m below the free water
surface will be

(a) 1000 kg

(b) 2000 kg

(c) 4000 kg

(d) 8000 kg

ANSWER: (a)

18. A large Reynold number is indication of

(a) Smooth and streamline flow

(b) Laminar flow

(c) Steady flow

(d) Highly turbulent flow

ANSWER: (d)

19. In steady flow of a fluid, the acceleration of any
fluid particle is

(a) Constant

(b) Variable

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- (c) Zero
 - (d) Never zero
- ANSWER: (c)

20. Froude number is significant in
- (a) Supersonics, as with projectile and jet propulsion
 - (b) Full immersion or completely enclosed flow, as with pipes, aircrafts wings, nozzles etc.,
 - (c) Simultaneous motion through two fluids where there is a surface of discontinuity, gravity forces
 - (d) All of the above
- ANSWER: (c)

21. The flow in venturiflume takes place at
- (a) Atmospheric pressure
 - (b) Vacuum
 - (c) High pressure
 - (d) Any pressure
- ANSWER: (a)

22. Two dimensional flow occurs when the
- (a) Directional and magnitude of the velocity at all points are identical
 - (b) Velocity of successive fluid particles, at any point, is same at successive periods of time
 - (c) Magnitude and direction of velocity, do not change from point to point in the fluid
 - (d) Fluid particles move in a plane or parallel planes and the streamline patterns are identical in each plane
- ANSWER: (d)

23. A piece of wood having weight 5 kg floats in water with 60% of its volume under the (liquid. The specific gravity of wood is
- (a) 0.83
 - (b) 0.6
 - (c) 0.4
 - (d) None of the above
- ANSWER: (b)

24. In order that the water shall never rise more than 100 cm above the crest for a discharge of 5 cubic metres per second, the length of weir will be
- (a) 1 metre
 - (b) 2.5 metres
 - (c) 2.49 metres
 - (d) 2.51 metres
- ANSWER: (c)

25. Separation of flow occurs due to reduction of pressure gradient to
- (a) Zero
 - (b) Negligibly low value
 - (c) The extent such that vapour formation starts
 - (d) None of the above
- ANSWER: (c)

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1. Two parallel wires separated by 25 cm carry currents of $i_1 = 25$ A and $i_2 = 35$ A flowing in opposite directions. The force per unit length acting between them is:

- (a) a repulsive force of 7×10^4 N/m
- (b) an attractive force of 7×10^{-4} N/m
- (c) a repulsive force of 35×10^2 N/m
- (d) an attractive force of 35×10^2 N/m

Ans. (a)

2. In the case of a series L-C-R circuit, the sharpness of resonance curve is determined by the quality factor Q given by:

- (a) $\frac{XL}{XC}$
- (b) $\frac{L}{R}$ at resonance frequency
- (c) $\frac{L}{R}$ at any frequency other than resonance frequency
- (d) $\frac{XC}{XL}$

Ans. (b)

3. A device used to measure the magnetic field makes use of Hall effect. In a magnetic field of 200 G, it gives a Hall voltage of 16 μ V. If with the same current and orientation, it gives a Hall voltage of 24 μ V in another field, then its magnitude:

- (a) 1600 G
- (b) 480 G
- (c) 300 G
- (d) 150 G

Ans.(c)

4. Under space charge conditions with the plate voltage $E_b = 100$ V and the permeance $K = 10^{-4}$ (in SI unit), the plate current in a diode will be:

- (a) 10⁻⁶ mA
- (b) 102 mA
- (c) 102 mA
- (d) 10 mA

Ans. (a)

5. For a BJT, the current amplification factor $\beta_{cc} = 0.9$. This transistor is connected in CE configuration. When the base current changes by 0.4 mA, the change in collector current will be:

- (a) 36 mA
- (b) 9 mA
- (c) 4 mA
- (d) 3.6 mA

Ans. (d)

6. A CE amplifier has voltage gain of 50, an input impedance of 1000 Ohms, and an output impedance of 200 Ohms. The power gain of the amplifier will be:

- (a) 24 dB
- (b) 41 dB
- (c) 250 dB
- (d) 12500 dB

Ans. (c)

7. The input signal given to a CE amplifier having a voltage gain of 150 is $V_i = 2\cos(15t + 10^\circ)$. The corresponding output signal is:

- (a) $300\cos(15t + 190^\circ)$
- (b) $300\cos(15t + 90^\circ)$
- (c) $75\cos(15t + 10^\circ)$

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(d) $2\cos(15t+190^\circ)$

Ans. (a)

8. If in the first Bohr orbit of a hydrogen atom the total energy of the electron is $21.76 \times 10^{-19}\text{J}$, then its potential energy will be:

(a) $-43.52 \times 10^{-19}\text{J}$

(b) $-27.76 \times 10^{-19}\text{J}$

(c) $-10.88 \times 10^{-19}\text{J}$

(d) $-13.60 \times 10^{-19}\text{J}$

Ans. (a)

9. Match List I with List H and select the correct answer using the codes given below the Lists:

List I List II

(Processes) (Description)

A. Isothermal process 1. No heat exchange

B. Isentropic process 2. Constant temperature

C. Isochoric process 3. Constant pressure

D. Isobaric process 4. Constant volume

5. Constant enthalpy

Codes:

A B C D

(a) 2 1 5 4

(b) 3 2 4 5

(c) 2 1 4 3

(d) 1 5 2 3

Ans. (c)

10. A system absorbs $1.5 \times 10^3\text{J}$ of energy as heat and produces 500 J of work. The change in the internal energy of the system will be:

(a) 50J

(b) 100J

(c) 150J

(d) 1000J

Ans. (d)

11. If a capacitor of 1F charged to a potential of 300 V is discharged through a resistor kept at room temperature, then the entropy change of the universe in J/K is equal to:

(a) Zero

(b) 0.4×10^{-4}

(c) 1.5×10^{-4}

(d) 4.0×10^{-4}

Ans. (c)

12. The volume of a certain mass of gas at constant pressure is doubled to its value at 0°C . The temperature of the gas will be:

(a) 100°C

(b) 173°C

(c) 273°C

(d) 546°C

Ans. (c)

13. The period of oscillations of a galvanometer mirror due to the Brownian motion is 40 s. The moment of inertia of the galvanometer about its suspensions axis is $8 \times 10^{-12}\text{kg}\cdot\text{m}^2$. The root-mean-square of maximum deflection of this mirror at a temperature of 50°C is:

(a) $2.7 \times 10^{-4}\text{rad}$

(b) $2.1 \times 10^{-4}\text{rad}$

(c) $1.5 \times 10^{-4}\text{rad}$

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(d) 0.9×10^{-4} rad

Ans. (c)

14. If a black body radiation in a spherical cavity of volume V satisfies the relation $PV^{\gamma} = \text{constant}$ during a quasistatic isentropic process, then the numerical value of γ should be:

(a) $7/5$

(b) $5/3$

(c) $4/3$

(d) $3/2$

Ans. (c)

Direction: The following ten items consists of two statements, one labelled the 'Assertion A' and the other labelled the 'Reason R'. You are to examine these two statements carefully and decide, if the 'Assertion A' and the 'Reason R' are individually true and if so, whether the Reason is a correct explanation of the Assertion. Select your answers to these items using the codes given below and mark your answer sheet accordingly.

