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## PHYSICS

## BOOKS - DC PANDEY ENGLISH

## SOLVED PAPER 2017

## Solved papers 2017(NEET)

1. The resistance of a wire is $R$ ohm. If it is melted and stretched to $n$ times its original length, its new resistance will be
A. $n R$
B. $\frac{R}{n}$
C. $n^{2} R$
D. $\frac{R}{n^{2}}$

Answer: C

## D Watch Video Solution

2. A capacitor is charged by a battery. The
battery is removed and another identical
uncharged capacitor is connected in parallel.

The total electrostatic energy of resulting
system
A. increasese by a factor of 4
B. decreases by factor of 2
C. remains the same
D. increases by a factor of 2

## Answer: D

## D Watch Video Solution

3. Figure shows a circuit that contains three identical resistors with resistance $R=0.9 \Omega$ each, two identical inductors with inductance
$L=2.0 \mathrm{mH}$ each, and an ideal battery with emf $\varepsilon=18 \mathrm{~V}$. The current $i$ through the battery just after the switch closed is.

A. $2 m A$
B. 0.2 A
C. 2A
D. O.A

## - Watch Video Solution

4. The photoelectric threshold wavelength of
silver is $3250 \times 10^{-10} \mathrm{~m}$. The velocity of the electron ejected from a silver surface by ultraviolet light of wavelength $2536 \times 10^{-10} m$ is
$\left(\right.$ Givenh $=4.14 \times 10^{6} \mathrm{~ms}^{-1} \mathrm{eVs}$

$$
\left.c=3 \times 10^{8} m s^{-1}\right)
$$

$$
\begin{aligned}
& \text { A. }=6 \times 10^{5} \mathrm{~ms}^{-1} \\
& \text { B. }=0.6 \times 10^{6} \mathrm{~ms}^{-1} \\
& \text { C. }=61 \times 10^{3} \mathrm{~ms}^{-1} \\
& \text { D. }=0.3 \times 10^{6} \mathrm{~ms}^{-1}
\end{aligned}
$$

Answer: A::B

D Watch Video Solution
5. Radioactive material ' $A$ ' has decay constant
' $8 \lambda$ ' and material ' B ' has decay constant
'lamda'. Initial they have same number of nuclei. After what time, the ratio of number of nuclei of material 'B' to that 'A' will be $\frac{1}{e}$ ?

$$
\begin{aligned}
& \text { A. } \frac{1}{\lambda} \\
& \text { B. } \frac{1}{7 \lambda} \\
& \text { C. } \frac{1}{8 \lambda} \\
& \text { D. } \frac{1}{9 \lambda}
\end{aligned}
$$

## - Watch Video Solution

6. A 250 -turns recantagular coil of length 2.1
cm and width 1.25 cm carries a current of $85 \mu A$ and subjected to magnetic field of strength $0.85 T$. Work done for rotating the coil by $180^{\circ}$ against the torque is
A. $9.1 \mu \mathrm{~J}$
B. $4.55 \mu \mathrm{~J}$
C. $2.3 \mu \mathrm{~J}$

## D. $1.5 \mu J$

## Answer: A

## D Watch Video Solution

7. A long solenoid of diameter 0.1 m has
$2 \times 10^{4}$ turns per meter. At centre of the solenoid is 100 turns coil of radius 0.01 m
placed with its axis coinciding with solenoid axis. The current in the solenoid reduce at a constant rate to 0 A from 4 a in 0.05 s . If the
resistance of the coil is $10 \pi^{2} \Omega$, the total charge flowing through the coil during this time is
A. $32 \pi \mu C$
B. $16 \mu C$
C. $32 \mu C$
D. $16 \pi \mu c$

