PHYSICS

BOOKS - MHTCET PREVIOUS YEAR PAPERS AND PRACTICE PAPERS

PRACTICE SET 03

Paper 1 Pysics Chemistry

1. In a vertical circle the minimum or critical velocity at highest point of path will be

A. $\sqrt{2rg}$

B. $\sqrt{rg}$

C. $r\omega$

D. zero

Answer: B

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2. An object is placed at a distance of 40 cm in front of a concave mirror of focal length 20 cm. The image produced is

A. real and inverted and of same size

B. virtual and erect and of same size

C. real and erect and of samee size

D. virtual and inverted and of same size

Answer: A

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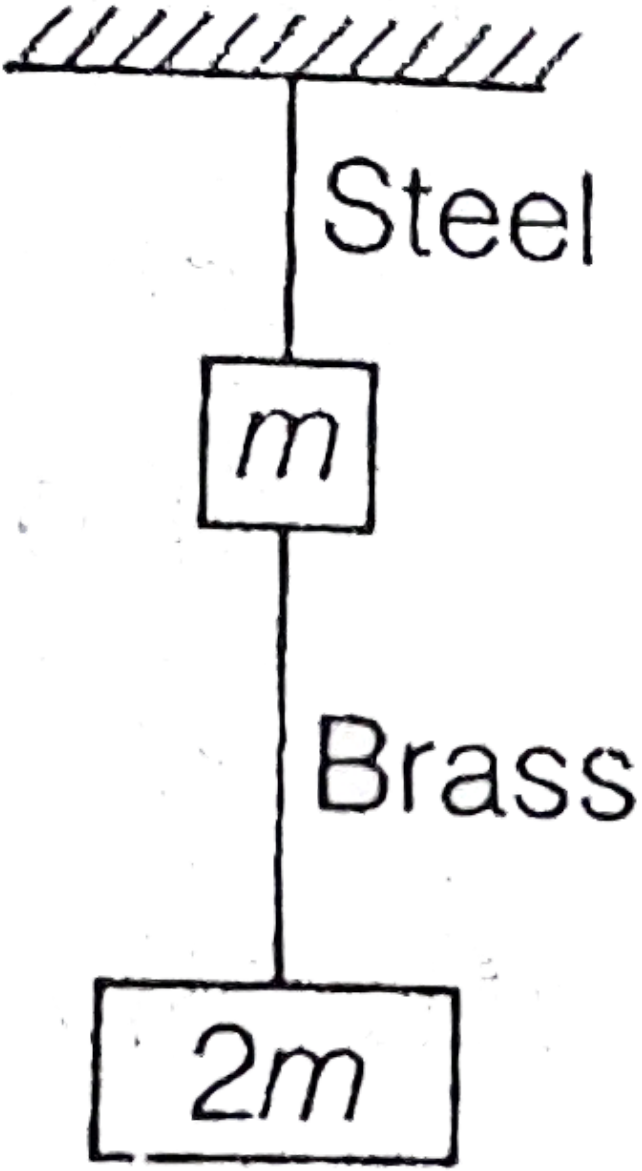
3. If the ratio of lengths, radii and young's modulii of steel and brass wires in the figure are a,b and c, respectively. Then, the

corresponding ratio of increase in their lengths would be


Steel
m
Brass
2m

A. $\frac{2cm}{b^2}$

B. $\frac{3a}{2b^2c}$

C. $\frac{3c}{2ab^2}$

D. $\frac{2a^2c}{b}$

Answer: B

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4. Value of g varies with altitude and rotation of the earth, it is minimum at

A. poles

B. earth's surface

C. equator

D. depends on height

Answer: C

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5. A diver at a depth of 12 m in water $(\mu = 4/3)$ sees the sky in a cone of semi-vertical angle

A. $\sin^{-1}\left(\frac{4}{3}\right)$

B. $\tan^{-1}\left(\frac{4}{3}\right)$

C. $\sin^{-1}\left(\frac{3}{4}\right)$

D. 90°

Answer: C

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6. In a ring of mass 0.5 kg and radius $\sqrt{5}$m, to produce angular acceleration of $18 rad/s^2$ in this body, applied torque (in N-m) should be

A. 7.2

B. 0.14

C. 45

D. 450

Answer: C

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7. When a tap is closed, the manometer attached to the pipe reads $3.5 \times 10^5 Nm^{-2}$. When the tap is opened, the reading of

manometer falls to $3.0 \times 10^5 Nm^{-2}$. The velocity of water in the pipe is

A. $100ms^{-1}$

B. $10ms^{-1}$

C. $1ms^{-1}$

D. $10\sqrt{10}ms^{-1}$

Answer: B

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8. Water rises upto height 2h in a capillary tube of certain diameter. This capillary tube is replaced by similar tube of half the diameter. Now, the water will rise to the height of

A. 4h

B. 3h

C. 2h

D. h

Answer: A

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9. Vibrations of simple pendulum in air are

A. free vibrations

B. damped vibrations

C. forced vibrations

D. resonant vibrations

Answer: B

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10. Which of the following units denotes the dimensions $\left[ML^2/Q^2\right]$, where Q denotes the electric charge?