Codes:

(a) Both A and R are true and R is the correct explanation of A

(b) Both A and R are true but R is not a correct explanation of A

(c) A is true but R is false

(d) A is false but R is true

15. Assertion (A): The shape of an automobile is so designed that it resembles the streamline pattern of the fluid through which it moves,

Reason (R): Only then the resistance offered by the fluid is maximum

Ans. (c)

16. Assertion (A): When two vibrating tuning forks having frequencies 256 Hz and 512 Hz are held near each other, beats cannot be heard.

Reason (R): The principle of superposition is valid only if the frequencies of the oscillators are nearly equal.

Ans. (a)

17. Assertion (A): Resonance is a special case of forced vibration in which the natural frequency of vibration of the body is the same as the impressed frequency and the amplitude of forced vibration is maximum.

Reason (R): The amplitude of forced vibrations of a body increases with the increase in the frequency of the externally impressed periodic force.

Ans. (c)

18. Assertion (A): A single lens produces a coloured image of an object illuminated by white light.

Reason (R): The refractive index of the material of lens is different for different wavelength of light.

Ans. (a)

19. Assertion (A): At room temperature water does not sublime from ice to steam.

Reason (R): The critical point of water is much above the room temperature.

Ans. (a)

20. Assertion (A): It is not possible for a system, unaided by an external agency to transfer heat from a body at a lower temperature to another at a higher temperature.

Reason (R): It cannot violate the second law of thermodynamics.

Ans. (a)

21. Assertion (A): In the absence of an externally applied electric field, the dipole moment per unit volume of a polar dielectric material is always zero.

Reason (R): In polar dielectrics each molecule has a permanent dipole moment but these are randomly oriented in the absence of an externally applied electric field.

Ans. (a)

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22. Assertion (A): If a heavy nucleus is split into two medium sized ones, each of the new nuclei will have more binding energy per nucleon than the original nucleus.

Reason (R): Joining two light nuclei together to give a single nucleus of medium size means more binding energy per nucleon in the new nucleus.

Ans. (c)

23. Assertion (A): In the process of nuclear fission, the fragments emit two or three neutrons as soon as they are formed and subsequently emit particles.

Reason (R): As the fragments contain an excess of neutrons over .proton, emission of neutrons and β^- particles bring their neutron/proton ratio to stable values.

Ans. (a)

24. Assertion (A): The energy gap between the valence band and conduction band is greater in silicon than in germanium.

Reason (R): Thermal energy produces fewer minority carriers in silicon than in germanium.

Ans. (a)

25. A damped simple harmonic oscillator of frequency f_1 is constantly driven by an external periodic force of frequency f_2 . At the steady state, the oscillator frequency will be:

- (a) f_1
- (b) f_2
- (c) $f_1 - f_2$
- (d) $(f_1 + f_2)/2$

Ans. (b)

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Physics solved previous Objective questions UPSC

physics solved questions for UPSC IAS

UPSC Exam material Physics objective questions and answers

1. Two charged particles A and B have the same linear momentum but A has twice the charge as on B. Both move in circular paths of radii r_A and r_B about a magnetic field. Which one of the following is the correct value of r_A/r_B

- (a) 2
- (b) 0.5
- (c) 4
- (d) 0.25

Ans. (b)

2. The ground state energy of positronium is:

- (a) -1.2eV
- (b) -3.4 eV
- (c) -6.8eV
- (d) -13.6eV

Ans. (c)

3. The minimum wavelength of continuous X-rays is given by:

- (a) eh/Vc
- (b) ch/eV
- (d) cV/eh
- (c) eV/ch

(Where the symbols have their usual significance)

Ans. (b)

4. An X-ray of energy 50 keV strikes an electron initially at rest. The change in wavelength of the X-ray scattered at angle 90° is, approximately:

(Given, $h = 6.63 \times 10^{-34}\text{ J-s}$, $m = 9.11 \times 10^{-31}\text{ kg}$)

- (a) Zero
- (b) $2.4 \times 10^{-12}\text{ m}$

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- (c) 4.8×10^{-12} m
(d) 2.7×10^{-11} m
Ans. (b)

5. The relationship between the angular frequency ω and the wave number k (using de-Broglie's hypothesis) of a particle associated with it is $\omega = ck^2$, where c is constant. The group velocity for the particle wave is:

- (a) $1/2ck$
(b) $1/ck$
(c) $2ck$
(d) $4ck$
Ans. (c)

6. A radioactive sample containing N_0 nuclei emits N particles per second on decaying. The half-life of the sample, in seconds is:

- (a) $0.693 (N/N_0)$
(b) (N/N_0)
(c) $0.693 (N_0/N)$
(d) (N_0/N)
Ans. (c)

7. For which of the following cases is the de-Broglie wavelength same?

1. Particle of mass m , kinetic energy K
2. Particle of mass $2m$, kinetic energy $2K$
3. Particle of mass $2m$, kinetic energy K

Select the correct answer using the codes given below:

- (a) 2 and 3
(b) 1 and 3
(c) 1 and 2
(d) 1, 2 and 3
Ans. (d)

8. If E_0 is the zero-point energy of a harmonic oscillator of frequency ν and h is Planck's constant then its energy in the $n = 2$ state will be:

- (a) $(E_0 + h\nu)$
(b) $2E_0$
(c) $4E_0$
(d) $(E_0 + 2h\nu)$
Ans. (d)

9. A threshold wavelength of a metal is 7000 Å. The work function is: (Given, velocity of light $c = 3 \times 10^8$ m/s and Planck's constant 6.624×10^{-34} J-s)

- (a) 1.775 eV
(b) 17.75 eV
(c) 177.5 eV
(d) 0.8875 eV
Ans. (a)

Directions: The following items consist of two statements, one labeled the 'Assertion (A)' and the other labeled the 'Reason (R)'. You are to examine these two statements carefully and decide, if the 'Assertion (A)' and the 'Reason (R)' are individually true and if so, whether the 'Reason (R)' is a correct explanation of the 'Assertion (A)'. Select your answers to these items using the Codes given below and mark your answer sheet accordingly:

Codes:

- (a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

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10. Assertion (A): While traveling through air, sound waves, from two different sources, pass through each other without being destroyed.

Reason (R): The frequency of simple harmonic waves is independent of their amplitude.

Ans. (b)

11. Assertion (A): Two ships sail parallel and close to each other during a naval exercise. To achieve this they are to be steered slightly outwards.

Reason (R): Flow of liquid to drag in the channel produces excess pressure above the normal on the outer sides of the ships, which pushes them inwards.

Ans. (a)

12. Assertion (A): A skater brings his hands closer to his body to spin faster.

Reason (R): Only then his moment of inertia will decrease and angular velocity will increase.

Ans. (a)

13. Assertion (A): The pressure of air inside a small soap bubble is greater than the pressure of air inside a larger bubble.

Reason (R): The pressure of air is inversely proportional to the surface area of the bubble.

Ans. (a)

14. Assertion (A): The spherical aberration in a plano-convex lens is reduced, if its spherical surface faces the incident parallel light.

Reason (R): In a lens spherical aberration is minimized, if the total deviation produced by a lens is equally shared by two surfaces.

