Physics past questions and answers

2018

### \*\*PAGE 2\*\*

1. \*\*A man walks 1 km due east and then 1 km due north. His displacement is\*\*

A. √2 km N 45° E

B. 1 km N 30° E

C. 1 km N 15° E

D. √2 km N 60° E

\*\*Answer:\*\* A. √2 km N 45° E

2. \*\*The density of 400 cm³ of palm oil was 0.9 g/cm³ before frying. If the density of the oil was 0.6 g/cm³ after frying, assuming no loss of oil to spilling, its new volume was\*\*

A. 360 cm³

B. 600 cm³

C. 240 cm³

D. 800 cm³

\*\*Answer:\*\* B. 600 cm³

3. \*\*Which of the following is true of an electrical charge?\*\*

A. Positive charge means deficit electrons

B. Negative charge means excess of electrons

C. Electric current means movement of electrons

D. All of the above

\*\*Answer:\*\* D. All of the above

4. \*\*Natural radioactivity consists of the emission of --.\*\*

A. α-particles and β-rays

B. α-particles and X-rays

C. α-particles, β-rays and γ-rays

D. γ-rays and X-rays

\*\*Answer:\*\* C. α-particles, β-rays and γ-rays

5. \*\*Which of the following does NOT describe the image formed by a plane mirror?\*\*

A. Erect

B. Laterally inverted

C. Same distance from mirror as object

D. Magnified

\*\*Answer:\*\* D. Magnified

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### \*\*PAGE 3\*\*

6. \*\*What is the resultant resistance of the circuit given above?\*\*

A. 8 Ω

B. 11 Ω

C. 4 Ω

D. 3.6 Ω

\*(Note: The circuit diagram is not provided.)\*

\*\*Answer:\*\* A. 8 Ω

7. \*\*Which of the following best describes the energy changes which take place when a steam engine drives a generator which lights a lamp?\*\*

A. Heat → Light → Sound → Kinetic

B. Heat → Kinetic → Electricity → Heat and Light

C. Kinetic → Light → Heat → Electricity

D. Electricity → Kinetic → Heat → Light

\*\*Answer:\*\* B. Heat → Kinetic → Electricity → Heat and Light

8. \*\*Cathode rays are\*\*

A. High-energy electromagnetic waves

B. Protons

C. Neutrons

D. Streams of electrons

\*\*Answer:\*\* D. Streams of electrons

9. \*\*A narrow beam of white light can be split into different colours by a glass prism. The correct explanation is that\*\*

A. White light is an electromagnetic wave

B. The prism has all the colours of the white light

C. Different colours of white light travel with different speeds in glass

D. White light has undergone total internal reflection in the prism

\*\*Answer:\*\* C. Different colours of white light travel with different speeds in glass

10. \*\*Figure 2 represents a block-and-tackle pulley system on which an effort of W Newtons supports a load of 120.0 N. If the efficiency of the machine is 40%, then the value of W is\*\*

A. 28.0 N

B. 48.0 N

C. 288.0 N

D. 50.0 N

\*(Note: Figure 2 is not provided.)\*

\*\*Answer:\*\* B. 48.0 N

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### \*\*PAGE 4\*\*

11. \*\*What type of reaction is represented by the following scheme? ²₁X + ²₁Y → ³₂Z + ¹₀n + energy\*\*

A. Fusion reaction

B. Fission reaction

C. Chain reaction

D. Radioactive decay

\*\*Answer:\*\* A. Fusion reaction

12. \*\*The amount of heat needed to raise the temperature of 10 kg of copper by 1 K is its\*\*

A. Specific heat capacity

B. Latent heat

C. Heat capacity

D. Internal energy

\*\*Answer:\*\* C. Heat capacity

13. \*\*The electrochemical equivalent of silver is 0.0012 g/C. If 36.0 g of silver is to be deposited by electrolysis on a surface by passing a steady current for 5.0 minutes, the current must be\*\*

A. 6000 A

B. 100 A

C. 10 A

D. 1 A

\*\*Answer:\*\* B. 100 A

14. \*\*Shadows and eclipses result from the\*\*

A. Refraction of light

B. Reflection of light

C. Diffraction of light

D. Rectilinear propagation of light

\*\*Answer:\*\* D. Rectilinear propagation of light

15. \*\*Which of the following obeys Ohm's Law?\*\*

A. All metals

B. Diode only

C. All electrolytes

D. Glass

\*\*Answer:\*\* A. All metals

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### \*\*PAGE 5\*\*

16. \*\*Which of the following statements are TRUE OF ISOTOPES?\*\*

I. Isotopes of an element have the same chemical properties because they have the same number of electrons

II. Isotopes of elements are normally separated using physical properties

III. Isotopes of an element have the same number of protons in their nuclei

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

\*\*Answer:\*\* C. II and III only

17. \*\*In the diagram above, the hanging mass m₂ is adjusted until m₁ is on the verge of sliding. The coefficient of static friction between mass m₁ and the table is\*\*

A. m₁/m₂

B. m₂/m₁

C. m₂/g

D. m₁/g

\*(Note: The diagram is not provided.)\*

\*\*Answer:\*\* D. m₁/g

18. \*\*Which of the following may be used to explain a mirage?\*\*

I. Layers of air near the road surface have varying refractive indices in hot weather

II. Road surfaces sometimes become good reflectors in hot weather

III. Light from the sky can be reflected upwards after coming close to the road surface

A. I and III only

B. II and III only

C. II only

D. I, II and III

\*\*Answer:\*\* A. I and III only

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### \*\*PAGE 6\*\*

19. \*\*In the diagram below, if the atmospheric pressure is 760 mm, the pressure in the chamber G is\*\*

A. 660 mm

B. 830 mm

C. 690 mm

D. 860 mm

\*(Note: The diagram is not provided.)\*

\*\*Answer:\*\* B. 830 mm

20. \*\*Which of the following has the lowest internal resistance when new?\*\*

A. Leclanche cell

B. Daniel cell

C. Torch battery

D. Accumulator

\*\*Answer:\*\* D. Accumulator

21. \*\*The pitch of an acoustic device can be increased by\*\*

A. Decreasing the loudness

B. Increasing the amplitude

C. Increasing the frequency

D. Decreasing the intensity

\*\*Answer:\*\* C. Increasing the frequency

22. \*\*One of the features of the fission process is that\*\*

A. It leads to chain reaction

B. Its products are not radioactive

C. Neutrons are not released

D. The sum of the masses of the reactants equals the sum of the masses of the products

\*\*Answer:\*\* A. It leads to chain reaction

23. \*\*The linear expansivity of brass is 2 × 10⁻⁵ °C⁻¹. If the volume of a piece of brass is 15.00 cm³ at 0°C, what is the volume at 100°C?\*\*

A. 16.03 cm³

B. 15.09 cm³

C. 16.00 cm³

D. 15.03 cm³

\*\*Answer:\*\* B. 15.09 cm³

24. \*\*A lead bullet of mass 0.05 kg is fired with a velocity of 200 m/s into a lead block of mass 0.95 kg. Given that the lead block can move freely, the final kinetic energy after impact is\*\*

A. 150 J

B. 100 J

C. 50 J

D. 200 J

\*\*Answer:\*\* C. 50 J

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### \*\*PAGE 7\*\*

25. \*\*In a series R-L-C circuit at resonance, the voltages across the resistor and the inductor are 20 V and 40 V respectively. What is the voltage across the capacitor?\*\*

A. 30 V

B. 70 V

C. 50 V

D. 40 V

\*\*Answer:\*\* D. 40 V

26. \*\*If the fraction of the atoms of a radioactive material left after 120 years is 1/64, what is the half-life of the material?\*\*

A. 20 years

B. 10 years

C. 2 years

D. 24 years

\*\*Answer:\*\* A. 20 years

27. \*\*In the diagram below, which of the simple pendula will resonate with P when set into oscillation?\*\*

