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PHYSICS

BOOKS - MHTCET PREVIOUS YEAR PAPERS AND PRACTICE PAPERS

PRACTICE SET 05

Paper 1 Physics Chemistry

1. AMPERE'S CIRCUITAL LAW

A. $\int B \cdot dI = \mu_0 (l)_{\text{net}}$

B. $\int B \cdot dI = \mu_0 l$

C. $\int B \cdot dI = \mu_0 / l$

D. $\int B \cdot dI = \frac{\mu_0}{q}$

Answer: A

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2. What is meant by figure of merit of a galvanometer?

A. $k = \frac{n.C}{AB}$

B. $l = \frac{C}{nAB}\phi$

C. $k = \frac{C}{nAB}$

D. $k = \frac{\phi}{l}$

Answer: C

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3. A radioactive nucleus of mass M emits a photon of frequency v and the nucleus recoils. The recoil energy will be

A. $Mc^2 - fv$

B. $h^2v^2 / 2Mc^2$

C. zero

D. hv

Answer: B

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4. Magnetic transition temperature is also known as

A. yield point

B. magnetic level

C. field point

D. Curie point

Answer: D

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5. 220 V AC means rms voltage and voltage amplitude have the values

A. 220 V, 311 V

B. 220 V, 110 V

C. 220 V, 420 V

D. 240 V, $\frac{220}{l}$

Answer: A

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6. Susceptance and admittance are respectively the reciprocals of

A. resistance and capacitance

B. capacitance and resistance

C. reactance and impendance

D. impendance and reactance

Answer: C

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7. Dimensional formula of magnetic field is :-

A. $\left[ML^{-2}A^{-1}\right]$

B. $\left[ML^2T^{-1}A^{-2}\right]$

C. $\left[MT^{-2}A^{-2}\right]$

D. $\left[MT^{-1}A^{-2}\right]$

Answer: A

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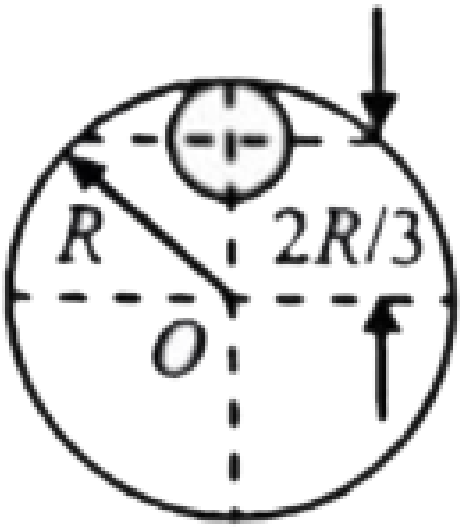
8. A thin disc of mass 9M and radius R from which a disc of radius R/3 is cut shown in figure. Then moment of inertia of the remaining disc about O, perpendicular to the

plane of disc is -



A. $4MR^2$

B. $\frac{40}{9}MR^2$

C. $10MR^2$

D. $\frac{37}{9}MR^2$

Answer: A

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9. The activity of a radioactive sample is measures as N_0 counts per minute at $t = 0$ and N_0 / e counts per minute at $t = 5 \text{ min}$. The time (in minute) at which the activity reduces to half its value is.

A. $\frac{\log_e(2)}{5}$

B. $\frac{5}{\log_e 2}$

C. $5 \log_{10} 2$

D. $5 \log_e 2$

Answer: D

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10. A student has measured the length of a wire equal to 0.04580 m. this value of length has the number of significant figures equal to

A. five

B. four

C. six

D. none of these

Answer: B

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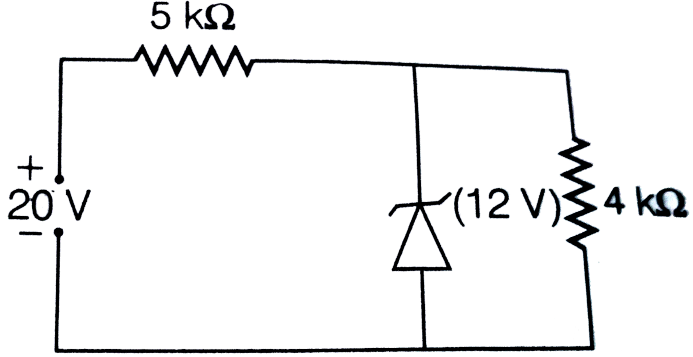
11. In the given circuit, the current through the resistor $4k\Omega$ is



A. 1 mA

B. 3 mA

C. 5 mA

D. 4 mA

Answer: B

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12. A TV transmission tower has a height of 160 m. its coverage range is

A. 160 km

B. 80 km

C. 480 km

D. 45.25 km

Answer: D

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13. 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. $2\sqrt{3}$