Ans. (a)

15. Assertion (A): The most common solution to the problem of eliminating chromatic aberration is achieved with a chromatic doublet.

Reason (R): When lenses are combined to form a doublet, spherical aberration may be minimized.

Ans. (b)

16. Assertion (A): The central fringe in the reflected light of Newton's rings between a plano-convex lens and a plane glass plate is dark in the absence of any dust particles.

Reason (R): When a ray of light undergoes reflection at the surface of a denser medium it suffers a phase change of π .

Ans. (a)

17. Assertion (A): A 1 mW He-Ne laser is hundred times brighter than the intensity of sunlight on earth.

Reason (R): Laser beam is highly directional.

Ans. (a)

18. Assertion (A): At 0 K, the molecules of a gas possess no energy.

Reason (R): At absolute zero temperature the molecule of a gas possess some energy called zero point energy

Ans. (b)

19. Assertion (A): At a given temperature radiations emitted by pin hole cavities in different materials are different.

Reason (R): Pinhole cavities in all materials behave like perfect black body.

Ans. (d)

20. Assertion (A): If a body is in thermal equilibrium with the surroundings, then it will absorb and emit radiant energy at the same rate.

Reason (R): Stefan-Boltzmann law is true for both emission and absorption of radiant energy

Ans (c)

21. Assertion (A): The study of Hall Effect can give the sign of charge carriers in a conductor.

Reason (R): The sign of charge carriers is determined by the sign of the Hall potential which is

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developed in-the lateral direction of the current.

Ans. (a)

22. Assertion (A): In Stern-Gerlach experiment the single beam of silver atoms after passing through non-homogeneous magnetic field was split into two distinct parts.

Reason (R): Space quantization permits two opposite spin directions, resulting in the deflection of the beam in two opposite directions.

Ans. (a)

23. Assertion (A): An electron cannot be observed without changing its momentum by an indeterminate amount.

Reason (R): Momentum of an electron is h/λ where λ is its wavelength.

Ans. (b)

24. Assertion (A): Uniform magnetic field B has a non-zero divergence at the pole of a bar magnet.

Reason (R): Magnetic field cannot transfer energy to charged particles.

Ans. (d)

25. Assertion (A): Electrons find greater attractive forces by collector once they reach the base from an emitter in n-p-n transistor operation.

Reason (R): The reverse bias voltage on the collector is much higher than the forward bias on the emitter.

Ans. (a)

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Objective physics Sample paper

solved physics Sample paper for PMT PET CBSE Physics

1. A machine gun fires n bullets per second and the mass of each bullet is m . If the speed of bullets is v , then the force exerted on the machine gun is

- (a) mng
- (b) mnv
- (c) $mnvg$
- (d) mnv/g

Ans. (b)

2. A Diwali rocket is ejecting 0.05 kg of gases per second at a velocity of 400 ms⁻¹. The accelerating force on the rocket is

- (a) 0 dyne
- (b) 20 newton
- (c) 20 kg wt
- (d) sufficient data not given

Ans. (b)

3. A stretching force of 100 N is applied at one end of a spring balance and an equal stretching force is applied at the other end at the same time. The reading on the balance will be

- (a) 200 N
- (b) 100 N
- (c) 400 N
- (d) zero

Ans. (b)

4. Aluminium has a density of 2.7 g/cc. The mass of 15 cc of aluminium is

- (a) 45 g
- (b) 40.5 g
- (c) 80 g

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(d) 100 g
Ans. (b)

5. 60 cc of a liquid of relative density 1.4 are mixed with 40 cc of another liquid of relative density 0.8. The density of the mixture is
(a) 1.16 g/cc
(b) 2.26 g/cc
(c) 11.6 g/cc
(d) 116 g/cc
Ans. (a)

6. The height of mercury which exerts the same pressure as 20 cm of water column, is
(a) 1.47cm
(b) 14.8 cm
(c) 148 cm
(d) none of these
Ans. (a)

7. The hot air balloon rises because it is
(a) denser
(b) less dense
(c) equally dense
(d) the given statement is wrong
Ans. (b)

8. A boat full of iron nails is floating on water in a lake. When the iron nails are removed, the water level
(a) rises
(b) falls
(c) remains the same
(d) nothing can be said
Ans. (b)

9. A solid weighs 32 g f in air and 28.8 g f in water. The R.D. of the solid is
(a) 8.9
(b) 10
(c) 29.12
(d) 20
Ans. (b)

10. If the density of a metal is 8.2 g/cc, its relative density is
(a) 8.2
(b) $1/8.2$
(c) 0.82
(d) none of these
Ans. (b)

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Physics Solved Objective Questions For RRB Exams
Physics Model questions Fully Solved
RRB ASM General Knowledge : Physics Solved Paper

1. A bullet of mass A and velocity B fired into a block of wood of mass C. If loss of any mass and friction be neglected, the velocity of the system must be
(a) $AB/A+C$
(b) $A+C/B+C$
(c) $AC/B+C$
(d) $A+B/AC$
Ans. (a)

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2. A rocket works on the
(a) first law of motion
(b) second law of motion
(c) third law of motion
(d) law of conservation of energy
Ans. (c)

3. 1 dyne is equal to
(a) 980 g wt
(b) 1/100 g wt
(c) 980 kg wt
(d) none of these
Ans. (b)

4. Two skaters A and B of mass 50 kg and 70 kg respectively stand facing each other 6 metres apart. They then pull on a light rope stretched between them. How far has each moved when they meet?
(a) Both have moved 3 metres.
(b) A moves 2.5 metres and B moves 3.5 metres.
(c) A moves 3.5 metres and B moves 2.5 metres.
(d) A moves 2 metres and B moves 4 metres.
Ans. (c)

5. A body of mass M collides against a wall with velocity V and rebounds with the same speed. Its change of momentum is
(a) zero
(b) MV
(c) $2MV$
(d) $-MV$
Ans. (c)

6. A bullet in motion hits and gets embedded in a solid resting on a frictionless table. What is conserved?
(a) Momentum and kinetic energy
(b) Momentum alone
(c) Kinetic energy alone
(d) Neither momentum nor kinetic energy
Ans. (b)

7. A man sitting in a train in motion is facing the engine. He tosses a coin up, the coin falls behind him. The train is moving
(a) forward with uniform speed
(b) backward with uniform speed
(c) forward with acceleration
(d) forward with deceleration
Ans. (b)

8. If the mass of a body is 12.1 g and the density is 2.2 g/cc, its volume is
(a) 1.5 cm³
(b) 8 cc
(c) 11 cc
(d) 55 cc
Ans. (a)

9. Brine has a density of 1.2 g/cc. 40 cc of it are mixed with 30 cc of water. The density of solution is
(a) 2.11 g/cc
(b) 1.11 g/cc
(e) 12.2 g/cc

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(d) 20.4 g/cc

Ans. (b)

10. If a force of 10 N acts on surfaces of areas in the ratio 1: 2. then the ratio of thrusts is

(a) 1:2

(b) 2:1

(c) 3:1

(d) 1.1

Ans. (d)

11. The buoyant force depends on the

(a) depth of a liquid

(b) density of a liquid

(c) colour of a liquid

(d) none of these

Ans. (b)

12. A force of 50 N is applied on a nail of area 0.00 1 sq. cm. Then the thrust is

(a) 50 N

(b) 100 N

(c) 0.05 N

(d) 10 N

Ans. (a)