Answer: C

D Watch Video Solution
8. Suppose the charge of a proton and an electron differ slightly. One of them is ee and the other is $(e+\Delta e)$. If the net of between
force and gravitational force between two hydrogen atoms placed at a distance $d$ (much greater than atomic size) apart is zero, then
$\Delta e$ is of the other [Given mass of hydrogen,

$$
\left.m_{h}=1.67 \times 10^{-27} \mathrm{~kg}\right]
$$

A. $10^{-20} C$
B. $10^{-23} C$
C. $10^{-37} C$
D. $10^{-47} C$

## Answer: C

## D Watch Video Solution

## 9. The ratio of wavelength of the lest line of

## Balmer series and the last line Lyman series is:

A. 2
B. 1
C. 4

## D. 0.5

## Answer: C

## D Watch Video Solution

10. The de - Broglie wavelength of a neutron in
thermal equilibrium with heavy water at a temperature $T$ (kelvin) and mass $m$, is

$$
\begin{aligned}
& \text { A. } \frac{h}{\sqrt{m k T}} \\
& \text { B. } \frac{h}{\sqrt{3 m k T}}
\end{aligned}
$$

# C. $\frac{2 h}{\sqrt{3 m k T}}$ <br> D. $\frac{2 h}{\sqrt{m k T}}$ 

Answer: B

## D Watch Video Solution

11. A thin prism having refracting angle $10^{\circ}$ is made of glass of refracting index 1.42. This prism is combined with another thin prism of glass of refractive index 1.7. This combination
produces dispersion without deviation. The refracting angle of second prism should be :
A. $4^{\circ}$
B. $6^{\circ}$
C. $8^{\circ}$
D. $10^{\circ}$

Answer: B
( Watch Video Solution
12. Thermodynamic processes are indicated in
the following diagram


Match the following :

| Column-I |  | Column-II |
| :--- | :--- | :--- |
| P. Process I | a. Adiabatic |  |
| P. Process II | b. Isobaric |  |
| Process III | c. Isochoric |  |
| Process IV | d. | Isothermal |

A. $P \rightarrow a, Q \rightarrow c, R \rightarrow d, S \rightarrow b$

$$
\text { B. } P \rightarrow c, Q \rightarrow a, R \rightarrow d, S \rightarrow b
$$

C. $P \rightarrow c, Q \rightarrow d, R \rightarrow b, S \rightarrow a$

$$
\text { D. } P \rightarrow d, Q \rightarrow b, R \rightarrow a, S \rightarrow c
$$

## Answer: B

## D Watch Video Solution

13. A beam of light from a source $L$ is incident normally on a plane mirror fixed at a certain distance $x$ from the source. The beam is reflected back as a spot on a scale placed just
above the source $L$. When the mirror is rotated
through a small angle $\theta$ the spot of the light is
found to move through a distance $y$ on the scale. The angle $\theta$ is given by

> A. $\frac{y}{2 x}$
> B. $\frac{y}{x}$
> C. $\frac{x}{2 y}$
> D. $\frac{x}{y}$

Answer: A
14. An arrangment of three parallel staright wires placed perpendcular to plane of paper carrying same current $I$ along the same direction is shown in figure. Magnitude of force per unit length on the middle wire ' $B$ '
is given by

A. $\frac{\mu_{0} i^{2}}{2 \pi d}$
B. $\frac{2 \mu_{0} i^{2}}{\pi d} \frac{\mu_{0} i^{2}}{2 \pi d}$
C. $\frac{\sqrt{2 \mu}_{0} i^{2}}{\pi d}$
D. $\frac{\mu_{0} i^{2}}{\sqrt{2}(\pi d)}$

## Answer: D

## D Watch Video Solution

15. The ratio of resolving power of an optical microscope for two wavelength $\lambda_{1}=4000 \AA$ and $\lambda_{2}=6000 \AA$ is:
A. $8: 27$
B. 9: 4
C. $3: 2$
D. 16:81

## Answer: C

## D Watch Video Solution

16. A potentiometer is an accurate and versatile device to make electrical measurements of $E . M . F$. because the method involves
A. cells
B. potential gradients
C. a condition of no current flow through
the galvanometer
D. a combination of cells, galvanometer and resistances