B. $\sqrt{3}cm$

C. $1cm$

D. 2 cm

Answer: D

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14. A car is moving on a circular track of radius 0.1 km with a speed 60 km/h, angle of banking would be

A. $\tan^{-1}(1/18)$

B. $\tan^{-1}(5/18)$

C. $\cos^{-1}(5/18)$

D. $\tan^{-1}(18/5)$

Answer: B

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15. Acceleration due to gravity at a depth equal to half the radius of earth from its surface is

A. $\frac{g}{2}$

B. $\frac{3g}{2}$

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

D. $\frac{3g}{4}$

Answer: A

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16. Weight of a body at the centre of the earth is zero because

A. gravitational force is zero

B. gravitational force is infinite

C. force is maximum on earth's surface

D. none of the above

Answer: A

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17. Theorem of parallel axes is applicable for

A. two dimensional bodies

B. laminar type bodies

C. three dimensional bodies

D. any type of bodies

Answer: D

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18. Very thin ring of radius R is rotated about its centre. Its radius will

A. increase

B. decrease

C. change depends on material

D. none of the above

Answer: A

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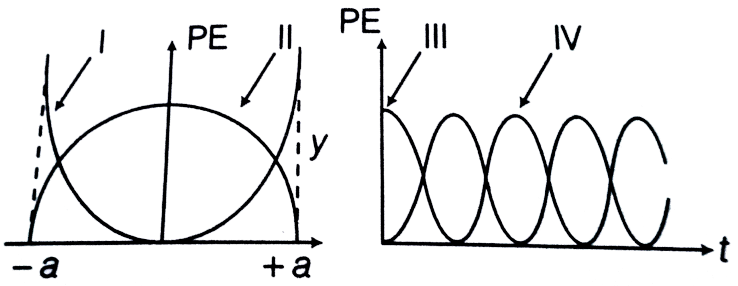
19. If for a particle executing SHM, the equation of SHM is given as $y = a\cos\omega t$. Then which of the following graphs represents the variation in potential energy?



A. II,IV

B. I,III

C. III,IV

D. I,II

Answer: B

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20. The work done in splitting a drop of water of 1 mm radius into 10^6 drops is (S.T. of water $= 72 \times 10^{-3} J/m^2$)

A. $8.95 \times 10^{-5} J$

B. $10.5 \times 10^{-5} J$

C. $6.5 \times 10^{-5} J$

D. $8 \times 10^{-4} J$

Answer: A

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21. A particle moves from position $3\hat{i}+2\hat{j}+6\hat{k}$ to $14\hat{i}+13\hat{j}+9\hat{k}$ due to a uniform force of $4\hat{i}+\hat{j}+3\hat{k}$. Find the work done I the displacement is in metre.

A. 16 J

B. 64 J

C. 32 J

D. 48 J

Answer: B

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22. If M=mass of wire, ρ=density of wire, R=radius of wire, r=change in radius, L=original length of wire and l=change in length, then poisson's ratio is given by

A. $\frac{Mr\rho}{\pi R^3 l}$

B. $\frac{Mr}{\pi R^2 l\rho}$

C. $\frac{Mr}{\pi R^3 \rho l}$

D. $\frac{Mr\rho}{\pi R^2 l}$

Answer: C

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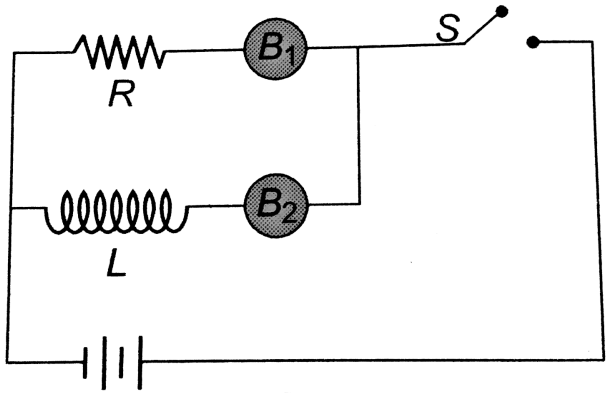
23. The adjoining figure shows two bulbs B_1 and B_2 resistor R and an inductor and L.

When the switch S is turned off



A. B_1 dies out immediately but B_2 will with some delay

B. B_2 dies ou immediately but B_1 with some delay

C. Both B_1 and B_2 will dies out immediately

D. Both B_1 and B_2 will die out with some delay

Answer: A

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24. A tunning fork A has a frequency of 3 % more than that of a standard force. A second fork B has a frequency 2% less than that of the standard fork. When A and B are sounded

together, the number of beats produced per sound is 8. the frequency off fork B is

A. 154.5 Hz

B. 250 Hz

C. 157.8 Hz

D. 300 Hz

Answer: C

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25. For silver and water, the value of angle of coontact is

A. 90°

B. 120°

C. 180°

D. 0°

Answer: A

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26. A boat crosses a river of width 1 km by shortest path in 15 min. if the speed of boat in still water is 5 kmh^{-1}, then what is the speed of the river?

