



PHYSICS

BOOKS - MHTCET PREVIOUS YEAR PAPERS AND PRACTICE PAPERS

PRACTICE SET 24

Paper 1 Physics And Chemistry

1. What are units of magnetic permeability?

A. WbA^{-1}

B. Wb^{-1}

C. $WbAm^{-1}$

D. $WbA^{-1}m$

Answer: a



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2. A surface $s = 10\hat{j}$ is kept in an electric field.

$E = 2\hat{i} + 4\hat{j} + 7\hat{k}$. How much electric flux will

come out through the surface ?

A. 40 units

B. 50 units

C. 30 units

D. 20 units

Answer: a



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3. $e = \alpha t - \frac{1}{2}\beta t^2$, If temperature of cold

junction is $0^\circ C$ then temperature of inversion

is

(if

$$\alpha = 500.0 \mu V / .^{\circ} C, \beta = 5.0 \mu V / \text{Square.}^{\circ} C$$

)

A. $100^{\circ}C$

B. $200^{\circ}C$

C. $300^{\circ}C$

D. $400^{\circ}C$

Answer: b



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4. Two discs of the same material and thickness have radii 0.2 m and 0.6 m. Their moments of inertia about their axes will be in the ratio of

A. 1 : 81

B. 1 : 2

C. 1 : 9

D. 1 : 3

Answer: a



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5. The diameter of a flywheel is increased by 1% . Increase in its moment of interia about the central axis is

A. 0.01

B. 0.005

C. 0.02

D. 0.04

Answer: c





6. What torque will increase angular velocity of a solid disc of mass 16kg and diameter 1 m from zero to 2 rpm in 8 s ?

A. $\frac{\pi}{4}N - m$

B. $\frac{\pi}{2}N - m$

C. $\frac{\pi}{3}N - m$

D. $(\pi)N - m$

Answer: d



7. A ray of light is incident on a plane mirror along the direction given by vector $A = 2\hat{i} - 3\hat{j} + 4\hat{k}$. Find the unit vector along reflected ray. Take normal to mirror along the direction of vector $B = 3\hat{i} - 6\hat{j} + 2\hat{k}$.

A.
$$\frac{-94\hat{i} + 237\hat{j} + 68\hat{k}}{49\sqrt{29}}$$

B.
$$\frac{-94\hat{i} + 68\hat{j} + 273\hat{k}}{49\sqrt{29}}$$

C.
$$\frac{-94\hat{i} - 237\hat{j} + 68\hat{k}}{48\sqrt{29}}$$

D.
$$\frac{-94\hat{i} - 68\hat{j} + 273\hat{k}}{49\sqrt{29}}$$

Answer: a



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8. The weight of a person on earth is 600 N.

His weight on moon will appear as

A. zero

B. 100 N

C. 600 N

D. 3600 N

Answer: b



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9. A satellite of the earth is revolving in a circular orbit with a uniform speed v . If the gravitational force suddenly disappears, the satellite will

- A. continues to move with speed along original orbit
- B. will fall to earth
- C. move with velocity v tangent to original orbit
- D. will fly away from earth due to absence of gravitational pull

Answer: c



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10. A lift is tied with thick iron wires and its mass is 1000 kg. The minimum diameter of wire, if the maximum acceleration of lift is 1.2 m/s^2 , is ($g = 9.8 \text{ m/s}^2$)

A. 0.00141 m

B. 0.00282 m

C. 0.005 m

D. 0.01 m

Answer: d



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11. The image of a small electric bulb fixed on the wall of a room is to be obtained on the opposite wall $3m$ away by means of a large convex lens. What is the maximum possible focal length of the lens required for the purpose ?

A. 3.25 m

B. 1.55 m

C. 0.75 m

D. 0.25 m

Answer: c



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12. A soap bubble in vacuum has a radius of 3 cm and another soap bubble in vacuum has a radius of 4 cm . If the two bubbles coalesce under isothermal conditions then the radius of the new bubble is :

A. 2.3 cm

B. 4.5 cm

C. 5 cm

D. 7 cm

Answer: c



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13. A number of small drops of mercury adiabatically coalesce to form a single drop. The temperature of the drop will

A. increase

B. remain same

C. decrease

D. depend on size

Answer: a



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14. A gas is found to obey the law $p^2V =$ constant. The initial temperature and volume

are T_0 and V_0 . If the gas expands to a volume $3V_0$, its final temperature becomes

A. $\frac{T_0}{3}$

B. $\frac{T_0}{\sqrt{3}}$

C. $\sqrt{3}T_0$

D. None of these

Answer: c



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15. In order to double the separation between the molecules (keeping temperature fixed), the final pressure must be made how many times the initial pressure ?