Answer: C

- Watch Video Solution

17. The given electrical network is equivalent to

A. AND gate
B. OR gate
C. NOR gate
D. NOT gate

## Answer: C

## D Watch Video Solution

18. In a common emitter transistor transistor amplifier, the audio signal voltage across the collector is 3 V . The resistance of collector is $3 k \Omega$. If current gain is 100 and the base resistance is $2 k \Omega$, the voltage and power gain of the amplifier are
A. 200 and 1000
B. 15 and 200
C. 150 and 15000
D. 20 and 2000

## Answer: C

## D Watch Video Solution

19. Young's double slit experiment is first performed in air and then in a medium other than air. It is found than 8th bright fringe in the medium lies where 5th dark fringe lies in air. The refractive index of the medium is nearly
A. 1.25
B. 1.59
C. 1.69
D. 1.78

## Answer: D

## D Watch Video Solution

## 20. Which one of the following represents

## forward basis diode ?

A. (a) $\stackrel{\text { ov }}{\square} \quad m^{\text {R }}$
B. ${ }^{(0)} \xrightarrow{A V} \square n_{n}-3 v$
C. (c) $\stackrel{2 v}{\square} m^{i n}+2 v$
D. $(0) \xrightarrow{3 v} \longrightarrow$ min

## Answer: A

## D Watch Video Solution

21. Two Polaroids $P_{1}$ and $P_{2}$ are placed with
their axis perpendicular to eachother.

Unpolarised light $I_{0}$ is nicident on $P_{1}$. A third
polaroid $P_{3}$ is kept in between $P_{1}$ and $P_{2}$ such
that its axis makes an angle $45^{\circ}$ with that of
$P_{1}$. The intensity of transmitted light through
$P_{2}$ is

$$
\begin{aligned}
& \text { A. } \frac{I_{0}}{2} \\
& \text { B. } \frac{I_{0}}{4} \\
& \text { C. } \frac{I_{0}}{8} \\
& \text { D. } \frac{I_{0}}{16}
\end{aligned}
$$

Answer: C

- Watch Video Solution

22. In an electromagnetic wave in free space the root mean square value of the electric field is $E_{r m s}=6 \mathrm{~V} / \mathrm{m}$. The peak value of the magnetic field is
A. $1.41 \times 10^{-8} T$
B. $2.83 \times 10^{-8} T$
C. $0.70 \times 10^{-8} T$
D. $4.23 \times 10^{-8} T$

Answer: B
23. If $\theta_{1}$ and $\theta_{2}$ be the apparent angles of dip observed in two verticle planes at right angles
to each other, then the true angle of $\operatorname{dip} \theta$ is given by
A. $\cot ^{2} \theta=\cot ^{2} \theta_{1}+\cot ^{2} \theta_{2}$
B. $\tan ^{2} \theta=\tan ^{2} \theta_{1}+\tan ^{2} \theta_{2}$
C. $\cot ^{2} \theta=\cot ^{2} \theta_{1}-\cot ^{2} \theta_{2}$
D. $\tan ^{2} \theta=\tan ^{2} \theta_{1}-\tan ^{2} \theta_{2}$
24. The diagram below show regions of equipotential:

A positive chrages is moved from $A$ to $B$ in each diagram.

A. Maximum work is required to move $q$ in figure (iii)
B. In all the four cases, the work done is the
same
C. Minimum work is required to move $q$ in
figure (i)
D. Maximum work is required to move $q$ in
figure (ii)

## Answer: B

## Solved papers 2017(AIIMS)

1. An interference pattern is observed by

Young's double slit experiment.If now the separation between coherent source is halved and the distance of screen from coheren sources is doubled, then now fringe width
A. becomes double
B. becomes ne-fourth

## C. remains same

D. becomes four times

## Answer: D

## D Watch Video Solution

2. Two condensers, one of capacity $C$ and the other of capacity $C / 2$ are connected to a $V$
volt battery, as shown.


The work done in charging fully both the condensers is
A. $2 C V^{2}$
B. $\frac{3}{4} c V^{2}$
C. $\frac{1}{2} c V^{2}$
D. $\frac{1}{4} C V^{2}$