13. A piece of wood floats in water. What happens to it in alcohol?

(a) Floats higher

(b) Stays as before

(c) Sinks

(d) Sinks and rises

Ans. (c)

14. An ice cube is floating in a glass of water. What happens to the water level when the ice melts?

(a) Rises

(b) Falls

(c) remains same

(d) First rises and then falls

Ans. (c)

15. The SI unit of pressure is

(a) atmosphere

(b) dyne/cm²

(c) pascal

(d) mm of Hg

Ans. (c)

16. A body of mass 50 kg has a volume 0.049 m³. The buoyant force on it is

(a) 50 kg f

(b) 50N

(e) 49N

(d) 49kg f

Ans. (d)

17. If two masses A and B have their masses in the ratio 1: 4 and their volumes are equal, then the densities have the ratio

(a) 1:4

(b) 4:1

(c) 2:1

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(d) 3:1

Ans. (a)

18. If the density of a block is 981 kg/m^3 , it shall

(a) sink

(b) float

(c) float completely immersed in water

(d) float completely out of water

Ans. (b)

19. As the density of a series of liquids increases, the upthrust on the iron rod submerged

(a) increases

(b) decreases

(c) remains constant

(d) nothing can be said

Ans. (a)

20. The SI unit of thrust is

(a) N

(b) dyne

(c) kg wt

(d) N m^{-2}

Ans. (a)

21. The total force exerted by the body perpendicular to the surface is called

(a) pressure

(b) thrust

(c) impulse

(d) none of these

Ans. (a)

22. At sea level, atmospheric pressure is

(a) 76 cm of Hg column

(b) 76 cm of Hg column

(c) 0.76 cm of Hg column

(d) 76 cm of water column

Ans. (a)

23. Atmospheric pressure is measured by a

(a) doctor's thermometer

(b) pedometer

(c) mercury barometer

(d) none of these

Ans. (c)

24. The weather forecasting department uses.....as the unit of pressure,

(a) bar

(b) N m^{-2}

(c) Pa

(d) mm of Hg

Ans. (a)

25. Which of the following physical quantity has no unit?

(a) Relative density

(b) Density

(c) Pressure

(d) Thrust

Ans. (a)

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Physics For UPSC IAS

Physics Civil Service Exam practice test IAS Preliminary
UPSC Civil Services Prelims Examination Practice – Physics

1. The magnetic field through a coil changes at uniform rate from 0.1 T to 0.4 T during 2×10^2 s. If the area of cross-section of the coil is $4 \times 10^{-2} \text{ m}^2$ and the number of turns is 200, then the emf induced in the coil is:

- (a) 50 V
- (b) 120 V
- (c) 180 V
- (d) 220 V

Ans. (b)

2. A coil of N turns, made of copper wire of length 4 m is placed in a magnetic field that changes with time. The value of N, for which induced emf will be maximum, is:

- (a) 1
- (b) 2
- (c) 3
- (d) 4

Ans. (d)

3. A current of I A is passed through a semiconductor material of thickness 1 mm. It is placed in a transverse magnetic field of 1 T. If the carrier density is $10^{25}/\text{m}^3$, then the Hall potential is:

- (a) 63 mV
- (b) 6.3 mV
- (c) 0.63 mV
- (d) 0.063 mV

Ans. (c)

4. If a plane electromagnetic wave propagating in space has an electric field of amplitude 9×10^3 V/m, then the amplitude of the magnetic field is:

- (a) 2.7×10^{12} T
- (b) 9.0×10^{-3} T
- (c) 3.0×10^{-4} T
- (d) 3.0×10^{-5} T

Ans. (d)

5. A cyclotron of radius 64 cm accelerates deuterons ($m = 3.3 \times 10^{-27}$ kg). If the cyclotron frequency is 5 MHz, then the maximum speed with which the deuterons

Emerge, is

- (a) $3 \times 10^7 \text{ m/s}$
- (b) $2 \times 10^7 \text{ m/s}$
- (c) $1.5 \times 10^7 \text{ m/s}$
- (d) $2 \times 10^6 \text{ m/s}$

Ans. (b)

6. In a typical electron synchrotron, the magnetic field:

- (a) Is varied with time while the radio frequency is held constant
- (b) Is held constant while the radio frequency is varied with time
- (c) As well as the radio frequency are varied with time
- (d) As well as the radio frequency are held constant

Ans. (c)

7. Consider the following statements:

Stern and Gerlach experiment gives a direct and convincing confirmation of:

- 1. Space quantization.
- 2. Wave nature of electron.

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3. Spin of electron.

4. quantized atomic magnetic moment.

Which of the above statements are correct?

(a) 3 and 4

(b) 1,2and4

(c) 1,3and4

(d) 1 and 2

Ans. (c)

8. L ionization potential for a hydrogen atom is 13.6 eV. The ionization potential for a positronium atom where an electron revolves round a positron, is:

(b) 6.8 eV

(a) 13.6 eV'

(c) 3.4 eV

(d) 1.7 eV

Ans. (b)

9. The glancing angle in a X-rays diffraction experiment is 30° and the wavelength of the X-rays used is 20 nm. The inter planar spacing of the crystal diffracting these X-rays will be

(b) 20 nm

(a) 40 nm

(c) 15 nm

(d) 10 nm

Ans. (b)

10. If a proton and an electron have same de-Broglie wavelength, then:

(a) Both have same kinetic energies

(b) Proton has more kinetic energy than electron

(c) Electron has more kinetic energy than proton

(d) Both have same velocity

Ans. (c)

11. Six α -decays and a number of β -decays occur before ${}_{90}\text{Th}^{232}$ achieves stability; the final product in the chain being ${}_{82}\text{Pb}^{208}$. The number of β -disintegrations taking place is:

(a) 2

(b) 4

(c) 6

(d) 8

Ans. (b)

12. Two. Substances X and Y are made radioactive and contain equal number of atoms. X has half-life of 1 h and Y has half-life of 2 h. After a lapse of 2 h, the ratio of the rate of disintegration of X to that of Y will be:

(a) 1: 4

(b) 2: 1

(c) 1: 1

(d) 1: 2

Ans. (b)

13. An unstable particle of rest energy 1000 MeV decays into a μ -meson and a neutrino, with a mean life time of 10^{-8} s, when at rest. The mean decay distance, in meters, when the particle has a momentum of 1000 MeV/c is:

(a) 3

(b) 6

(c) 9

(d) 12

Ans. (a)

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14. Consider the following statements about a neutron:

1. Neutron is a fermion.
2. A neutron is heavier than a proton.
3. A free neutron is an unstable particle.

Which of the above statements are correct?