A. Halved

B. $\frac{1}{4}$ th

C. $\frac{1}{8}$ th

D. $\frac{1}{6}$ th

Answer: c



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16. The best laboratory approximation to an ideal black body is .

- A. lump of charcoal heated to a high temperature
- B. metal coated with a black dye
- C. glass surface coated with coalter
- D. hollow enclosure blackened inside and having a small hole

Answer: d



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17. IN a new system of units called star units, $1 \text{ kg}^* = 10 \text{ kg}$, $1 \text{ m}^* = 1 \text{ km}$ and $1 \text{ s}^* = 1 \text{ minute}$, what will be the value of 1J of energy in the new system?

A. $2.4 \times 10^{-5} J^*$

B. $3.6 \times 10^{-4} J^*$

C. $4.2 \times 10^{-3} J^*$

$$D. 4.2 \times 10^{-2} J^*$$

Answer: b



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18. A horizontal platform with an object placed on it executes simple harmonic motion in the vertical direction. The amplitude of oscillation is 3.92×10^{-3} m. What should be the least period of these oscillations, so that the object is not detached from the platform ?

A. 0.1151s

B. 0.1556 s

C. 0.1256 s

D. 0.1356 s

Answer: c



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19. The current voltage relation of diode is given by $i = \left(e^{1000V/T} - 1 \right) mA$, where the applied voltage V is in volt and the

temperature T is in degree Kelvin. If a student makes an error measuring $\pm 0.01V$ while measuring the current of $5mA$ at $300K$, what will be error in the value of current in mA?

- A. 0.2 mA
- B. 0.02 mA
- C. 0.5 mA
- D. 0.05mA

Answer: a



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20. The periodic time T of a simple pendulum are observed , for different length L if a graph of ' $\log T$ ' against ' $\log L$ ' is plotted , the slope of the graph at $T = 2$ s is

A. 2

B. $1/2$

C. $\sqrt{2}$

D. $\sqrt{2}$

Answer: b



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21. If wavelength of a sound wave in a medium is reduced by 50% , then the percentage change in its frequency is

A. -50

B. 100

C. -100

D. 50

Answer: b



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22. A string is producing transverse vibration whose equation is $y = 0.021 \sin (x + 30 t)$, where x and y are in metre and t is in second . If the linear density of the string is $1.3 \times 10^{-4} \text{ kg/m}$, then tension in string in newton will be

A. 10

B. 0.5

C. 1

D. 0.11

Answer: d



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23. An open U-tube contains mercury. When 11.2 cm of water is poured into one of the arms of the tube, how high does the mercury rise in the other arm from its initial level?

A. 0.56 cm

B. 1.35 cm

C. 0.41 cm

D. 2.32 cm

Answer: c



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24. The velocity of sound in a gas is 300 m/s .

The root mean square velocity of the

molecules is ($\gamma = 1.4$)

A. 4 m/s

B. 4000 m/s

C. 40 m/s

D. 400 m/s

Answer: d



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25. A man is watching two trains, one leaving and the other coming in with equal speed of 4 m/s. If they sound their whistles, each of

frequency 240 Hz, the number of beats heard by the man (velocity of sound in air is $320\frac{m}{s}$) will be equal to

A. 12

B. zero

C. 3

D. 6

Answer: d



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26. A small spherical ball falling through a viscous medium of negligible density has terminal velocity v . Another ball of the same mass but of radius twice that of the earlier falling through the same viscous medium will have terminal velocity