A. Wbm^{-2}

B. Henry (H)

C. Hm^{-2}

D. Weber (Wb)

Answer: B

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11. The frequencies of two tuning forks A and B are respectively $1.5\,\%$ more $2.5\,\%$ less than that of tuning fork C. When A and B sounded together, 12 beats are produced in 1 second. The frequency of tuning fork C is

A. 200 Hz

B. 240 Hz

C. 360 Hz

D. 300 Hz

Answer: D

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12. What percent of length of a wire will increses by applying a stress fo $1kg.\ Wt/mm^2$ on it.

$[Y = 1 \times 10^{11} Nm^{-2} \text{and} 1kgwt = 9.8N]$

A. $0.0078\ \%$

B. $0.0088\ \%$

C. $0.0098\ \%$

D. $0.0067\ \%$

Answer: C

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13. Can displacement be greater than distance?

A. Yes

B. No

C. Data insufficient

D. -

Answer: B

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14. In Melde's experiment, the tuning fork was arranged in parallel position and the vibrating length of string was 0.8m. Upon setting the tuning fork into vibration, four loops were formed along the string. If the linear density of the string is 0.5 mg/cm and the frequency of the tuning fork is 96Hz, then tension in the string will be

A. $0.1843 \times 10^{-2} N$

B. $9.215 \times 10^{-2} N$

C. $0.9215 \times 10^{-2} N$

D. $1.843 \times 10^{-2} N$

Answer: D

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15. Waves formed on a string, such that energy is not carried by it. These waves are

A. transverse progressive waves

B. longitudinal progresive waves

C. stationary waves

D. electromagnetic waves

Answer: C

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16. A magnet N-S is suspened from a spring and when it oscillates, the magnet moves in and out of the ocil C. the coil is connected to a

galvanometer G. then, as the magnetic oscillates

A. G shows no deflection

B. G shows deflection to the left and right but the amplitude steadily decreases

C. G shows deflection to the left and right with constant amplitude

D. G shows deflection on one side

Answer: B

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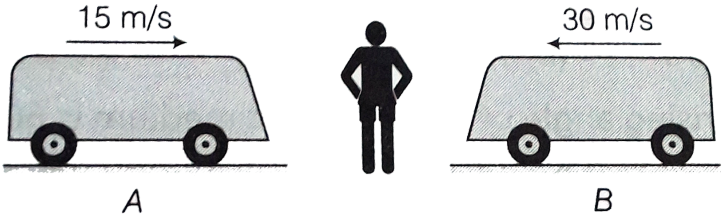
17. Two cars A and B approach a statinary observer from opposite sides as shown in figure. Observer hears no beats. If the frequency of the horn of the car B is 504 Hz, the frequency of horn of car A will be



A. 529.2 Hz

B. 295.2Hz

C. 440.5Hz

D. 259.2Hz

Answer: A

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18. If the binding energy per nucleon in $._3 Li^7$ and $._2 He^4$ nuclei are respectively 5.60 MeV and 7.06 MeV, then the ebergy of proton in the reaction $._3 Li^7 + p \rightarrow 2._2 He^4$ is

A. 19.6 MeV

B. $-2.4MeV$

C. $8.4MeV$

D. $17.3MeV$

Answer: D

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19. Two charges of equal magnitude q are placed in air at a distance 2a apart and third charge $-2q$ is placed at mid-point . The

potential energy of the system is (ε_0 = permittivity of free space)

A. $-\frac{q^2}{8\pi\varepsilon_0 a}$

B. $-\frac{3q^2}{8\pi\varepsilon_0 a}$

C. $-\frac{5q^2}{8\pi\varepsilon_0 a}$

D. $-\frac{7q^2}{8\pi\varepsilon_0 a}$

Answer: D

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20. For a certain gas the ratio of specific heat is given to be $\gamma = 1.5$ for this gas

A. $C_V = 3R$

B. $C_p = 3R$

C. $C_p = 5R$

D. $C_V = 5R$

Answer: B

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21. A square wire frame of L is dipped in a liquid, on taking out a membrane is formed. If the surface tension of liquid is T, force acting on the frame will be

A. 2TL

B. 4TL

C. 8TL

D. 10TL

Answer: C

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22. The length of a simple pendulum is about 100 cm known to an accuray of 1 mm. its period of oscillation oscillations using a clock of 0.1 resolution. What is the accuray in the determined value of g?