- (a) 1, 2 and 3
- (b) 1 and 2
- (c) 2 and 3
- (d) 1 and 3

Ans. (a)

15. The annihilation of a slow positron and an electron cannot result into a photon, but must produce at least two photons traveling in opposite directions. This implies conservation of:

- (b) Energy
- (a) Baryons
- (c) Leptons
- (d) Momentum

Ans. (d)

16. The energy of a particle in a potential box and that of the hydrogen atom varies with the quantum number n , respectively, as:

- (a) n^2 and $1/n^2$
- (b) $1/n^2$ and n^2
- (c) n^2
- (d) $2/n^2$ and $1/n^2$

Ans. (a)

17. An excited state of hydrogen atom has a life time of 2.5×10^{-14} s. The minimum error in the measurement of the energy of the excited state will be:

- (a) 1.656×10^{-40} erg
- (b) 1.656×10^{-40} J
- (c) 2.65×10^{-13} erg
- (d) 2.65×10^{-13} J

Ans. (c)

18. If input impedance of an FET is R_1 , and that of a BJT is R_2 , then:

- (a) $R_1 > R_2$
- (b) $R_1 < R_2$
- (c) $R_1 = R_2$
- (d) None of these

Ans. (a)

19. The correct sequence of the band-gaps of germanium (E_{g1}) silicon (E_{g2}) and gallium arsenide (E_{g3}) will be:

- (a) $E_{g1} > E_{g2} > E_{g3}$
- (b) $E_{g1} < E_{g2}$
- (c) $E_{g2} < E_{g1} < E_{g3}$
- (d) $E_{g2} > E_{g1} > E_{g3}$

Ans. (c)

20. The Fermi level of an intrinsic semiconductor is pinned at the centre of the band-gap. The probability of occupation of the highest electron state in valence band at room temperature will be:

- (a) Zero
- (b) Between zero and half
- (c) Half
- (d) One

Ans. (c)

21. If a semiconductor has an intrinsic carrier concentration of $1.41 \times 10^{16}/m^3$ when doped with $10^{21}/m^3$ phosphorus atoms, then the concentration of holes/ m^3 at room temperature will be:

- (a) 2×10^{21}

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- (b) 2×10^{11}
 - (c) 1.41×10
 - (d) 1.41×10^{16}
- Ans. (a)

22. A n-p-n transistor circuit has $\beta = 0.985$. If $I_C = 2 \text{ mA}$, then the value of I_B is:

- (a) 0.03 mA
 - (b) 0.003 mA
 - (c) 0.66 mA
 - (d) 0.015 mA
- Ans. (a)

23. The DC load line of an amplifier circuit:

- (a) Has a positive slope
 - (b) Has a curvature
 - (c) Does not contain the Q-point
 - (d) Has a negative slope
- Ans. (d)

24. If a transistor amplifier has a gain of 20 dB, then the ratio of output to input power is:

- (a) 100
 - (b) 10
 - (c) 20
 - (d) 200
- Ans. (a)

25. for a square-wave response (with respect to its maximum response), the rise-time of a transistor is defined as the time duration in which its response varies from:

- (a) 10% to 50%
 - (b) 0% to 50%
 - (c) 10% to 90%
 - (d) 25% to 75%
- Ans. (c)

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PHYSICS Practice objective test

1. If the energy, $B = G r$ where G is the universal gravitational constant, h is the Planck's constant and c is the velocity of light, then the values of p , q and r are, respectively:

- (a) $-\frac{1}{2}$, $\frac{1}{2}$ and $\frac{5}{2}$
- (b) $\frac{1}{2}$, $-\frac{1}{2}$ and $\frac{5}{2}$
- (c) $-\frac{1}{2}$, $\frac{1}{2}$ and $\frac{3}{2}$
- (d) $\frac{1}{2}$, $-\frac{1}{2}$ and $\frac{3}{2}$

Ans. (a)

2. Two bodies A and B start from rest and from the same point with a uniform acceleration of 2 m/s^2 . If B starts one second later, then the two bodies are separated, at the end of the next second, by:

- (a) 1 m
- (b) 2 m
- (c) 3 m
- (d) 4 m

Ans. (c)

3. A 25 kg crate, starting from rest at the top, slides down a plane that makes an angle of 30° with the horizontal. When it reaches the bottom of the 10m long slide, its velocity is 8 m/s. The work done by the force of friction is closest to a value of

- (a) $17.0 \times 10^2 \text{ J}$

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- (c) $6.5 \times 10^2 \text{J}$
 - (b) $8.0 \times 10^2 \text{J}$
 - (d) $4.5 \times 10^2 \text{J}$
- Ans. (d)

4. A particle of mass 10 kg is moving in a straight line. If its displacement, x With time t is given by, $x = (t^3 - 2t - 16)\text{m}$, then the force acting on it at the end of 4 s is:

- (a) 24N
 - (c) 300N
 - (b) 240N
 - (d) 1200N
- Ans. (b)

5. A golf ball of mass 0.05 kg placed on a tee, is struck by a golf club. The speed of the golf ball as it leaves the tee is 100 m/s. the time of contact between them is 0.02 s. If the force decreases to zero linearly with time, then the force at the beginning of the contact is

- (a) 500 N
 - (b) 250 N
 - (c) 200 N
 - (d) 100 N
- Ans. (a)

6. The moment of a inertia of a dumb-bell, consisting of point masses $m_1 = 2.0\text{kg}$ and $m_2 = 1.0\text{kg}$, fixed to the ends of a – rigid massless rod of length L 0.6 m, about an axis passing through the centre of mass and perpendicular to its length, is:

- (a) $0.72 \text{ kg}\cdot\text{m}^2$
 - (b) $0.36 \text{ kg}\cdot\text{m}^2$
 - (c) $0.27 \text{ kg}\cdot\text{m}^2$
 - (d) $0.24 \text{ kg}\cdot\text{m}^2$
- Ans. (d)

7. A merry-go-round starting from rest accelerates for 5 s with an angular acceleration of 0.4 rad/s^2 It then rotates at constant angular velocity for 30s before slowing down at the same rate. The distance covered by a thud, sitting on a toy-horse 3 m from the centre, is:

- (a) 35 m
 - (b) 55m
 - (c) 105 m
 - (d) 210m
- Ans. (d)

8. Two springs A and B with spring constants, $k_A = 2k_B$ are stretched by applying forces of equal magnitudes at their ends. If the energy stored in A is E , then the energy stored in B is.:

- (a) $E/4$
 - (b) $E/2$
 - (c) E
 - (d) $2E$
- Ans. (d)

9. In a circus, a person with a mass of 70 kg stands without any floor-support against the wall of a cylindrical rotor. If the coefficient of friction between the rotor-wall surface and the man's feet is 0.4 and radius of rotor is 2.0 m, then the minimum angular speed of rotor such that the person does not fall, should be:

- (a) 7.0 rad/s
 - (b) 1.75 rad/s
 - (c) 3.5 rad/s
 - (d) 5.25 rad/s
- Ans. (c)

10. A comet moves in an elliptical orbit with an eccentricity of $e = 0.20$ around a star. The distance between the perihelion and the aphelion is $1.0 \times 10^8 \text{km}$. If the speed of the comet at perihelion is 81

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km/s. then the speed of the comet at the aphelion, is:

- (a) 182 km/s
- (b) 36 km/s
- (c) 121.5 km/s
- (d) 54 km/S

Ans. (a)

11. A chair is suspended from a spring with spring constant of 600 N/m. The periodic time for oscillation of system is 1 s. When a man sits in this chair, the periodic time becomes 2.5 s. The weight of the man is closest to a value of:

- (a) 650 N
- (b) 800 N
- (c) 950 N
- (d) 1100 N

Ans. (b)