A. v

B. $\frac{v}{4}$

C. $\frac{v}{2}$

D. $2v$

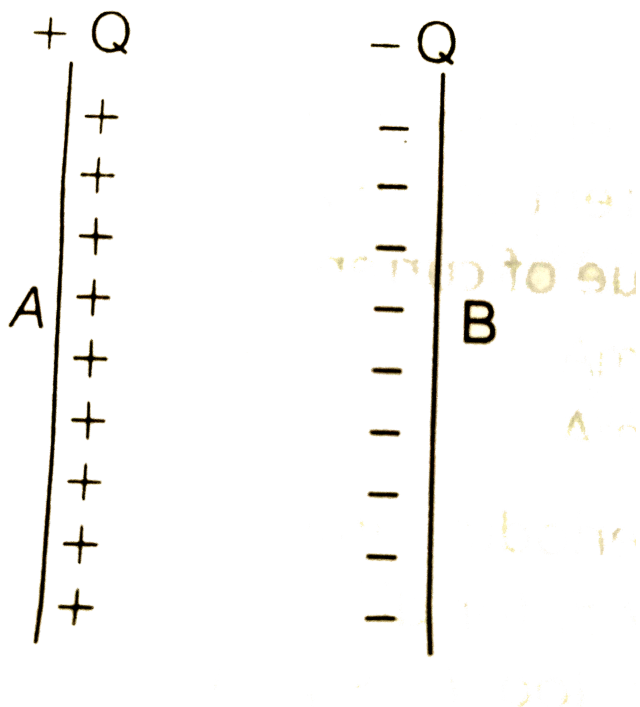
Answer: c



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27. The force between the plates of a parallel plate air capacitor , if charge on capacitor is Q

and area of each palte is A , will be



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28. The paltes of a capacitor are separated by 5mm. A battery of 1 kV is connected across

them . The force experienced by a deuteron located in between the plates is

A. $32 \times 10^{-14} N$

B. $1.6 \times 10^{-19} N$

C. $32 \times 10^{-24} N$

D. $1.6 \times 10^{-14} N$

Answer: a



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29. What are the advantages of a Wheatstone bridge method of measuring resistance over other methods ?

A. it does not involve Ohm's law

B. it is based on Kirchoff's law

C. it has four resistor arms

D. it is a null method

Answer: d



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30. Iron and silicon wires are heated from $30^{\circ}C$ to $50^{\circ}C$. The correct statement is that

- A. Resistance of both the wires increases
- B. Resistance of both the wires decreases
- C. Resistance of iron wire increases and that of silicon wire decreases
- D. Resistance of iron wire decreases and that of silicon wire increases

Answer: c



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31. Which of the following can cause the null point of a potentiometer to shift beyond the wire ?

- A. shorter length of wire
- B. Longer length of wire
- C. Low emf of auxiliary battery
- D. High emf of auxiliary battery

Answer: c



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32. A bus moving on a level road with a velocity v can be stopped at a distance of x by the application of a retarding force F . The load on the bus is increased by 25% by boarding the passengers. Now if the bus is moving with the same speed and if the same retarding force is applied the distance travelled by the bus before it stops is .

A. $125x$

B. x

C. $5x$

D. $2.5x$

Answer: a



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33. A block of mass 2 kg is at rest on a floor .

The coefficient of static friction between block and the floor is 0.54 . A horizontal force of 2.8

N is applied to the block . What should be the

frictional force between the block and the floor? (take , $g = 10m / s^2$)

A. 8.8 N

B. 5.8 N

C. 2.8 N

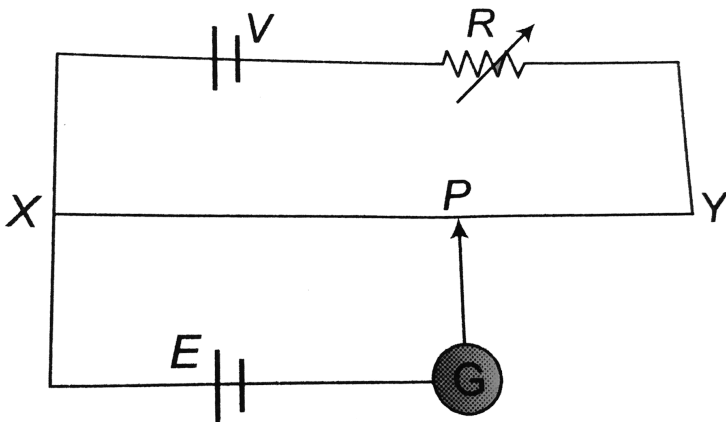
D. 10.8 N

Answer: c



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34. The resistance of a galvanometer is 50ohm and the current required to give full scale deflection is $100\mu A$. In order to convert it into an ammeter, reading upto $10A$, it is necessary to put a resistance of