Answer: B

## D Watch Video Solution

3. A sereis R-C circuit is connected to AC voltage source. Consider two cases, (A) when C is without a dielectric medium and (B) when $C$ is filled with dielectric of constant 4. The current $I_{R}$ through the resistor and voltage $V_{c}$ across the capacitor are compared in the two cases. Which of the following is/ are true?
A. $I_{R}^{A}>I_{R}^{B}$
B. $I_{R}^{A}<I_{R}^{B}$
C. $V_{C}^{A}<V_{C}^{B}$
D. None of these

Answer: B

## D Watch Video Solution

4. A tube of sugar solution 20 cm long is placed between crossed nicols and illuminated with light of wavelength $6 \times 10^{-5} \mathrm{~cm}$ If the
optical rotation produced is $13^{\circ}$ and the specific rotation is $65^{\circ}$ determine the strength of the solution
A. $0.1 g /$
B. $0.2 g$ /
C. $0.9 \mathrm{~g} /$
D. $1.0 \mathrm{~g} /$

Answer: A

D Watch Video Solution
5. A long wire having a semi-circular loop of radius $r$ carries a current $I$, as shown in Fig.

Find the magnetic field due to entire wire.

A. $\frac{\mu_{0} I}{4 r}$
B. $\frac{\mu_{0} I^{2}}{4 r}$
C. $\frac{\mu_{0} I}{4 r^{2}}$
D. None of these

Answer: A

## D Watch Video Solution

6. A conductor lies along the $z$-axis at
$-1.5 \leq z \leq 1.5 \mathrm{~m}$ and carries a fixed current
of $1.0 A$ in $-\widehat{a}_{z}$ direction (see figure). For a
field $\quad \vec{B}=3.0 \times 10^{-4} e^{-0.2 x} \widehat{a}_{y} \quad \mathrm{~T}$, find the power required to move the conductor at constant speed to $x=2.0 m, y=m$ in
$5 \times 10^{-3} s$. Assume parallel motion along the
x-axis.

A. 1.57 W
B. 2.97 W
C. 4.45 W
D. 9.87 W
7. A lens of refractive index $n$ is put in a liquid of refractive index $n$ '. If focal length of lens in air is $f$, its focal length in liquid will be.

$$
\begin{aligned}
& \text { A. } \frac{-f \mu^{\prime}(\mu-1)}{\mu-\mu} \\
& \text { B. } \frac{-f(\mu-\mu)}{\mu(\mu-1)} \\
& \text { C. } \frac{\mu^{\prime}(\mu-1)}{f(\mu-\mu)} \\
& \text { D. } \frac{f\left(\mu^{\prime} \mu\right)}{\mu-\mu^{\prime}}
\end{aligned}
$$

8. A parallel plate capacitor has an electric field of $10^{5} \mathrm{~V} / \mathrm{m}$ between the plates. If the charge on the capacitor plate is $1 \mu C$, then force on each capacitor plate is-
A. 0.5 N
B. 0.05 N
C. 0.005 N
D. None of these

Answer: B

## - Watch Video Solution

## 9. In the given figure,the angle of reflection is


A. $30^{\circ}$
B. $60^{\circ}$
C. $45^{\circ}$

## D. None of these

## Answer: C

## D Watch Video Solution

10. The current of transistor in common
emitter mode is 49 . The change in collector
current and emitter current corresponding to
the change in the base current by $5.0 \mu \mathrm{Am}$ will be :-
A. $245 \mu A, 250 \mu A$
B. $240 \mu A, 235 \mu A$
C. $260 \mu A, 255 \mu A$
D. None of these

Answer: A

## - Watch Video Solution

11. A cylinder conductor $A B$ of non uniform area of cross-section carries a current of 5 A .

The radius of the conductor at one end $A$ is 0.5
cm . The current density at the other end of the conductor is half of the value at $A$. The radius of the conductor at the end $B$ is nearly
A. 1.4 cm
B. 0.7 cm
C. 0.6 cm
D. None of these

Answer: B

D Watch Video Solution
12. A nuclear explosion is designed to deliver $1 M W$ of heat energy, how many fission events must be required in a second to attain this power level. If this explosion is designed with a nuclear fuel consisting of uranium 235 to run a reactor at this power level for one year, then calculate the amount of fuel needed. You can assume that the calculate the amount of energy released per fission event is 200 MeV .