A. 5 kmh^{-1}

B. 12 kmh^{-1}

C. 3 kmh^{-1}

D. 4 kmh^{-1}

Answer: C

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27. Plane progressive wave $y=A\sin(\omega t - kx)$ travels in positive X-direction with a speed

A. ω

B. $\frac{\omega}{k}$

C. $\frac{k}{x}$

D. v

Answer: B

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28. An object of mass 5 kg is attached to the hook of a spring balance and the balance is suspended vertically from the roof of a lift. The reading on the spring balance when the lift is going up with an acceleration of 0.25 ms^{-2} is take, (take, $g = 10ms^{-2}$)

A. 51.25 N

B. 48.75 N

C. 52.75 N

D. 47.25 N

Answer: A

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29. If fundamental frequency is 256 Hz, then II and III hormonics will be

A. 512, 768

B. 256, 512

C. 256, 768

D. None of these

Answer: A

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30. Average Translational Kinetic Energy Per Molecule

A. temperature only

B. temperature and nature of gas

C. nature of gas only

D. independent of both

Answer: A

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31. A train is moving with velocity $20m/\sec$. on this dust is falling at the rate of 50 kg / minute . The extra force required to move this train with constant velocity will be

A. 16.66 N

B. 1200 N

C. 1000 N

D. 166.6 N

Answer: A

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32. A winding wire which is used to prepare a solenoid of length 80 cm can bear a maximum cuurent of 10 A. the cross-sectional radius of the solenoid is 3 cm. what should be the length of the winding wire if a magnetiic field

of 0.2 T is to be produced at the centre of the solenoid along its axis?

A. $6 \times 10^3 m$

B. $1.2 \times 10^2 m$

C. $4.8 \times 10^2 m$

D. $2.4 \times 10^3 m$

Answer: D

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33. In forced oscillation of a particle the amplitude is maximum for a frequency ω_2 of the force while the energy is maximum for a frequecyomega_(2) of the force, then .

A. $\omega_1 < \omega_2$

B. $\omega_1 < \omega_2$ when damping is small and $\omega_1 > \omega_2$ when damping is large

C. $\omega_1 > \omega_2$

D. $\omega_1 = \omega_2$

Answer: D

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34. An iceberg is floating in water. The density of ice in the iceberg is 917 kg m^{-3} and the density of water is 1024 kg m^{-3}. What percentage fraction of the iceberg would be visible?

A. 0.05

B. 0.1

C. 0.12

D. 0.08

Answer: B

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35. The wavelength of maximum emission shifts towards smaller wavelengths as the temperature of black body

A. increases

B. decreases

C. increases or decreases

D. remains constant

Answer: A

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36. Electrons used in an electron microscope are accelerated by a voltage of 25 kV. If the voltage is increased to 100 kV then the de

Broglie wavelength associated with the electrons would

A. increase by 2 times

B. decrease by 2 times

C. decrease by 4 times

D. increase by 4 times

Answer: B

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37. The equation of standing wave is $y = 0.1\cos(\pi x)\sin(200\pi t)$. What is the frequency of the wave?

A. 100 Hz

B. 50 Hz

C. 25 Hz

D. 200 Hz

Answer: A

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38. A liquid flows through a pipe of non-uniform cross-section. If A_1 and A_2 are the cross-sectional areas of the pipe at two points, the ratio of velocities of the liquid at these points will be

A. $A_1 A_2$

B. $\frac{A_1}{A_2}$

C. $\frac{A_2}{A_1}$

D. $\frac{1}{A_1 A_2}$

Answer: C

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39. The magnificationof the image when an object is placed at a distance x from the principle focus of a mirror of focal length f is

A. $\frac{x}{f}$

B. $1+\frac{f}{x}$

C. $\frac{f}{x}$

D. $1-\frac{f}{x}$

Answer: C

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40. A block whose mass is 1 kg is fastened to a spring. The spring has a spring constant of 100N/m. the block is pulled to a distance x=10 cm from its equilibrium position at x=0 on a frictionless surface from rest at t=0. the kinetic energy and potential energy of the block when it is 5 cm away from the mean position is

A. 0.375 J, 0.125 J

B. 0.125 J, 0.375 J

C. 0.125 J, 0.125 J

D. 0.375J, 0.375J

Answer: A

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41. A monochromatic beam of light of wavelength $6000A$ in vacuum enters a medium of refractive index 1.5. In the medium its wavelength is...., its frequency is.....