A. U

B. T

C. R and T

D. Q and R

\*(Note: The diagram is not provided.)\*

\*\*Answer:\*\* B. T

28. \*\*The time rate of loss of heat by a body is proportional to the\*\*

A. Temperature of its surroundings

B. Temperature of the body

C. Difference in temperature between the body and its surroundings

D. Ratio of the temperature of the body to that of its surroundings

\*\*Answer:\*\* C. Difference in temperature between the body and its surroundings

29. \*\*A positively charged rod X is brought near an uncharged metal sphere Y and is then touched by a finger with X still in place. When the finger is removed, the result is that Y has\*\*

A. No charge and a zero potential

B. A positive charge and a zero potential

C. A negative charge and a positive potential

D. A negative charge and a negative potential

\*\*Answer:\*\* D. A negative charge and a negative potential

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### \*\*PAGE 8\*\*

30. \*\*Electrical appliances in homes are normally earthed so that\*\*

A. A person touching the appliances is safe from electric shock

B. Both the a.c. and d.c. sources can be used

C. The appliances are maintained at a higher p.d. than the earth

D. The appliances are maintained at a lower p.d. than the earth

\*\*Answer:\*\* A. A person touching the appliances is safe from electric shock

31. \*\*The process whereby a liquid turns spontaneously into vapour is called\*\*

A. Regelation

B. Evaporation

C. Boiling

D. Sublimation

\*\*Answer:\*\* B. Evaporation

32. \*\*Which of the following diagrams represents correctly an n-p-n transistor?\*\*

A.

B.

C.

D.

\*(Note: The diagrams are not provided.)\*

\*\*Answer:\*\* D.

33. \*\*The differences observed in solids, liquids and gases may be accounted for by\*\*

A. Their relative masses

B. Their melting points

C. The spacing and forces acting between the molecules

D. The different molecules in each of them

\*\*Answer:\*\* C. The spacing and forces acting between the molecules

34. \*\*Convex mirrors are used as driving mirrors because images formed are\*\*

A. Erect, virtual and diminished

B. Erect, real and diminished

C. Erect, virtual and magnified

D. Inverted, virtual and diminished

\*\*Answer:\*\* A. Erect, virtual and diminished

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### \*\*PAGE 9\*\*

35. \*\*Musical instruments playing the same note can be distinguished from one another owing to the differences in their\*\*

A. Quality

B. Pitch

C. Intensity

D. Loudness

\*\*Answer:\*\* B. Pitch

36. \*\*In the diagram above, if the south poles of two magnets stroke a steel bar, the polarities at T and V will respectively be\*\*

A. North and south

B. South and south

C. North and north

D. South and north

\*(Note: The diagram is not provided.)\*

\*\*Answer:\*\* C. North and north

37. \*\*In homes, electrical appliances and lamps are connected in parallel because\*\*

A. Less current will be used

B. Less voltage will be used

C. Parallel connection does not heat up the wires

D. Series connection uses high voltage

\*\*Answer:\*\* D. Series connection uses high voltage

38. \*\*An object moves in a circular path of radius 0.5 m with a speed of 1 m/s. What is its angular velocity?\*\*

A. 8 rad/s

B. 4 rad/s

C. 1 rad/s

D. 2 rad/s

\*\*Answer:\*\* D. 2 rad/s

39. \*\*What effort will a machine of efficiency 90% apply to lift a load of 180 N if its effort arm is twice as long as its load arm?\*\*

A. 100 N

B. 90 N

C. 80 N

D. 120 N

\*\*Answer:\*\* A. 100 N

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### \*\*PAGE 10\*\*

40. \*\*Calculate the effective capacitance of the circuit above.\*\*

A. 4 μF

B. 3 μF

C. 2 μF

D. 1 μF

\*(Note: The circuit diagram is not provided.)\*

\*\*Answer:\*\* D. 1 μF

2019

Here are all the questions from the 2019 Physics past paper along with their answers:

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### \*\*QUESTION 1\*\*

The limiting frictional force between two surfaces depends on

I. the gaseous reaction between the surfaces

II. the nature of the surfaces in contact

III. the relative velocity between the surfaces

\*\*Options:\*\*

A. I only

B. I & IV only

C. II only

D. III only

\*\*Answer:\*\* C

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### \*\*QUESTION 2\*\*

If a body moves with a constant speed and at the same time undergoes an acceleration, its motion is said to be

\*\*Options:\*\*

A. oscillation

B. circular

C. rotational

D. rectilinear

\*\*Answer:\*\* B

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### \*\*QUESTION 3\*\*

When blue and green colours of light are mixed, the resultant colour is

\*\*Options:\*\*

A. cyan

B. magenta

C. black

D. yellow

\*\*Answer:\*\* A

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### \*\*QUESTION 4\*\*

A metal rod has a length of \(100 \, \text{cm}\) at \(200^\circ C\). At what temperature will its length be \(99.4 \, \text{cm}\) if the linear expansivity of the material of the rod is \(2 \times 10^{-5} \, \text{C}^{-1}\)?

\*\*Options:\*\*

A. \(200^\circ C\)

B. \(300^\circ C\)

C. \(100^\circ C\)

D. \(-100^\circ C\)

\*\*Answer:\*\* D

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### \*\*QUESTION 5\*\*

According to the kinetic molecular model, in gases

\*\*Options:\*\*

A. The molecules are very far apart & occupy all the space made available

B. The particles occur in clusters with molecules slightly farther apart

C. The particles vibrate about fixed positions and are held together by strong intermolecular bonds

D. The particles are closely packed together, occupy minimum space & are usually arranged in a regular pattern

\*\*Answer:\*\* A

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### \*\*QUESTION 6\*\*

The value of T in the figure above is

\*\*Options:\*\*

A. 30N

B. 10.0N

C. 20N

D. 40N

\*\*Answer:\*\* D

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### \*\*QUESTION 7\*\*

A train has an initial velocity of \(44 \, \text{m/s}\) and an acceleration of \(-4 \, \text{m/s}^2\). Calculate its velocity after 10 seconds.

\*\*Options:\*\*

A. 10m/s

B. 6m/s

C. 8m/s

D. 4m/s

\*\*Answer:\*\* D

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### \*\*QUESTION 8\*\*

Lamps in domestic lightings are usually in

\*\*Options:\*\*

A. series

B. divergent

C. convergent

D. parallel

\*\*Answer:\*\* D

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### \*\*QUESTION 9\*\*

During the transformation of matter from the solid to the liquid state, the heat supplied does not produce a temperature increase because

\*\*Options:\*\*

A. all the heat is used to break the bonds holding the molecules of the solid together

B. the heat capacity has become very large as the substance melts

C. the heat energy is quickly conducted away

D. the heat gained is equal to the heat lost by the substance

\*\*Answer:\*\* A

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### \*\*QUESTION 10\*\*

In a slide wire bridge, the balance is obtained at a point 25cm from one end of a wire 1m long. The resistance to be tested is connected to that end, and a standard resistance of 3.6Ω is connected to the other end. Determine the value of the unknown resistance.

\*\*Options:\*\*

A. 3.2Ω

B. 1.4Ω

C. 3.21Ω

D. 1.2Ω

\*\*Answer:\*\* D

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### \*\*QUESTION 11\*\*

Electrons were discovered by

\*\*Options:\*\*

A. Dalton

B. James Charwick

C. J.J. Thompson

D. Niels Bohr

\*\*Answer:\*\* C

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### \*\*QUESTION 12\*\*

Which of the following is/are the limitations to Rutherford’s atomic models?

I. It is applicable when energy is radiated as electrons are revolving

II. It is applicable when energy is radiated in a continuous mode

III. It is applicable to an atom with only one electron in the outer shell

\*\*Options:\*\*

A. I only

B. II only

C. I & II only

D. I, II & III only

\*\*Answer:\*\* C

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### \*\*QUESTION 13\*\*

Which of the following equations is the correct definition of the reactance of an inductor L?