12. When a spring is stretched by a distance x , it exerts a force, given by $F = (-5x - 16x^2)$ N. The work done, when the spring is stretched from 0.1 m to 0.2 m, is

- (a) 8.1×10^{-2} J
- (b) 12.2×10^{-2} J
- (c) 8.1×10^{-1} J
- (d) 12.2×10^{-1} J

Ans. (a)

13. If the momentum of an electron moving with a velocity $0.9c$ is increased by 1%, then the increase in its energy is:

- (a) 1%
- (b) 0.9%
- (c) 0.81%
- (d) 0.5%

Ans. (a)

14. An inertial frame of reference B is moving along the X-axis with a velocity 9×10^6 m/s with respect to another inertial frame A. A rod is located in the frame A with its two ends at the coordinate points (5, -5, 0) m and (5, 7, 5) m. The length of the rod as observed from the frame B is

- (a) 13.5m
- (b) 13.0m
- (c) 12.75 m
- (d) 12.5

Ans. (b)

15. A rain drop of radius 1.5 mm, experiences a drag force, $F = (2 \times 10^{-5}v)$ N, while falling through air from a height of. 2 km, with a velocity V . The terminal velocity of the rain drop will be nearly:

- (a) 200 m/s
- (b) 80 m/s
- (c) 7 m/s
- (d) 3 m/s

Ans. (c)

16. Two traveling waves

$$y_1 = 0.65 \sin (0.4x - 800t) \text{ m}$$

$$\text{And } y_2 = -0.65 \sin (0.4x + 800t) \text{ m}$$

Are superposed in a medium. For the resultant wave at the point $x = 2.5$ m, the maximum displacement is:

- (a) Zero
- (c) 0.65 m
- (b) 1.30m

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(d) 0.91 m
Ans. (b)

17. The maximum amplitude in the case of a forced oscillator occurs at the
(a) Natural frequency of the oscillator
(b) Frequency of the force
(c) Frequency greater than the natural frequency of the oscillator
(d) Frequency less than the natural frequency of the oscillator
Ans. (d)

18. A sound source S of frequency 1125 Hz is moving towards a stationary observer O with a speed of 29 m/s. Then O perceives it as a frequency of v_1 . If S is stationary while O is moving towards S, with the same speed, the frequency perceived by O, is v_2 . If the velocity of sound is 343 m/s, then v_1 and v_2 are, respectively:
(a) 1229; 1220
(b) 1220; 1229
(c) 1224; 1224
(d) 1224; 1232
Ans. (a)

19. The temperature in Kelvin, at which the average speed of H_2 molecules will be same as that of N_2 molecules at $35^\circ C$, will be
(a) 22
(b) 42
(c) 295
(d) 495
Ans. (a)

20. Consider the following statements regarding the characteristics of entropy:
1. Entropy is a measure of disorder.
2. Entropy changes during a reversible adiabatic process.
3. Entropy of a system decreases in all irreversible processes.
4. Change in entropy for complete reversible thermodynamic cycle is zero.
Which of the above statements are correct?
(a) 1 and 2
(b) 2 and 3
(c) 3 and 4
(d) 1 and 4
Ans. (d)

21. A Carnot engine whose low-temperature reservoir is at $27^\circ C$ has efficiency 37.5%. The high-temperature reservoir is at
(a) $480^\circ C$
(b) $327^\circ C$
(c) $307^\circ C$
(d) $207^\circ C$
Ans. (d)

22. Colloidal particles of mass M are suspended in a gas at 300 K and 1 atm. The most probable energy of these particles is equal to the kinetic energy of a gas molecule moving with the most probable velocity V_p , at the temperature:
(a) 450 K
(b) 380 K
(c) 300 K
(d) 150 K
Ans. (c)

23. In the van der Waals' equation, the terms (a/V^2) and (b) are introduced to account for the:
(a) Inter-molecular attraction and the total volume occupied by the gas

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- (b) Molecular size and the size of the containing vessel
 - (c) Inter-molecular attraction and the volume of the molecules
 - (d) Inter-molecular attraction and the force exerted by the molecules on the walls of the container
- Ans. (d)

24. In the spectrum of black body radiation, the distribution of energy switches from adherence to Planck's law, to Wien's law (in short Wavelength region) because of the fact that both these laws:

- (a) Assume continuous variation of energy
- (b) assume discontinuous Variation of energy
- (c) Use the same expressions for different modes of vibration
- (d) Lead to very small values for the probability factor

Ans. (b)

25. The phenomenon of viscosity in gases is associated with momentum transport from 'high velocity' region to 'low velocity' region. The mean square velocity of those molecules which participate in the transfer of momentum across a hypothetical layer of the gas is given by:

- (a) $2kT/m$
- (b) $8kT/m$
- (d) $3kT/m$
- (c) $4kT/m$

Ans. (b)

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1. Two organ pipes closed at one end, when blown simultaneously produce 4 beat /s. If the length of the shorter pipe is 0.75 m, the length of the other will be (velocity of sound = 330 m/s)

- (a) 1m
- (b) 0.87m
- (c) 0.82m
- (d) 0.78m

Ans. (d)

2. Two glass slabs of thickness 6 cm and 7 cm with refractive indices 1.5 and 1.75 respectively, are placed one above the other on an ink drop. The apparent depth of the ink drop is

- (a) 8 cm
- (b) 5 cm
- (c) 2 cm
- (d) 6.5 cm

Ans. (a)

3. A prism of glass ($n = 1.5$) has the prism angle as 60° . If angles of incidence and emergence at first and second refracting faces are i_1 and i_2 , then for minimum deviation

- (a) $i_1 = i_2$
- (c) $i_1 > i_2$
- (b) $i_1 = 0$
- (d) $i_1 < i_2$

Ans. (a)

4. Indicate the color of light, among the following, which travels through glass with the minimum speed:

- (a) Red
- (c) Yellow
- (b) Green
- (d) Violet

Ans. (d)

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5. Objectives of a pair of binoculars have apertures 60 mm and focal length 250 mm. The ocular aperture is 250mm and focal length 22 mm. The angular magnification is, approximately:

- (a) 11.4
- (b) 114
- (c) 1140
- (d) 11400

Ans. (a)

6. Two lenses separated by a distance- t and having the focal lengths f_1 and f_2 respectively, are made of the same material. Then the chromatic aberration will be minimum, if t is equal to:

- (a) $2(f_1 + f_2)$
- (b) $2(f_1 - f_2)$
- (c) $(f_1 - f_2)/2$
- (d) $(f_1 + f_2)/2$

Ans. (d)

7. Spherical aberration is minimized by

- 1. Use of stops.
- 2. Use of plano-convex lens.
- 3. Using two suitable lenses in contact.
- 4. Using two plano-convex lenses separated by a distance.

Which of the above statements are correct?