A. $0.2\,\%$

B. $0.5\,\%$

C. $0.1\,\%$

D. $2\,\%$

Answer: A

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23. Two bodies hae temperatures as $227^\circ C$ and $727^\circ C$ ratio of heat radiated by them will be

A. $1:4$

B. $1:16$

C. $16:1$

D. $4:1$

Answer: B

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24. The acceleration due to gravity at a place is $\pi^2 m/s^2$. Then, the time period of a simple pendulum of length 1 m is

A. $\frac{2}{\pi}s$

B. $2\pi s$

C. $2s$

D. πs

Answer: C

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25. In a polarised wave, the vibrations of field vectors are

A. asymmetric

B. symmetric

C. radomised

D. none of these

Answer: A

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26. A particle executes S.H.M. of amplitude 25 cm and time period 3 s. What is the minimum time required for the particle to move between two points 12.5 cm on either side of the mean position ?

A. 0.5 s

B. 1 s

C. 1.5 s

D. 2 s

Answer: A

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27. Polarising angle of a transparent medium is 60°, angle of refraction will be

A. 120°

B. 45°

C. 30°

D. 60°

Answer: C

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28. The (x,y,z) co -ordinates of two points A and B are give respectively as (0,3,- 1) and (-2,6,4) The displacement vector from A to B is given by

A. $-2\hat{i}+6\hat{j}+4\hat{k}$

B. $-2\hat{i}+3\hat{j}+3\hat{k}$

C. $-2\hat{i}+3\hat{j}+5\hat{k}$

D. $2\hat{i}+3\hat{j}-5\hat{k}$

Answer: C

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29. If yellow light in the Young's double slit experiement is replaced by red light, the fringe width will

A. increases

B. decreases

C. unchanged

D. the fringes disappear

Answer: A

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30. A body of mass 4 kg is accelerated up by a constant force, travels a distance of 5 m in the

first second and a distance of 2m in the third second. The force acting on the body is

A. 2N

B. 4N

C. 6N

D. 8N

Answer: C

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31. Surface charge densities of two thin concentric spherical capacitors or shells are given as $\sigma \text{ and } -\sigma$. The radii are R and 2R. The concentric capacitors are connected by a thin conducting wire. The entire charge on the inner miner transfers to the outer caspacitor and potential difference between them becomes zero. final potential of each capacitor will be

A. $-\frac{3\sigma R}{2\varepsilon_0}$

B. $-\frac{2\sigma R}{\varepsilon_0}$

C. $-\frac{\sigma R}{2\varepsilon_0}$

D. zero

Answer: A

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32. A galvanometer of resistance 100Ω has voltage sensitivity 2 div/volt.t he current sensitvity of galvanometer is

A. 1 div/A

B. 100 div/A

C. 10 div/A

D. 200 div/A

Answer: D

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33. The amplitude of a executing SHM is $4cm$ At the mean position the speed of the particle is $16cm/s$ The distance of the particle from

the mean position at which the speed the particle becomes $8\sqrt{3}cm/s$ will be

A. $2\sqrt{3}cm$

B. $\sqrt{3}cm$

C. $1cm$

D. 2 cm

Answer: D

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34. Some materials shows magnetic properties according to their nature. Which of the following is diamagnetic?

A. aluminium

B. quartz

C. nickel

D. bismuth

Answer: D

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35. In hydrogen atom, an electron is revolving in the orbit of radius 0.53Å with $6.6 \times 10^{15} rotations/\sec ond.$ Magnetic field produced at the centre of the orbit is

A. $.125 Wb/m^2$

B. $1.25 Wb/m^2$

C. $12.5 Wb/m^2$

D. $125 Wb/m^2$

Answer: C

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36. Capability of movement of a charged particle is determined by its mobility. SI unit of the mobility is

A. A-m/N

B. A-m

C. A/m

D. None of these

Answer: A

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37. In a potentiometer, the null point is received at 7th wire. If now we have to change the null point at 9th wire, what should we do?