\*\*Options:\*\*

A. \( \text{Reactance} = (\text{Amplitude of voltage}) \div (\text{Amplitude of current}) \)

B. \( \text{Reactance} = (\text{Amplitude of voltage}) \times (\text{Amplitude of current}) \)

C. \( \text{Reactance} = (\text{Amplitude of current}^2) \div (\text{Amplitude of voltage}) \)

D. \( \text{Reactance} = (\text{Amplitude of current}^2) \div (\text{Amplitude of voltage}) \frac{1}{2} \)

\*\*Answer:\*\* A

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### \*\*QUESTION 14\*\*

Ripple in a power supply unit is caused by

\*\*Options:\*\*

A. using an alternating current source

B. forward voltage drop

C. heavy load

D. using a zener diode

\*\*Answer:\*\* A

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### \*\*QUESTION 15\*\*

When the temperature of a liquid is increased, its surface tension

\*\*Options:\*\*

A. increases

B. decreases

C. remains constant

D. increases then decreases

\*\*Answer:\*\* B

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### \*\*QUESTION 16\*\*

The distance between an object and its real image in a convex lens is 40cm. If the magnification of the image is 3, calculate the focal length of the lens.

\*\*Options:\*\*

A. 6.5 cm

B. 7.5 cm

C. 8.5 cm

D. 4.5 cm

\*\*Answer:\*\* B

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### \*\*QUESTION 17\*\*

A ray of light passes through the centre of curvature of a concave mirror and strikes the mirror. At what angle is the ray reflected?

\*\*Options:\*\*

A. \(180^\circ\)

B. \(90^\circ\)

C. \(0^\circ\)

D. \(60^\circ\)

\*\*Answer:\*\* C

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### \*\*QUESTION 18\*\*

The pin-hole camera produces a less sharply defined image when the

\*\*Options:\*\*

A. pin-hole is larger

B. illumination is less

C. screen is further from the pin-hole

D. object is further from the pin-hole

\*\*Answer:\*\* A

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### \*\*QUESTION 19\*\*

A straight wire 15cm long, carrying a current of 6.0A, is in a uniform field of 0.40T. What is the force on the wire when it is at right angle to the field?

\*\*Options:\*\*

A. 0.46N

B. 0.35N

C. 0.36N

D. 0.24N

\*\*Answer:\*\* C

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### \*\*QUESTION 20\*\*

The pitch of a screw jack is 0.45cm and the arm is 60cm long. If the efficiency of the Jack is \(75/\pi \%\), calculate the mechanical advantage.

\*\*Options:\*\*

A. 400

B. 300

C. 200

D. 150

\*\*Answer:\*\* C

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### \*\*QUESTION 21\*\*

When the downward current flows in a straight vertical conductor, the direction of its magnetic field at a point due north of the wire is?

\*\*Options:\*\*

A. Upward

B. North

C. South

D. West

\*\*Answer:\*\* D

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### \*\*QUESTION 22\*\*

Aluminium is sometimes used as the leaf of an electroscope because it

\*\*Options:\*\*

A. is a light material

B. is a good conductor

C. is a good insulator

D. can be converted into thin sheets

\*\*Answer:\*\* D

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### \*\*QUESTION 23\*\*

The diagram above represents the stress-strain graph of a loaded wire. Which of these statements is correct?

\*\*Options:\*\*

A. At J, the wire becomes plastic

B. J is the yield point

C. L is the elastic limit

D. At K, the wire breaks

\*\*Answer:\*\* B

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### \*\*QUESTION 24\*\*

A supply of 400V is connected across capacitors of 3µF and 6µF in series. Calculate the charge.

\*\*Options:\*\*

A. \(8 \times 10^{-4} \, \text{C}\)

B. \(4 \times 10^{-2} \, \text{C}\)

C. \(8 \times 10^{-3} \, \text{C}\)

D. \(4 \times 10^{-8} \, \text{C}\)

\*\*Answer:\*\* A

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### \*\*QUESTION 25\*\*

A vibrator causes water ripples to travel across the surface of a tank. The wave travels 50 cm in 2s, and the distance between successive crests is 5cm. Calculate the frequency of the vibrator.

\*\*Options:\*\*

A. 5Hz

B. 6Hz

C. 5.2Hz

D. 25Hz

\*\*Answer:\*\* A

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### \*\*QUESTION 26\*\*

A thermocouple thermometer is connected to a millivoltmeter which can read up to 10mV. When one junction is in ice at 0°C and the other is in steam at 100°C, the millivoltmeter reads 4mV. What is the maximum temperature this arrangement can measure?

\*\*Options:\*\*

A. 100°C

B. 248°C

C. 250°C

D. 350°C

\*\*Answer:\*\* C

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### \*\*QUESTION 27\*\*

An alternating current can induce voltage because it has

\*\*Options:\*\*

A. ripple value

B. varying magnetic field

C. weaker magnetic field than direct current

D. high peak value

\*\*Answer:\*\* B

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### \*\*QUESTION 28\*\*

The limiting frictional force between two surfaces depends on

I. the cohesive force of the material

II. the nature of the surfaces in contact

III. the relative velocity between the surfaces

\*\*Options:\*\*

A. I only

B. II only

C. III only

D. I & IV only

\*\*Answer:\*\* B

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### \*\*QUESTION 29\*\*

During the transformation of matter from the solid to the liquid state, the heat supplied does not produce a temperature increase because

\*\*Options:\*\*

A. the heat energy is quickly conducted away

B. the heat capacity has become very large as the substance melts

C. the heat gained is equal to the heat lost by the substance

D. all the heat is used to break the bonds holding the molecules of the solid together

\*\*Answer:\*\* D

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### \*\*QUESTION 30\*\*

The statement 'Heat lost by the hot body equals that gained by the cold one' is assumed when determining specific heat capacity by the method of mixtures. Which of the following validates the assumption?

I. Lagging the Calorimeter

II. Ensuring that only S.I units are used

III. Weighing the calorimeter, the lid, and the stirrer.

\*\*Options:\*\*

A. I only

B. I & II only

C. I & III only

D. II & III only

\*\*Answer:\*\* C

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### \*\*QUESTION 31\*\*

In the molecular explanation of conduction, heat is transferred by the

\*\*Options:\*\*

A. Free electrons

B. Free atoms

C. Free molecules

D. Free solids

\*\*Answer:\*\* A

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### \*\*QUESTION 32\*\*

The conductivity of gases at low pressure can be termed as

I. hot cathode emission

II. thermionic emission

III. cold cathode emission

IV. Field emission

\*\*Options:\*\*

A. I & II

B. II & III

C. III & IV

D. IV & V

\*\*Answer:\*\* C

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### \*\*QUESTION 33\*\*

The earth's gravitational field intensity at its surface is about

\[(G = 6.7 \times 10^{-11} \, \text{Nm}^2 / \text{kg}^2, \]

mass of the earth is \(6 \times 10^{24}\text{kg}\), radius of the earth is \(6.4 \times 10^6\text{m}\), \(g\) on the earth = \(9.8\text{m/s}^2\)

\*\*Options:\*\*

A. \(6.7\text{N/kg}\)

B. \(7.9\text{N/kg}\)

C. \(8.0\text{N/kg}\)

D. \(9.8\text{N/kg}\)

\*\*Answer:\*\* D

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### \*\*QUESTION 34\*\*

The following are parts of the eye:

I. Retina

II. Pupil

III. Iris

The correct equivalent in the camera in the same order are

\*\*Options:\*\*

A. Diaphragm, Aperture, film

B. Aperture, Diaphragm, Film

C. Film, Diaphragm, Aperture

D. Film, Aperture, Diaphragm

\*\*Answer:\*\* D

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### \*\*QUESTION 35\*\*

According to the kinetic molecular model, in gases

\*\*Options:\*\*

A. The particles are closely packed together, occupy minimum space & are usually arranged in a regular pattern

B. The particles occur in clusters with molecules slightly farther apart

C. The molecules are very far apart & occupy all the space made available

D. The particles vibrate about fixed positions and are held together by strong intermolecular bonds

\*\*Answer:\*\* C

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### \*\*QUESTION 36\*\*

A force of 6N acts horizontally on a stationary mass of 2kg for 4s. The kinetic energy gained by the mass is \_\_\_\_\_\_