- (a) 3 and 4
- (b) 1, 2 and 4
- (c) 1, 2 and 3
- (d) 1, 2, 3 and 4

Ans. (d)

8. An object of 12 mm height is placed at a distance of 80 cm to the left of a lens of power + 2.5 D made of glass of refractive index 1.5. The size of the image is:

- (a) 3mm
- (b) 6mm
- (c) 12mm
- (d) 18mm

Ans. (c)

9. A telescope has a convex lens of focal length 100 cm as objective and a concave lens of focal length 1 cm as eye-piece. When focused to infinity, the distance between the two lenses:

- (a) Is 101 cm
- (b) Is 100 cm
- (c) Is 99 cm
- (d) Depends on the apertures

Ans. (c)

10. A microscope has three objectives, of focal lengths 16 mm, 4 mm and 1.6 mm; an optical tube length of 16 cm and eyepieces marked 5x and 10x. The highest magnification possible is:

- (a) + 1000x
- (b) +10000x
- (c) + 5000x
- (d) + 50000 x

Ans. (c)

11. Consider the following statements when a steel ball hits a clay chunk in air and gets embedded in it, then

- 1. Both the momentum and the energy conserved.
- 2. Only momentum is conserved.
- 3. Energy is used to deform the clay chunk.

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4. Momentum is not conserved.

Which of the above statement(s) is/are correct?

- (a) 1 only
- (b) 2 and 3
- (c) 3 and 4
- (d) 1 and 3

Ans. (b)

12. A wooden block having a mass of 1 kg is placed on a table. The block just starts to move, when a force of 10 N is applied at 45° to the vertical to push the block. The coefficient of friction between the table and the block, (taking $g = 10 \text{ m/s}^2$) is approximately:

- (a) 0.2
- (c) 0.6
- (b) 0.4
- (d) 0.8

Ans. (d)

13. A tunnel is dug through the earth from one side to the other along a diameter. A metallic ball having diameter smaller than the diameter of the tunnel is dropped from one side. The correct motion of the ball is it:

- (a) Executes SHM about the centre of earth
- (b) Stops at the centre of the earth
- (c) Freely passes out through the other end of the tunnel
- (d) Does not pass through the tunnel

Ans. (a)

14. For a particle undergoing a circular motion with uniform velocity the velocity is:

- (a) Radial, acceleration is radial
- (b) Transverse, acceleration is radial
- (c) Transverse, acceleration is transverse
- (d) Radial, acceleration is transverse

Ans. (b)

15. Consider the earth to be a perfect sphere and having uniform mass distribution. R is the radius of the earth and x is the distance from the centre of the earth. The gravitational intensity is largest (absolute value) when x is:

- (a) Zero
- (c) Equal to R
- (b) In between zero and R
- (d) Greater than R

Ans. (c)

16. The velocity of a particle at which its mass is double its rest mass (where c is velocity of light), is:

- (a) $0.75 c$
- (b) $0.80 c$
- (c) $0.85 c$
- (d) $0.95 c$

Ans. (c)

17. What is the work done on a particle of rest mass m_0 in order to increase its speed from $0.6 c$ to $0.8 c$?

- (a) $5m_0c^2/12$
- (b) $5m_0c^2/6$
- (c) $5m_0c^2/24$
- (d) $m_0c^2/7$

Ans. (c)

18. A streamline represents a fixed path followed by an orderly procession of fluid particles. If A , B and C are any three points on a streamline and v_1 , v_2 and v_3 are the velocities of the fluid particles at

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those points, then which one of the following statements is not correct?

- (a) v_1 , v_2 and v_3 are equal to each other at all points
- (b) Any particle at anytime has a velocity v_1 at v_2 at B and v_3 at C
- (c) All particles passing through A also pass through B and C
- (d) v_1 , v_2 and v_3 are tangential to the direction of flow at A, B and C respectively

Ans. (a)

19. Two particles execute simple harmonic motions of the same amplitude and frequency along the same straight line. They pass one another traveling in opposite directions, whenever their displacement is half their amplitude. The phase difference between the two is:

- (a) $2\pi/3$
- (b) π
- (c) $\pi/6$
- (d) $\pi/3$

Ans. (a)

20. Two simple harmonic waves, when fed simultaneously to the X and Y plates of a CRO trace a circle on the screen. Then both the waves have

- 1. The same frequency
 - 2. The same amplitude
 - 3. A constant phase difference of
- Which of the above statements are correct?

- (a) 1 and 2
- (b) 2 and 3
- (c) 1 and 3
- (d) 1, 2 and 3

Ans. (d)

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1. A heated body emits radiation which has maximum intensity at frequency ν_m . If the temperature of the body is doubled

- (1) The maximum intensity radiation will be at frequency $2\nu_m$
- (2) The maximum intensity radiation will be at frequency $(1/2)\nu_m$
- (3) The total emitted energy will increase by a factor of 2
- (4) The total emitted energy will increase by a factor of 16

Ans. (2)

Section-B

Direction: In the following questions more than one of the answers given may be correct. Select the correct answers and mark it according to the code.

Code:

- (a) 1, 2 and 3 are correct
- (b) 1. and 2 are correct
- (c) 2 and 4 are correct
- (d) 1 and 3 are correct

2. Let V and E denote the gravitational potential and gravitational field at a point. It is possible to have

- (1) $V=0$ and $E=0$
- (2) $V\neq 0$ and $E=0$
- (3) $V\neq 0$ and $E\neq 0$
- (4) $V=0$ and $E\neq 0$

Ans. (a)

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3. A steel cube weighs 1 kg in air and 0.88 kg in water. The density of the steel is $7.71 \times 10^3 \text{ kg/m}^3$ and of water is 10^3 kg/m^3 . The cube

- (1) Must be solid
- (2) Consists of impure steel
- (3) Must be hollow
- (4) Consists of pure steel

Ans. (b)

4. Which of the following are not correct about centre of mass?

- (1) It depends on frame of reference
- (2) Internal forces may affect the motion of centre of mass
- (3) Centre of mass and centre of gravity are synonymous
- (4) In centre of mass frame momentum of a system is always zero

Ans. (1)

5. If a particle travels a linear distance at speed v_1 and comes back along the same track at speed v_2 .

- (1) Its average speed is arithmetic mean $(v_1 + v_2)/2$
- (2) Its average speed is harmonic mean $2v_1v_2/(v_1+v_2)$
- (3) Its average speed is geometric mean $\sqrt{v_1v_2}$
- (4) Its velocity is zero

Ans. (3)

6. Apparent weight of a body in an elevator is more than rest weight. If elevator is

- (1) Going up and slowing down
- (2) Going up and speeding up
- (3) Going down and speeding up
- (4) Going down and slowing down

Ans. (3)

7. Let V and E denote the gravitational potential and gravitational field at a point. It is possible to have

- (1) $V=0$ and $E=0$
- (2) $V \neq 0$ and $E=0$
- (3) $V \neq 0$ and $E \neq 0$
- (4) $V=0$ and $E \neq 0$

Ans. (1)

8. For an isolated system in the absence of any dissipative effect

- (1) ICE is conserved
- (2) Total energy is conserved
- (3) PE is conserved
- (4) Mechanical energy is conserved

Ans. (3)

9. Which of the following statements are correct?

- (1) Young's modulus, bulk modulus and shear modulus have the units of pressure
- (2) Young's modulus describes the length elasticity of a material
- (3) The value of Young's modulus depends on the dimensions of the body
- (4) Modulus of elasticity is the smallest value of stress required to produce a permanent distortion in a body

Ans. (4)

10. A steel cube weighs 1 kg in air and 0.88 kg in water. The density of the steel is $7.71 \times 10^3 \text{ kg/m}^3$ and of water is 10^3 kg/m^3 . The cube

- (1) Must be solid
- (2) Consists of impure steel
- (3) Must be hollow

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(4) Consists of pure steel

Ans. (4)

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1. The Prongs of a vibrating tuning fork are immersed in water. Then

- (1) Amplitude of the waves decreases
- (2) Velocity of the waves decreases
- (3) Frequency of the waves decreases
- (4) Wavelength of the waves increases

Ans. (c)

2. In which of the following situations will there be no force?

- (1) A positive charge projected passes a piece of soft iron
- (2) A positive charge sent along the axis of a solenoid
- (3) Two parallel wires carrying current in the same direction
- (4) A positive charge projected between the poles of a magnet.