A. Attach resistance in series with battery

B. Increase resistance in main circuit

C. decrease resistance in main circuit

D. decrease applied emf

Answer: B

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38. In a Whatstone's bridge all the four arms have equal resistance R_0. If the resistance of the galvanometer arm is $2R_0$, the equivalent resistance of the combination as seen by the battery is

A. R_0

B. $2R_0$

C. $\frac{R_0}{4}$

D. $\frac{R_0}{2}$

Answer: A

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39. A shell of mass 10 kg is moving with a velocity with a velocity of $10ms^{-1}$ when it blasts and forms two parts of mass 9 kg and 1 kg respectively. If the 1st mass is stationary, the velocity of the 2nd is

A. $1ms^{-1}$

B. $10ms^{-1}$

C. $100ms^{-1}$

D. $1000ms^{-1}$

Answer: C

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40. Cyclotron is a device used to accelerate charged particles but it does not accelerate

A. proton

B. charged particles

C. electrons

D. any particle

Answer: C

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41. Transformer is an electrical device based on electromagnetic inductions and is used to

A. convert AC into DC

B. convert DC into AC

C. to step up or down DC voltage

D. to step up or down AC voltage

Answer: D

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42. A body of mass 2 kg is kept by pressing to a vertical wall by a force of 100 N . The coefficient of friction between wall and body is 0.3. Then the frictional force is equal to

A. 6 N

B. 20 N

C. 600 N

D. 700 N

Answer: B

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43. A wave equation which gives the displacement along y -direction is given by $y = 0.001 \sin(100t + x)$ where x and y are in

meterand t is time in second. This represented a wave

A. travelling with a velocity of 100 m/s in the negative x-direction

B. travelling with a velocity of $\frac{50}{\pi}$ m/s in the positive x-direction

C. of wavelengthh 1 m

D. from frequency $\frac{100}{2\pi}$ Hz

Answer: A

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44. To double the covering range of a TV transimitter tower, its height should be made

A. 2 times

B. 4 times

C. $\sqrt{2}$ times

D. 8 times

Answer: B

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45. Digital circuits can be made by the repetition of frequently used gates which are

A. OR gate

B. AND gate

C. NOT gate

D. NAND gate

Answer: D

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46. Which of the following has the highest moment of inertia when each of them has the same mass and the same radius?

A. A ring about any of its diameter

B. A disc about any of its diameter

C. A hollow sphere about any of its diameter

D. A solid sphere about any of its diameter

Answer: C

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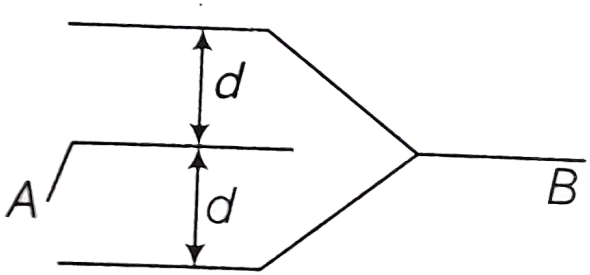
47. Three plates of common surface A are connected as shown in the figure. The effective capacitance will be



A. $\frac{\varepsilon_0 A}{d}$

B. $\frac{3\varepsilon_0 A}{d}$

C. $\frac{3}{2}\frac{\varepsilon_0 A}{d}$

D. $\frac{2\varepsilon_0 A}{d}$

Answer: D

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48. The fundamental of a closed pipe is 220 Hz. If $\frac{1}{4}$ of the pipe is filled with water, the frequency of the first overtone of the pipe now is

A. 220 Hz

B. 440 Hz

C. 880 Hz

D. 1760 Hz

Answer: C

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49. A motorcycle is travelling on a curved track of radius 500 m. If the coefficient of friction between road and tyres is 0.5, the speed avoiding skidding will be

A. 50 m/s

B. 75 m/s

C. 25 m/s

D. 35 m/s

Answer: A

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50. The electron in a hydrogen atom makes a transition from $n = n_1$ to $n = n_2$ state. The time period of the electron in the initial state

(n_1) is eigh times that in the final state (n_2).

The possible values of n_1 and n_2 are

A. $n_1 = 4, n_2 = 2$

B. $n_1 = 8, n_2 = 2$

C. $n_1 = 8, n_2 = 1$

D. $n_1 = 6, n_2 = 2$

Answer: A

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1. A body of mass 4 kg is accelerated up by a constant force, travels a distance of 5 m in the first second and a distance of 2m in the third second. The force acting on the body is

A. 2N

B. 4N

C. 6N

D. 8N

Answer: A

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