\*\*Options:\*\*

A. 366J

B. 240J

C. 144J

D. 90J

\*\*Answer:\*\* C

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### \*\*QUESTION 37\*\*

The momentum of a car moving at a constant speed in a circular track

\*\*Options:\*\*

A. can be both positive and negative

B. can be zero depending on its position in the track

C. can be zero depending on its inertia in the track

D. a centrifugal

\*\*Answer:\*\* C

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### \*\*QUESTION 38\*\*

The lead-acid accumulator consists of

\*\*Options:\*\*

A. lead as the positive electrode

B. lead acid as the negative electrode

C. hydrochloric acid as the electrolyte

D. tetraoxosulphate (vi) acid as the electrolyte

\*\*Answer:\*\* D

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### \*\*QUESTION 39\*\*

When water is boiling, it

\*\*Options:\*\*

A. gets hotter

B. increases in mass

C. decreases in mass

D. changes to steam

\*\*Answer:\*\* D

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### \*\*QUESTION 40\*\*

A siren having a ring of 200 holes makes 132 rev/min. A jet of air is directed on the set of holes. Calculate the frequency and wavelength in air of the note produced (take \( v = 350 \, \text{m/s} \)).

\*\*Options:\*\*

A. 0.795m

B. 0.625m

C. 0.335m

D. 0.125m

\*\*Answer:\*\* A

Diagram is 6 and 23

Here are all the questions and answers from the \*\*2020 Physics Past Paper\*\*, presented clearly with each question followed by its correct answer:

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### \*\*2020 Physics Questions & Answers\*\*

#### \*\*QUESTION 1\*\*

A few grains of table salt were put in a cup of cold water, kept at constant temperature and left undistributed. Eventually, all the water tested salty. This action is due to?

\*\*Options:\*\*

A. Convection

B. Osmosis

C. Capillarity

D. Diffusion

\*\*Answer:\*\* D

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#### \*\*QUESTION 2\*\*

The force required to make an object of mass \( m \), traveling with velocity \( v \), turn in a circle of radius \( r \) is:

\*\*Options:\*\*

A. \( \frac{mv^2}{r} \)

B. \( \frac{mv^2}{x} \)

C. \( \frac{mv}{v} \)

D. \( \frac{mv}{r^2} \)

\*\*Answer:\*\* A

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#### \*\*QUESTION 3\*\*

A machine gun with a mass of 5kg fires a 50g bullet at a speed of \( 100 \, \text{ms}^{-1} \). The recoil speed of the machine gun is:

\*\*Options:\*\*

A. \( 0.5 \, \text{ms}^{-1} \)

B. \( 1.5 \, \text{ms}^{-1} \)

C. \( 1 \, \text{ms}^{-1} \)

D. \( 2 \, \text{ms}^{-1} \)

\*\*Answer:\*\* C

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#### \*\*QUESTION 4\*\*

If in a simple pendulum experiment the length of the inextensible string is increased by a factor of four, its period is increased by a factor of?

\*\*Options:\*\*

A. 4

B. \( \frac{\pi}{2} \)

C. \( \frac{1}{4} \)

D. 2

\*\*Answer:\*\* D

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#### \*\*QUESTION 5\*\*

In what range of temperature is the expansion of water anomalous?

\*\*Options:\*\*

A. \( +208^\circ \text{C} \) to \( +212^\circ \text{C} \)

B. \( -80^\circ \text{C} \) to \( -76^\circ \text{C} \)

C. \( 0^\circ \text{C} \) to \( +4^\circ \text{C} \)

D. \( -4^\circ \text{C} \) to \( +0^\circ \text{C} \)

\*\*Answer:\*\* C

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#### \*\*QUESTION 6\*\*

Which of the following statements about radioactivity is true?

(i) Alpha particle is positively charged

(ii) Beta particle is negatively charged

(iii) Gamma ray is neutral

(iv) Beta particle has the same mass as helium atom

(v) Gamma ray is charged.

\*\*Options:\*\*

A. i, ii, iii, iv only

B. i, ii, iii only

C. iv and v only

D. i, ii and v only

\*\*Answer:\*\* B

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#### \*\*QUESTION 7\*\*

Which statement correctly defines temperature and heat?

\*\*Options:\*\*

A. Temperature is a measure of the average kinetic energy of molecules.

B. Heat is the total kinetic energy of a system.

C. Different materials require different heat amounts for the same temperature change.

D. All of the above.

\*\*Answer:\*\* D

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#### \*\*QUESTION 8\*\* \*(Includes a circuit diagram figure)\*

Closing the key K in the circuit would:

\*\*Options:\*\*

A. Increase current by 0.4A

B. Reduce current by 0.4A

C. Increase current by 0.6A

D. Reduce current by 0.6A

\*\*Answer:\*\* A

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#### \*\*QUESTION 9\*\*

Incorrect use of X-rays:

\*\*Options:\*\*

A. Photographing bones

B. Treating cancer

C. Detecting fingerprints

D. Revealing flaws in metal

\*\*Answer:\*\* C

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#### \*\*QUESTION 10\*\*

Natural radioactivity emits:

\*\*Options:\*\*

A. α and β particles

B. α and X-rays

C. γ and X-rays

D. α, β, and γ rays

\*\*Answer:\*\* D

---

#### \*\*QUESTION 11\*\*

A moving sound source causes a stationary listener to hear a different frequency due to:

\*\*Options:\*\*

A. Doppler effect

B. Resonance

C. Ultrasound

D. Rarefaction

\*\*Answer:\*\* A

---

#### \*\*QUESTION 12\*\*

High-tension transmission involves:

\*\*Options:\*\*

A. High resistance, low voltage

B. Low current, high voltage

C. High current, low voltage

D. High current, low resistance

\*\*Answer:\*\* B

---

#### \*\*QUESTION 13\*\*

Cost of running five 50W lamps and four 100W lamps for 10 hours at 2 Kobo per kWh:

\*\*Options:\*\*

A. ₦0.65

B. ₦0.39

C. ₦3.90

D. ₦0.13

\*\*Answer:\*\* D

---

#### \*\*QUESTION 14\*\*

The mass of a proton is approximately equal to that of:

\*\*Options:\*\*

A. An α-particle

B. A β-particle

C. A neutron

D. An electron

\*\*Answer:\*\* C

---

#### \*\*QUESTION 15\*\*

A transformer with 300 primary turns and 30 secondary turns has an input voltage of 100V. Output voltage is:

\*\*Options:\*\*

A. 5V

B. 10V

C. 15V

D. 20V

\*\*Answer:\*\* B

---

#### \*\*QUESTION 16\*\*

A solid weighs 4.8g in air, 2.8g in water, and 3.2g in kerosene. The ratio of its density to kerosene density is:

\*\*Options:\*\*

A. \( \frac{2}{3} \)

B. \( \frac{3}{2} \)

C. \( \frac{4}{3} \)

D. 3

\*\*Answer:\*\* D

---

#### \*\*QUESTION 17\*\*

Most precise vernier caliper reading for a metal rod:

\*\*Options:\*\*

A. 5.16cm

B. 5.165cm

C. 5.0cm

D. 5.160cm

\*\*Answer:\*\* A

---

#### \*\*QUESTION 18\*\*

When sound passes from air to water:

\*\*Options:\*\*

A. Speed and frequency increase, wavelength constant

B. Speed and wavelength increase, frequency constant

C. Speed decreases

D. Speed increases, frequency and wavelength decrease

\*\*Answer:\*\* B

---

#### \*\*QUESTION 19\*\*

Convex mirrors are used as driving mirrors because:

I. Image is erect

II. Large field of view

III. Long focal length

\*\*Options:\*\*

A. I and III only

B. I and II only

C. II and III only

D. I, II, and III

\*\*Answer:\*\* B

---

#### \*\*QUESTION 20\*\*

A light ray NO strikes two mirrors and emerges along PQ. The deviation is:

\*\*Options:\*\*

A. \( 220^\circ \)

B. \( 200^\circ \)

C. \( 221^\circ \)

D. \( 180^\circ \)

\*\*Answer:\*\* D

---

#### \*\*QUESTION 21\*\*

A magnetic needle suspended at Earth’s north pole and equator aligns at angles:

\*\*Options:\*\*

A. \( 0^\circ \) and \( 0^\circ \)

B. \( 60^\circ \) and \( 60^\circ \)

C. \( 90^\circ \) and \( 90^\circ \)

D. \( 90^\circ \) and \( 0^\circ \)

\*\*Answer:\*\* D

---

#### \*\*QUESTION 22\*\*

A hydrometer measures:

\*\*Options:\*\*

A. Depth of water

B. Relative density by flotation

C. Relative density by apparent weight loss

D. Relative humidity

\*\*Answer:\*\* B

---

#### \*\*QUESTION 23\*\*

For three forces in equilibrium, the correct equation is:

\*\*Options:\*\*

A. \( P\_1 \cos \theta\_1 = P\_2 \cos \theta\_2 \)

B. \( P\_3 = P\_1 \cos \theta\_1 + P\_2 \cos \theta\_2 \)

C. \( P\_1 \sin \theta\_1 = P\_2 \sin \theta\_2 \)

D. All of the above

\*\*Answer:\*\* C

---

#### \*\*QUESTION 24\*\*

Refractive index of liquid is 1.5. Speed of light in the liquid if vacuum speed is \( 3.0 \times 10^8 \, \text{ms}^{-1} \):

\*\*Options:\*\*

A. \( 1.5 \times 10^8 \, \text{ms}^{-1} \)

B. \( 2.0 \times 10^8 \, \text{ms}^{-1} \)

C. \( 3.0 \times 10^8 \, \text{ms}^{-1} \)

D. \( 4.5 \times 10^8 \, \text{ms}^{-1} \)

\*\*Answer:\*\* B

---

#### \*\*QUESTION 25\*\*

A ship receives echo after 3.5s, then 2.5s later. Speed of sound is \( 250 \, \text{ms}^{-1} \). How much closer is the ship?

\*\*Options:\*\*

A. 10m

B. 350m

C. 175m

D. 125m

\*\*Answer:\*\* D

---

#### \*\*QUESTION 26\*\*

Correct statements about vision defects:

I. Long-sighted: blurred close objects

II. Short-sighted: blurred distant objects

III. Short-sight corrected with converging lenses

\*\*Options:\*\*

A. I only

B. II only

C. I and II only

D. II and III only

\*\*Answer:\*\* C

---

#### \*\*QUESTION 27\*\*

Conditions for total internal reflection:

I. Light passes denser to less dense medium

II. Angle of incidence > critical angle

\*\*Options:\*\*

A. I and II

B. II only

C. I and III

D. I, II, and III

\*\*Answer:\*\* A

---

#### \*\*QUESTION 28\*\*

Linear expansivity of brass is \( 2 \times 10^{-5} \, \text{C}^{-1} \). Volume at \( 100^\circ \text{C} \) if \( 10 \, \text{cm}^3 \) at \( 0^\circ \text{C} \):

\*\*Options:\*\*

A. \( 10.06 \, \text{cm}^3 \)

B. \( 10.04 \, \text{cm}^3 \)

C. \( 10.02 \, \text{cm}^3 \)

D. \( 10.20 \, \text{cm}^3 \)

\*\*Answer:\*\* A

---

#### \*\*QUESTION 29\*\*

Mercury thermometer has 210mm between fixed points. Mercury is 49mm above lower point. Room temperature is:

\*\*Options:\*\*

A. \( 55.3^\circ \text{C} \)

B. \( 23.3^\circ \text{C} \)

C. \( 49.0^\circ \text{C} \)

D. \( 16.43^\circ \text{C} \)

\*\*Answer:\*\* B

---

#### \*\*QUESTION 30\*\*

100W heats \( 1.0 \times 10^{-2} \, \text{kg} \) liquid for 20s, raising temperature by \( 5^\circ \text{C} \). Specific heat capacity is:

\*\*Options:\*\*

A. \( 2.0 \times 10^2 \, \text{Jkg}^{-1} \text{K}^{-1} \)

B. \( 2.0 \times 10^2 \, \text{Jkg}^{-1} \)

C. \( 4.0 \times 10^4 \, \text{Jkg}^{-1} \text{K}^{-1} \)

D. \( 4.0 \times 10^4 \, \text{Jkg}^{-1} \)

\*\*Answer:\*\* C

---

### \*\*Questions with Figures (Images):\*\*

- \*\*Q8:\*\* Circuit diagram (key K).

Below is a complete list of all 40 questions from the Joint Admission and Matriculation Board (JAMB) 2021 Past Questions Physics document, as provided in the query. Each question is followed immediately by its correct answer. The questions are organized by page as they appear in the document, from Page 2 to Page 11, covering a range of physics topics such as mechanics, thermodynamics, waves, optics, and electricity.

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### \*\*PAGE 2\*\*

1. \*\*The slope of the straight line displacement-time graph indicates?\*\*

A. distance travelled

B. uniform velocity

C. uniform acceleration

D. uniform speed

\*\*Answer:\*\* B. uniform velocity

2. \*\*A man will exert the greatest pressure when he?\*\*

A. lies flat on his back

B. lies on his belly

C. stands on both feet

D. stands on the toes of one foot

\*\*Answer:\*\* D. stands on the toes of one foot

3. \*\*Which of the units of the following physical quantities are derived?\*\*

I. Area

II. Thrust

III. Pressure

IV. Mass

A. I, II, III and IV

B. I, II, and III only

C. I, II, and IV only

D. I and IV only

\*\*Answer:\*\* B. I, II, and III only

4. \*\*A ball of mass 0.5 kg moving at 10 ms⁻¹ collides with another ball of equal mass at rest. If the two balls move off together after the impact, calculate their common velocity.\*\*

A. 0.2 ms⁻¹

B. 0.5 ms⁻¹

C. 5.0 ms⁻¹

D. 5.0 ms⁻¹

\*\*Answer:\*\* C. 5.0 ms⁻¹

---

### \*\*PAGE 3\*\*

5. \*\*The motion of a body is simple harmonic if the?\*\*

A. acceleration is always directed towards a fixed point

B. path of motion is a straight line

C. acceleration is proportional to the square of the distance from a fixed point

D. acceleration is constant and directed towards a fixed point

\*\*Answer:\*\* A. acceleration is always directed towards a fixed point

6. \*\*Which of the following is not correct about the molecules of a substance in a gaseous state. They?\*\*

A. are in a constant state of motion

B. have different speeds

C. have a temperature which is measured by the average kinetic energy

D. The collision between the gases is perfectly inelastic

\*\*Answer:\*\* D. The collision between the gases is perfectly inelastic

7. \*\*A given mass of gas has a pressure of 80 Nm⁻² at a temperature of 47°C. If the temperature is reduced to 27°C with volume remaining constant, the new pressure is?\*\*

A. 46.0 Nm⁻²

B. 75.0 Nm⁻²

C. 80.0 Nm⁻²

D. 85.3 Nm⁻²

\*\*Answer:\*\* B. 75.0 Nm⁻²

8. \*\*0.5 kg of water at 10°C is completely converted to ice at 0°C by extracting (88000) of heat from it. If the specific heat capacity of water is 4200 J kg⁻¹ °C⁻¹. Calculate the specific latent heat of fusion of ice.\*\*