A. 25×10^7 per m

B. 25×10^6 per m

C. 25×10^4 per m

D. 25×10^8 per m

Answer: B

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42. In the interference pattern all the fringes are of equal emit light of

A. intensity

B. contrast

C. width

D. all of these

Answer: C

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43. Two sources of light are said to be coherent if they emit light of

A. same intensity

B. same amplitude

C. constant phase difference

D. same frequency

Answer: C

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44. In young's experiement, a creast of one wave coincides with the through of the other

wave at a point. The phase difference between the two waves is

A. zero

B. 4π

C. 6π

D. 7π

Answer: D

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45. When field lines are leaving a surface the flux will be taken as

A. positive

B. negative

C. depens on the surface

D. neither positive nor negative

Answer: A

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46. Electrostatic pressure is givcen by

A. $\frac{dF}{dS}$

B. $\frac{\sigma^2}{2\varepsilon_0}$

C. $\frac{1}{2}\varepsilon_0 E^2$

D. All of these

Answer: D

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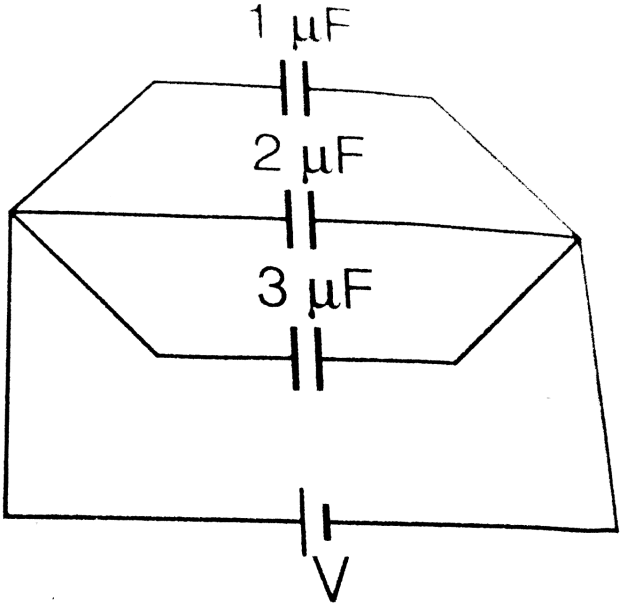
47. Equivalent capacitance for the circuit shown in figure will be



A. $\frac{6}{11}\mu F$

B. $2\mu F$

C. $6\mu F$

D. $\frac{4}{9}\mu F$

Answer: C

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48. One face of prism of refracting angle 30° and refractive index 1.414 is silvered. At what angle must a ray of light fall on the unsilvered face so that it retraces its path out of the prism ?

A. 45°

B. 60°

C. 30°

D. 0°

Answer: A

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49. Wheatstone bridge is not suitable for the measurement of resistance of the order of

A. ohm

B. kilo-ohm

C. mega-ohm

D. except (c)

Answer: C

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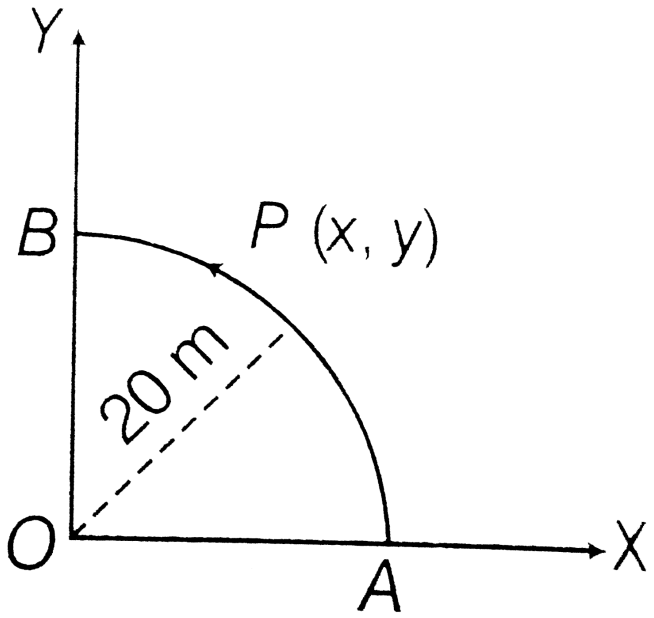
50. A point P moves in counter-clockwise direction on figure. The movement of P is such that it sweeps out a length $s = t^3 + 5$, where s is in metre and t is in second. The radius of

the pathh is 20 m. the acceleration of P when

t=2s is nearly



A. $14m/s^2$

B. $13m/s^2$

C. $12m/s^2$

D. $7.2m/s^2$

Answer: A

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