Ans. (a)

3. A nuclide A undergoes α -decay and another nuclide B undergoes β -decay.

- (1) All the α -particles emitted by A will have almost the same speed
- (2) The α -particles emitted by A may have widely different speeds
- (3) All the β -particles emitted by B will have almost the same speed
- (4) The β -particles emitted by B may have widely different speeds.

Ans. (c)

4. The meniscus of a liquid obtained in one of the limbs of a narrow U-tube is held in an electromagnet with the meniscus in line with the field. The liquid is seen to rise. This indicates that the liquid is

- (1) Paramagnetic
- (2) Ferromagnetic
- (3) Diamagnetic
- (4) Non-magnetic

Ans. (a)

5. In an n-p-n transistor circuit, the collector current is 10 mA. If 90% of the electrons are able to reach the collector:

- (1) The emitter current will be 9 mA
- (2) The emitter current will be 11 mA
- (3) The base current will be 1 mA
- (4) The base current will be 0.1 mA

Ans. (b)

6. If an increasing temperature, the resistance decreases, then it is

- (1) Superconductor
- (2) Semiconductor
- (3) Insulator
- (4) None of these

Ans. (b)

Directions: In the following questions more than one of the answers given may be correct. Select the correct answers and mark it according to the code.

Code:

- (a) 1 and 2 are correct
- (b) 2 and 3 are correct

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- (c) 1 and 4 are correct
- (d) 1, 2 and 3 are correct

7. The charge flowing in a conductor varies with time as $Q = at - bt^2$ then the current:

- (1) Reaches a maximum and then decreases
- (2) Falls to zero after $t = a/2b$
- (3) Changes at the rate of $(-2b)$
- (4) Will remain constant

Ans. (b)

8. In Seebeck series, antimony appears after bismuth. But in Sb-Bi thermocouple the current flows from:

- (1) Bi to Sb through hot junction
- (2) Bi to Sb through cold junction
- (3) Sb to Bi through hot junction
- (4) Sb to Bi through cold junction

Ans. (c)

9. A ray of light traveling in a transparent medium falls on a surface separating the medium from air at an angle of incidence 45° . The ray undergoes total internal reflection. If n is the refractive index of the medium with respect to air, select the possible value of n from the following:

- (1) 1.3
- (2) 1.4
- (3) 1.5
- (4) 1.6

Ans. (c)

10. In the Young's double slit experiment, the interference pattern is found to have an intensity ratio between bright and dark fringes as 9. This implies that:

- (1) The intensities at the screen due to the two slits are 4 units and 1 unit respectively
- (2) The intensities at the screen due to two slits are 5 units and 4 units respectively
- (3) The amplitude ratio is 3
- (4) The amplitude ratio is 2

Ans. (a)

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Basic Physics Model questions for exams
Physics Model Questions and Practice Exam
sample question paper of basic physics

1. A hammer weighing 3 kg, moving with a velocity of 10 m/s, strikes against the head of a spike and drives it into a block of wood. If the hammer comes to rest in 0.025 s, the impulse associated with the ball will be

- (a) 30Ns
- (b)-30Ns
- (c) 15Ns
- (d)-15Ns

Ans. (b)

2. In the above problem, the average (retarding) force acting on the spike will be

- (a) 600 N
- (b)-600 N
- (c) 1200 N
- (d)-1200N

Ans. (d)

3. When a bicycle travels on rough surface, its speed

- (a) increases
- (b) decreases

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- (c) remains the same
- (d) none of these

Ans. (b)

4. It is difficult to walk on ice because of

- (a) absence of friction
- (b) absence of inertia
- (c) more inertia
- (d) more friction

Ans. (a)

5. The law which gives a quantitative measurement of force is

- (a) Newton's third law of motion
- (b) Newton's first law of motion
- (c) Newton's second law of motion
- (d) Newton's law of gravitation

Ans. (c)

6. External forces

- (a) are always balanced
- (b) never balanced
- (c) may or may not be balanced
- (d) none of these

Ans. (c)

7. A and B are two objects with mass 6 kg and 34 kg respectively. Then

- (a) A has more inertia than B
- (b) B has more inertia than A
- (c) A and B both have same inertia
- (d) none of the above is true

Ans. (b)

8. Which of the following class of forces different from others?

- (a) Magnetic force
- (b) Electrcal force
- (c) Gravitational force
- (d) Stretching of a spring

Ans. (d)

9. A body is said to be under balanced forces when the resultant force acting on the body is

- (a) unity
- (b) zero
- (c) infinite
- (d) none of these

Ans. (b)

10. If $g = 10 \text{ ms}^{-2}$, what is the force of gravity acting on a mass of 1 kg?

- (a) 1 N
- (b) 10 N
- (c) 1 N
- 10

- (d) none of these

Ans. (b)

11. A force acts on an object which is free to move. If we know the magnitude of the force and the mass of the object, newton's 2nd law of motion enables us to determine the object's

- (a) weight

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- (b) speed
 - (c) acceleration
 - (d) position
- Ans. (c)

12. When a force of 1 newton acts on a mass of 1 kg that is able to move freely, the object moves with a/an

- (a) speed of 1 ms⁻¹
- (b) acceleration of 1 ms⁻²
- (c) speed of 1 kms⁻¹
- (d) acceleration of 10 ms⁻²

Ans. (b)

13. Newton used the phrase 'quantity of motion' for

- (a) momentum
- (b) force
- (c) acceleration due to gravity
- (d) none of these

Ans. (a)

14. kg ms⁻¹ is the SI unit of

- (a) impulse
- (b) force
- (c) angular velocity
- (d) none of these

Ans. (a)

15. The gravitational unit of force in the metric system is

- (a) g wt
- (b) N
- (c) kg wt
- (d) none of these

Ans. (c)

16. Frictional force can't be measured in

- (a) kg wt
- (b) newton
- (c) dyne
- (d) kg ms⁻¹

Ans. (d)

17. Graphite powder is used in machines to

- (a) enhance friction
- (b) enhance profit
- (c) reduce friction
- (d) reduce efficiency

Ans. (c)

18. Friction is a/an

- (a) self-adjusting force
- (b) necessary evil
- (c) important force in daily life
- (d) all the above

Ans. (d)

19. A cannon after firing recoils due to

- (a) conservation of energy
- (b) backward thrust of gases produced
- (c) Newton's 1st law of motion

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(d) Newton's 3rd law of motion

Ans. (d)

20. You are marooned on a frictionless horizontal surface and cannot exert any horizontal force by pushing against the surface. How can you get off?

(a) By jumping.

(b) By spitting or sneezing.

(c) By rolling your body on the surface.

(d) By running on the plane.

Ans. (b)

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