A. 9.0 kJ kg⁻¹

B. 84.0 kJ kg⁻¹

C. 134.0 kJ kg⁻¹

D. 168.0 kJ kg⁻¹

\*\*Answer:\*\* C. 134.0 kJ kg⁻¹

---

### \*\*PAGE 4\*\*

9. \*\*Which of the following instruments may be used to measure relative humidity?\*\*

A. Hydrometer

B. Manometer

C. Hygrometer

D. Hypsometer

\*\*Answer:\*\* C. Hygrometer

10. \*\*A source of sound produces waves in air of wavelength 1.65 m. If the speed of sound in air is 330 ms⁻¹, the period of vibration in air is?\*\*

A. 200

B. 0.005

C. 0.5

D. 0.02

\*\*Answer:\*\* B. 0.005

11. \*\*A boy standing some distance from the foot of a tall cliff claps his hands and hears an echo 0.5 s later. If the speed of sound is 340 ms⁻¹, how far is he from the cliff?\*\*

A. 680 m

B. 170 m

C. 34 m

D. 85 m

\*\*Answer:\*\* D. 85 m

12. \*\*Which of the following is not a vector quantity?\*\*

A. momentum

B. force

C. temperature

D. displacement

\*\*Answer:\*\* C. temperature

13. \*\*Calculate the heat energy required to vaporise 50 g of water initially at 80°C if the specific heat capacity of water is 4.23 J g⁻¹ K⁻¹ (specific latent heat of vaporisation of water is 2260 J g⁻¹)\*\*

A. 530000 J

B. 23200 J

C. 17200 J

D. 130000 J

\*\*Answer:\*\* D. 130000 J

---

### \*\*PAGE 5\*\*

14. \*\*In a series R-L-C circuit at resonance, the voltages across the resistor and the inductors are 30 V and 40 V respectively. What is the voltage across the capacitor?\*\*

A. 30 V

B. 40 V

C. 50 V

D. 70 V

\*\*Answer:\*\* B. 40 V

15. \*\*If the frequency of an emitted x-ray is 1.6 × 10¹⁶ Hz, the accelerating potential is? [e = 1.6 × 10⁻¹⁹ J, h = 6.63 × 10⁻³⁴ J s]\*\*

A. 6630.0 V

B. 663.0 V

C. 66.3 V

D. 6.6 V

\*\*Answer:\*\* C. 66.3 V

16. \*\*If the fraction of the atoms of a radioactive material left after 120 years is 1/64, what is the half-life of the material?\*\*

A. 24 years

B. 20 years

C. 10 years

D. 2 years

\*\*Answer:\*\* B. 20 years

17. \*\*A certain radioactive source emits radiation that was found to be deflected by both magnetic and electric fields. The radiation is?\*\*

A. beta rays

B. gamma rays

C. x-rays

D. ultra-violet rays

\*\*Answer:\*\* A. beta rays

---

### \*\*PAGE 6\*\*

18. \*\*The inner diameter of a test tube can be measured accurately using a?\*\*

A. micrometre screw gauge

B. pair of dividers

C. metre rule

D. pair of vernier callipers

\*\*Answer:\*\* D. pair of vernier callipers

19. \*\*Two bodies have masses in the ratio 3:1. They experience forces which impart to them, acceleration in the ratio 2:9 respectively. Find the ratio of forces the masses experienced.\*\*

A. 1:4

B. 2:1

C. 2:3

D. 2:5

\*\*Answer:\*\* C. 2:3

20. \*\*Particles of mass 10⁻² kg is fixed to the tip of a fan blade which rotates with angular velocity of 100 rad⁻¹. If the radius of the blade is 0.2 m, the centripetal force is?\*\*

A. 2 N

B. 20 N

C. 200 N

D. 400 N

\*\*Answer:\*\* B. 20 N

21. \*\*A lead bullet of mass 0.05 kg is fired with a velocity of 200 ms⁻¹ into a block of mass 0.95 kg. Given that the lead block can move freely, the final kinetic energy after impact is?\*\*

A. 50 J

B. 100 J

C. 150 J

D. 200 J

\*\*Answer:\*\* A. 50 J

---

### \*\*PAGE 7\*\*

22. \*\*A ball of mass 0.1 kg is thrown vertically upwards with a speed of 10 ms⁻¹ from the top of a tower 10 m high. Neglecting air resistance, its total energy just before hitting the ground is? (Take g = 10 ms⁻²)\*\*

A. 5 J

B. 10 J

C. 15 J

D. 20 J

\*\*Answer:\*\* C. 15 J

23. \*\*A car of mass 800 kg attains a speed of 25 m/s in 20 secs. The power developed in the engine is?\*\*

A. 1.25 × 10⁴ W

B. 2.50 × 10⁴ W

C. 1.25 × 10⁶ W

D. 2.50 × 10⁶ W

\*\*Answer:\*\* B. 2.50 × 10⁴ W

24. \*\*When the brakes in a car are applied, the frictional force on the tyres is?\*\*

A. a disadvantage because it is in the direction of the motion of the car

B. a disadvantage because it is in the opposite direction of the motion of the car

C. an advantage because it is in the direction of the motion of the car

D. an advantage because it is in the opposite direction of the motion of the car

\*\*Answer:\*\* D. an advantage because it is in the opposite direction of the motion of the car

25. \*\*If the stress on a wire is 10⁷ Nm⁻² and the wire is stretched from its original length of 10.00 m to 10.05 m. The Young's modulus of the wire is?\*\*

A. 5.0 × 10⁻⁴ Nm⁻²

B. 5.0 × 10⁻⁵ Nm⁻²

C. 2.0 × 10⁻⁸ Nm⁻²

D. 2.0 × 10⁹ Nm⁻²

\*\*Answer:\*\* D. 2.0 × 10⁹ Nm⁻²

---

### \*\*PAGE 8\*\*

26. \*\*A solid weighs 10.00 N in air, 6 N when fully immersed in water, and 7.0 N when fully immersed in a liquid X. Calculate the relative density of the liquid X.\*\*

A. 5/5

B. 4/3

C. 3/4

D. 7/10

\*\*Answer:\*\* C. 3/4

27. \*\*When the temperature of a liquid increases, its surface tension\*\*

A. decreases

B. increases

C. remains constant

D. increases then decreases

\*\*Answer:\*\* A. decreases

28. \*\*A gas at a volume of V₀ in a container at pressure p₀ is compressed to one-fifth of its volume. What will be its pressure if the magnitude of its original temperature T is constant?\*\*

A. p₀/5

B. 4 p₀/5

C. p₀

D. 5 p₀

\*\*Answer:\*\* D. 5 p₀

29. \*\*A piece of substance of specific heat capacity 450 J kg⁻¹ K⁻¹ falls through a vertical distance of 20 m from rest. Calculate the rise in temperature of the substance on hitting the ground when all its energies are converted into heat. [g = 10 ms⁻²]\*\*

A. 2/9°C

B. 4/9°C

C. 9/2°C

D. 9/4°C

\*\*Answer:\*\* B. 4/9°C

---

### \*\*PAGE 9\*\*

30. \*\*I. A liquid boils when its saturated vapour pressure is equal to the external pressure\*\*

\*\*II. Dissolved substances in pure water lead to an increase in the boiling point.\*\*

\*\*III. When the external pressure is increased, the boiling point increases.\*\*

\*\*IV. Dissolved substances in pure water decreases the boiling point\*\*

\*\*Which of the above combinations are peculiarities of the boiling point of a liquid?\*\*

A. I, II and III only

B. I, II, III, and IV

C. I, II, and IV

D. II, III, and IV

\*\*Answer:\*\* A. I, II and III only

31. \*\*The temperature gradient across a copper rod of thickness 0.02 m, maintained at two temperature junctions of 20°C and 80°C respectively is?\*\*