A. $5 \times 10^{-3}\Omega$ in parallel

B. $5 \times 10^{-4} \Omega$ in parallel

C. $10^5 \Omega$ in series

D. 99950Ω in series

Answer: b



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35. A long magnet is cut in two parts in such a way that the ratio of their lengths is 2:1. The ratio of pole strengths of both the sections is

A. 2:1

B. 1:2

C. 4:1

D. 1:1

Answer: d



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36. Liquids and gases never exhibit

A. diamagnetic property

B. paramagnetic property

C. ferromagnetic property

D. None of these

Answer: c



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37. The initial and final position vectors for a particle are respectively ,
 $(-3.0m)\hat{i} + (2.0m)\hat{j} + (8.0m)\hat{k}$ and

$(9.0m)\hat{i} + (2.0m)\hat{j} + (-8.0m)\hat{k}$. The

displacement of the particle is

A. $(6.0m)\hat{i} + (4.0m)\hat{j} + (16.0m)\hat{k}$

B. $(6.0m)\hat{i}$

C. $(12.0m)\hat{i} - (16.0m)\hat{k}$

D. $(12.0m)\hat{i}$

Answer: c



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38. For long distance transmission , the AC is stepped up because at high voltage , the transmission is

A. faster

B. economical

C. undamped

D. less dangerous

Answer: c



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39. The inductive reactance of a coil of 0.2 H inductance at a frequency of 60 Hz is

A. 7.54Ω

B. 0.754Ω

C. 75.4Ω

D. $7.54 \times 10^{-3}\Omega$

Answer: c



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40. An alternating voltage $V = V_0 \sin \omega t$ is applied across a circuit. As a result, a current $I = I_0 \sin\left(\omega t - \frac{p}{2}\right)$ flows in it. The power consumed per cycle is

A. zero

B. $0.5v_0l_0$

C. $0.707v_0l_0$

D. $1.414V_0l_0$

Answer: a



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41. Find the component of vector

$A = 2\hat{i} + 3\hat{j}$ along the direction $(\hat{i} - \hat{j})$.

A. $-\frac{1}{2}(\hat{i} - \hat{j})$

B. $-\frac{1}{2}(\hat{i} + \hat{j})$

C. $\frac{1}{2}(\hat{i} - \hat{j})$

D. $\frac{1}{2}(\hat{i} + \hat{j})$

Answer: a



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42. The colour of bright fringe nearest central achromatic fringe in the interference pattern with white light will be

A. violet

B. red

C. green

D. yellow

Answer: a



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43. A parallel beam of monochromatic unpolarised light is incident on a transparent dielectric plate of refractive index $\frac{1}{\sqrt{3}}$. The reflected beam is completely polarised . Then the angle of incidence is

A. 30°

B. 60°

C. 45°

D. 75°

Answer: a



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44. A cathode ray tube has a potential difference of V between the cathode and anode. The speed of the cathode rays is given by

A. $v \propto V^2$

B. $v \propto \sqrt{V}$

C. $v \propto \frac{1}{V}$

D. $v \propto V$

Answer: b



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45. The work function of a metal surface is 4.2 eV. The maximum wavelength which can eject electrons from this metal surface is

A. 3076 Å

B. 4116 Å

C. 2946 Å

D. 5088 Å

Answer: c



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46. If the ionization energy for the hydrogen atom is 13.6 eV , the energy required to excite it from the ground state to the next higher state is nearly

A. 3.4 eV

B. 10.2 eV

C. 12.1 eV

D. 1.5eV

Answer: b



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47. An optical fibre communication system works on a wavelength of $1.3 \times 10^{-6}\text{m}$. The number of subscribers it can feed if a channel required 20kHz are

A. 2.3×10^{10}

B. 1.15×10^{10}

C. 1×10^5

D. None of these

Answer: b



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48. The output of *OR* gate is 1

A. if both inputs are zero

B. if either or both inputs are ones

C. only if both inputs are one

D. if either input is zero

Answer: b



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49. In LED visible light is produced by

A. gallium phosphide

B. gallium arsenide

C. germanium phosphide

D. silicon phosphide

Answer: b



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50. A transistor is a/an

A. a current operated device

B. power driven device

C. a voltage operated device

D. resistance operated device

Answer: a



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