## A. 1 kg

## B. 0.01 kg

## C. 3.84 kg

D. 0.384 kg

## Answer: D

## D Watch Video Solution

13. A thin prism $P_{1}$ of angle $4^{\circ}$ and refractive index $1.54^{\circ} C$ is combined with another thin prism $P_{2}$ of refractive index 1.72 to produce dispersion without deviation. The angle of $P_{2}$ is
A. $4^{\circ}$
B. 5.33
C. $2.6^{\circ}$
D. $3^{\circ}$

## Answer: D

## D Watch Video Solution

14. The effective resistance between points $A$ and $C$ for the network shown figure is
A. $2 \omega$
B. $3 \omega$
C. $5 \omega$
D. $6 \omega$

Answer: B

## - Watch Video Solution

15. Charges $+q$ and $-q$ are placed at points $A$ and $B$ respectively which are a distance $2 L$ apart, $C$ is the midpoint between $A$ and $B$.

The work done in moving a charge $+Q$ along the semicircle $C R D$ is

A. $\frac{q Q}{4 \pi e_{0} L}$
B. $\frac{q Q}{2 \pi e_{0} L}$
C. $\frac{q Q}{6 \pi e_{0} L}$
D. $\frac{-q Q}{6 \pi e_{0} L}$

## Answer: D

## - Watch Video Solution

16. In the given figure, C is middle point of line $S_{1} S_{2}$.A monochromatic light of wavelength $\gamma$ is incident on slits.The ratio of intensites of
$S_{3}$ and $S_{4}$ is

$$
\left.\nmid \begin{aligned}
& s_{2} \\
& s_{1}
\end{aligned} \right\rvert\, s_{3}{ }^{\frac{\lambda}{2}}
$$

A. 0
B. $\infty$
C. $4: 1$
D. 1: 4

Answer: B
17. A simple telescope consisting of an objective of focal length 60 cm and a single eye lens of focal length 5 cm is focused on a distant object in such a way that parallel rays emerge from eye lens. If the object subtends an angle of $2^{\circ}$ at the objective, the angular width of the image is (Let $\tan \theta=\theta$ assuming $\theta$ small).
A. $10^{\circ}$
B. $24^{\circ}$
C. $50^{\circ}$
D. $\frac{1^{\circ}}{6}$

Answer: B

## D Watch Video Solution

18. A Specimen of silicon is to be made P-type semiconductor for this one atom of lindium, on an average, is doped in
$5 \times 10^{22} a \rightarrow m / m^{3}$ then the number of acceptor atoms per $\mathrm{cm}^{3}$ will be
A. $2.5 \times 10^{30}$
B. $1.0 \times 10^{13}$
C. $1.0 \times 10^{15}$
D. $2.5 \times 10^{36}$

## Answer: C

## D Watch Video Solution

19. The angle of dip if dip needleoscillating in vertical plane makes 40 oscillations per min in a magnetic meridian and 30 oscillations per
minute in vertical plane at right angle to the magnetic meridian is

$$
\begin{aligned}
& \text { A. } \theta=\sin ^{-1}(0.5625) \\
& \text { B. } \theta=\sin ^{-1}(0.325) \\
& \text { C. } \theta=\sin ^{-1}(0.425) \\
& \text { D. } \theta=\sin ^{-1}(0.235)
\end{aligned}
$$

Answer: A
20. If three uniform spheres, each having mass
$M$ and radius $R$, are kept in such a way that each touches the other two, the magnitude of the gravitational force on any sphere due to the other two is:
A. 14 V
B. 15 V
C. 18 V
D. 30 V