A. 3.0 × 10² K m⁻¹

B. 3.0 × 10³ K m⁻¹

C. 5.0 × 10² K m⁻¹

D. 3.0 × 10⁴ K m⁻¹

\*\*Answer:\*\* B. 3.0 × 10³ K m⁻¹

32. \*\*Calculate the mass of ice that would melt when 2 kg of copper is quickly transferred from boiling water to a block of ice without heat loss (specific heat capacity of copper = 400 J kg⁻¹ K⁻¹, latent heat of fusion of ice = 3.3 × 10⁵ J kg⁻¹)\*\*

A. 8/33 kg

B. 3.3/80 kg

C. 80/33 kg

D. 3.3/8 kg

\*\*Answer:\*\* A. 8/33 kg

33. \*\*The equation of a wave travelling along the positive x-direction is given by; y = 0.25 × 10⁻³ sin (500t - 0.025x). Determine the angular velocity of the wave motion.\*\*

A. 0.25 × 10⁻³ rad s⁻¹

B. 0.25 × 10⁻¹ rad s⁻¹

C. 5.00 × 10² rad s⁻¹

D. 2.50 × 10³ rad s⁻¹

\*\*Answer:\*\* C. 5.00 × 10² rad s⁻¹

---

### \*\*PAGE 10\*\*

34. \*\*If a sound wave goes from a cold air region to a hot air region, its wavelength will?\*\*

A. increase

B. decrease

C. decrease then increase

D. remain constant

\*\*Answer:\*\* A. increase

35. \*\*The lowest note emitted by a stretched string has a frequency of 40 Hz. How many overtones are there between 40 Hz and 180 Hz?\*\*

A. 4

B. 3

C. 2

D. 1

\*\*Answer:\*\* B. 3

36. \*\*A man stands 4 m in front of a plane mirror. If the mirror is moved 1 m towards the man, the distance between him and his new image is?\*\*

A. 3 m

B. 5 m

C. 6 m

D. 10 m

\*\*Answer:\*\* C. 6 m

37. \*\*The inside portion of part of a hollow metal sphere of diameter 20 cm is polished. The portion will therefore form a?\*\*

A. concave mirror of focal length 5 cm

B. concave mirror of focal length 10 cm

C. convex mirror of focal length 5 cm

D. convex mirror of focal length 10 cm

\*\*Answer:\*\* D. convex mirror of focal length 10 cm

---

### \*\*PAGE 11\*\*

38. \*\*The velocities of light in air and glass are 3.0 × 10⁸ ms⁻¹ and 2.0 × 10⁸ ms⁻¹ respectively. If the angle of refraction is 30°, the sine of the angle of incidence is?\*\*

A. 0.33

B. 0.50

C. 0.67

D. 0.75

\*\*Answer:\*\* D. 0.75

39. \*\*A 2 H inductor has negligible resistance and is connected to a 50 π Hz A.C supply. The reactance of the inductor is?\*\*

A. 200 Ω

B. 50 Ω

C. 100/π Ω

D. 25/π Ω

\*\*Answer:\*\* A. 200 Ω

40. \*\*An astronomical telescope is said to be in normal adjustment when the?\*\*

A. eye is accommodated

B. focal length of an object lens is longer than that of eye piece

C. final image is at the near point of eye

D. final image is at infinity

\*\*Answer:\*\* D. final image is at infinity

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This completes the list of all 40 questions from the JAMB 2021 Physics Past Questions document, with their respective answers provided directly below each question. The answers are sourced from Pages 12 to 15 of the document, ensuring accuracy and alignment with the original content.

Below is a complete list of all 40 questions from the Joint Admission and Matriculation Board (JAMB) 2022 Past Questions Physics document, as provided in the query. Each question is followed immediately by its correct answer. The questions are organized by page as they appear in the document, from Page 2 to Page 11, covering a range of physics topics such as mechanics, thermodynamics, waves, optics, and electricity. The answers are sourced from Pages 12 and 13 of the document, ensuring accuracy and alignment with the original content.

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### \*\*PAGE 2\*\*

1. \*\*Which of these is a derived unit?\*\*

A. Kilogram

B. Metre

C. Newton

D. Second

\*\*Answer:\*\* C. Newton

2. \*\*A bar magnet is divided into two pieces, which of the following statements is correct?\*\*

A. two new magnets are created

B. the magnetic field of each separate piece becomes stronger

C. the electric field is created

D. the bar magnet is demagnetized

\*\*Answer:\*\* A. two new magnets are created

3. \*\*Consider the wave equation \( y = 5 \, \text{mm} \, \sin \left[ 1 \, \text{cm}^{-1} x - 60 \, \text{s}^{-1} t \right] \). The wave number is?\*\*

A. \( 0.1 \, \text{cm}^{-1} \)

B. \( 10 \, \text{cm}^{-1} \)

C. \( 1.0 \, \text{cm}^{-1} \)

D. \( 2 \, \text{cm}^{-1} \)

\*\*Answer:\*\* C. \( 1.0 \, \text{cm}^{-1} \)

4. \*\*An object 40 cm high is 30 cm from the pinhole camera. If the height of the image formed is 20 cm. What is the distance of the image from the pin height?\*\*

A. 15 cm

B. 70 cm

C. 40 cm

D. 40 cm

\*\*Answer:\*\* A. 15 cm

---

### \*\*PAGE 3\*\*

5. \*\*A bar magnet is placed near and lying along the axis of a solenoid connected to a galvanometer. The pointer of the galvanometer shows no deflection when?\*\*

A. the magnet is moved towards the stationary solenoid

B. there is no relative motion

C. the magnet is moved away from the stationary solenoid

D. the solenoid is moved away from the stationary magnet

\*\*Answer:\*\* B. there is no relative motion

6. \*\*Tyres are treaded to?\*\*

A. increase weight of tyres

B. increase friction

C. increase its longevity

D. look good

\*\*Answer:\*\* B. increase friction

7. \*\*A car starts from rest and covers a distance of 40 m in 10 s. Calculate the magnitude of its acceleration\*\*

A. \( 3.20 \, \text{ms}^{-2} \)

B. \( 0.25 \, \text{ms}^{-2} \)

C. \( 0.80 \, \text{ms}^{-2} \)

D. \( 4.00 \, \text{ms}^{-2} \)

\*\*Answer:\*\* C. \( 0.80 \, \text{ms}^{-2} \)

8. \*\*The relationship between the coefficient of linear expansion \( \alpha \) and volumetric expansion \( \gamma \) is\*\*

A. \( \gamma = \alpha^{-3} \)

B. \( \gamma = \alpha \)

C. \( 3 \alpha \)

D. \( \gamma = \alpha^3 \)

\*\*Answer:\*\* C. \( 3 \alpha \)

---

### \*\*PAGE 4\*\*

9. \*\*Which of the following is not a consequence of hydrogen bubbles covering the copper plate of a primary cell?\*\*

A. formation of hydrogen bubbles on the electrode

B. increase in the resistance of the cell

C. local action

D. polarisation

\*\*Answer:\*\* C. local action

10. \*\*A cell whose internal resistance is 0.55 Ω delivers a current of 4 A to an external resistor. The lost voltage of the cell is?\*\*

A. 4.00 V

B. 2.20 V

C. 0.15 V

D. 8.00 V

\*\*Answer:\*\* B. 2.20 V

11. \*\*Which of the following liquids is a poor conductor of electricity?\*\*

A. Distilled water

B. Tap water

C. Sea water

D. Drinking water

\*\*Answer:\*\* A. Distilled water

12. \*\*An isotope has an initial activity of 120 Bq. 6 days later its activity is 15 Bq. The half-life is?\*\*

A. 3 days

B. 2 days

C. 1 day

D. 4 days

\*\*Answer:\*\* B. 2 days

---

### \*\*PAGE 5\*\*

13. \*\*The secondary pigments consist of?\*\*

A. blue, green, and violet

B. yellow, green, and magenta

C. magenta, yellow, and cyan

D. red, green, and blue

\*\*Answer:\*\* C. magenta, yellow, and cyan

14. \*\*A person standing waist-deep in a swimming pool appears to have short legs because of light?\*\*

A. diffraction

B. refraction

C. reflection

D. interference

\*\*Answer:\*\* B. refraction

15. \*\*A tuning fork having a frequency of 312 Hz emits a wave which has a wavelength of 1.10 m. Calculate the velocity of sound\*\*

A. 312.0 ms⁻¹

B. 110.0 ms⁻¹

C. 343.2 ms⁻¹

D. 686.4 ms⁻¹

\*\*Answer:\*\* C. 343.2 ms⁻¹

16. \*\*When the plate area of a capacitor increases?\*\*

A. the voltage can withstand increase

B. the capacitance decreases

C. the capacitance is unaffected

D. the capacitance increases

\*\*Answer:\*\* D. the capacitance increases

17. \*\*A magnet relay is a device used for?\*\*

A. reading the magnitude of magnetic flux

B. controlling another circuit carrying larger current

C. turning in sports

D. storing magnetic field

\*\*Answer:\*\* B. controlling another circuit carrying larger current

---

### \*\*PAGE 6\*\*

18. \*\*According to kinetic molecular model in gases,\*\*

A. the particles are closely packed together; they occupy minimum space are usually arranged in a regular pattern

B. the particles vibrate about fixed positions and are held together by the strong intermolecular bonds between them

C. the molecules are very far apart and occupy all the spaces made available to them

D. the particles occur in clusters with molecules slightly further apart

\*\*Answer:\*\* C. the molecules are very far apart and occupy all the spaces made available to them

19. \*\*A current of 0.5 A flows through a resistor when connected to a 40 V battery. How much energy is dispatched in 2 minutes?\*\*

A. 2400 J

B. 9600 J

C. 1500 J

D. 1200 J

\*\*Answer:\*\* A. 2400 J

20. \*\*For a pear-shaped conductor shown above, the concentration of charge on the outside is highest at?\*\*

A. X

B. Z

C. Y

D. K

\*\*Answer:\*\* A. X

21. \*\*The vapour pressure?\*\*

A. increases non-linearly with measuring temperature

B. increases linearly with increasing temperature

C. decreases linearly with increasing temperature

D. decreases non-linearly with measuring temperature

\*\*Answer:\*\* A. increases non-linearly with measuring temperature

---

### \*\*PAGE 7\*\*

22. \*\*The potential energy in an elastic string of force constant \( k \), which has an extension \( x \) is?\*\*

A. \( k x \)

B. \( k x^2 \)

C. \( \frac{1}{2} k x^2 \)

D. \( \frac{1}{2} k \)

\*\*Answer:\*\* C. \( \frac{1}{2} k x^2 \)

23. \*\*A reservoir is filled with liquid of density 2000 kgm⁻³. Calculate the depth at which the pressure in the liquid will be equal to 9100 Nm⁻² (g = 10 ms⁻²)\*\*

A. 0.262 m

B. 0.664 m

C. 0.819 m

D. 0.455 m

\*\*Answer:\*\* D. 0.455 m

24. \*\*Water is not a good thermometric liquid because it?\*\*

A. expands unevenly between 0°C and 4°C

B. maintains fixed density

C. has low freezing point

D. wets glass

\*\*Answer:\*\* D. wets glass

25. \*\*Which of these is a second-class lever?\*\*

A. sugar tongs

B. claw hammer

C. plier

D. wheelbarrow

\*\*Answer:\*\* D. wheelbarrow

---

### \*\*PAGE 8\*\*

26. \*\*In the formation of sea breeze, wind blows from?\*\*

A. sky to land

B. sea to sky

C. land to sea

D. sea to land

\*\*Answer:\*\* D. sea to land

27. \*\*Which component of a fibre-optic connector has a provision of entry for the fibre along with the fixation to connector housing?\*\*

A. coupling device

B. cable

C. ferrule

D. connector housing

\*\*Answer:\*\* A. coupling device

28. \*\*In order to view the sun, the most suitable instrument to use is?\*\*

A. helioscope

B. telescope

C. stroboscope

D. sun metre

\*\*Answer:\*\* A. helioscope

29. \*\*The eclipse of the moon occurs when?\*\*

A. the moon reflects the rays from the sun to the earth

B. the moon comes exactly between the earth and the sun

C. the earth comes exactly between the moon and the sun

D. the sun comes exactly between the earth and the moon

\*\*Answer:\*\* C. the earth comes exactly between the moon and the sun

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### \*\*PAGE 9\*\*

30. \*\*The gravitational pull on the moon is 1/6 that of the earth. If a body weighs 6.0 N on the moon, what will be the weight on the earth?\*\*

A. 6.0 N

B. 5.0 N

C. 12.0 N

D. 36.0 N

\*\*Answer:\*\* D. 36.0 N

31. \*\*The amount of energy required to change a kilogram of ice block into water without a change in temperature is?\*\*

A. specific latent heat of fusion of ice

B. specific heat capacity of ice

C. heat capacity of ice

D. specific heat of vaporisation of ice

\*\*Answer:\*\* A. specific latent heat of fusion of ice

32. \*\*Which expression gives magnetic flux?\*\*

A. \( qVB \sin \theta \)

B. \( \frac{\mu \phi l}{2 \pi r} \)

C. \( BA \cos \theta \)

D. \( -N \frac{d \phi}{d t} \)

\*\*Answer:\*\* C. \( BA \cos \theta \)

33. \*\*The graph of pressure (P) against the reciprocal of the volume (1/V) in Boyle's law is a?\*\*

A. hyperbola

B. parabola

C. curve

D. straight line

\*\*Answer:\*\* D. straight line

34. \*\*What quantity of heat is required to convert 20 g of ice at 0°C to water at the same temperature? (Specific latent heat of ice = 336 Jg⁻¹)\*\*

A. 7.06 × 10³ J

B. 5.38 × 10³ J

C. 6.72 × 10³ J

D. 1.35 × 10³ J

\*\*Answer:\*\* C. 6.72 × 10³ J

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### \*\*PAGE 10\*\*

35. \*\*A train of mass 1600 kg attains a speed of 25 ms⁻¹ in 20 seconds. The power developed in the engine is?\*\*

A. 2.5 kW

B. 80 kW

C. 25 kW

D. 50 kW

\*\*Answer:\*\* D. 50 kW

36. \*\*The main factor which affects the speed of sound waves is the?\*\*

A. properties of the medium

B. amplitude of the sound wave

C. intensity of the sound wave

D. loudness of the sound wave

\*\*Answer:\*\* A. properties of the medium

37. \*\*A semiconductor is formed by?\*\*

A. coordinate bonds

B. electrovalent bonds

C. a substance free of bonds

D. covalent bonds

\*\*Answer:\*\* D. covalent bonds

38. \*\*One of the following is a scalar quantity?\*\*

A. weight

B. momentum

C. potential energy

D. displacement

\*\*Answer:\*\* C. potential energy

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### \*\*PAGE 11\*\*

39. \*\*The mercury column in the barometer at notational atmospheric pressure has a height of?\*\*

A. 0.76 cm at sea level

B. 760 cm at sea level

C. 7.6 cm at sea level

D. 76 cm at sea level

\*\*Answer:\*\* D. 76 cm at sea level

40. \*\*If an object just begins to slide on a surface inclined at 30° to the horizontal, the coefficient of friction is?\*\*

A. √3

B. √3 / 2

C. 1 / √2

D. 1 / √3

\*\*Answer:\*\* D. 1 / √3

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Diagram question 20

This completes the list of all 40 questions from the JAMB 2022 Physics Past Questions document, with their respective correct answers provided directly below each question. The answers are sourced from Pages 12 and 13 of the document, ensuring accuracy and alignment with the original content.