## - Watch Video Solution

21. The Young's experiment is performed with
the lights of blue $(\lambda=4360 \AA)$ and green colour $(\lambda=5460 \AA)$. If the distance of the 4 th fringe from the centre is $x$, then
A. $X_{\text {blue }}=X_{\text {green }}$
B. $X_{\text {blue }}>X_{\text {green }}$
C. $X_{\text {blue }}<X_{\text {green }}$
D. $X_{\text {blue }} / X_{\text {green }}$

## Answer: C

## - Watch Video Solution

22. Select the correct output $Y$

A. 1
B. 0
C. not predictable

## D. None of these

## Answer: A

## D Watch Video Solution

23. Assertion A beam of charged particles is
employed in the treatment of cancer

Reson Charged particles on passing through a material medium lose their energy by causing ionization of the atoms along their path.
A. Both assertin and reason are true and
reason is the correct explanation of assertion
B. Both assertion and reason are true but reason is not the correct explanation of assertion
C. Assertion is true but reason is flase

D. Both assertion and reason are false

## Answer: A

24. Assertion In He-Nelaser, population inversion takes place between energy levels of neon atoms.

Reason Helium atoms have a metastable energy level.
A. Both assertion and reason are true and
reason is the correct explanation of
assertion
B. Both assertion and reason are true but reason is not the correct explanation of

## assertion

C. Assertion is true but reason is flase
D. Both assertion and reason are false

## Answer: B

## - Watch Video Solution

25. Assertion The average value of alternating emf is $63.39 \%$ of the peak value .

Reason The rms value of alternating emf is $70.72 \%$ of peak value
A. Both assertin and reason are true and
reason is the correct explanation of
assertion
B. Both assertion and reason are true but
reason is not the correct explanation of assertion

# C. Assertion is true but reason is flase 

## D. Both assertion and reason are false

## Answer: B

## D Watch Video Solution

26. Assertion Photoelectric effect can take place only with an electron bound in the atom

Reason Electron is a fermion Whereas proton is a boson
A. Both assertin and reason are true and
reason is the correct explanation of assertion
B. Both assertion and reason are true but reason is not the correct explanation of assertion
C. Assertion is true but reason is flase

D. Both assertion and reason are false

## Answer: C

27. Assertion: Cyclotron does not accelerate.

Reason: Mass of the electron is very small.
A. Both assertin and reason are true and
reason is the correct explanation of
assertion
B. Both assertion and reason are true but
reason is not the correct explanation of assertion
C. Assertion is true but reason is flase

## D. Both assertion and reason are false

## Answer: A

## D Watch Video Solution

28. Assertion: The electric field due to dipole
on its axis line at a distance $r$ is $E$. Then
electric field due to the same dipole on the equatorial line and at the same distance will
be $\frac{E}{2}$

Reason: Electric field due to dipole varies inversely as the square of distance.
A. Both assertin and reason are true and reason is the correct explanation of assertion
B. Both assertion and reason are true but
reason is not the correct explanation of
assertion
C. Assertion is true but reason is flase
D. Both assertion and reason are false

## Answer: C

## D Watch Video Solution

29. Assertion A potentiometer is preferred over that of a voltmeter for measurement of emf of a cell

Reason potentiometer does not draw any current from the cell.
A. Both assertin and reason are true and
reason is the correct explanation of
B. Both assertion and reason are true but reason is not the correct explanation of assertion
C. Assertion is true but reason is flase
D. Both assertion and reason are false

Answer: A
( Watch Video Solution
30. Assetion The magnetism of magnet is due to the spin motion of electrons

Reason Dipole moment of electron is smaller than that due to orbit motion around nucleus.
A. Both assertin and reason are true and
reason is the correct explanation of
assertion
B. Both assertion and reason are true but
reason is not the correct explanation of assertion

# C. Assertion is true but reason is flase 

## D. Both assertion and reason are false

## Answer: C

## D View Text Solution

31. Assertion : The mirrorrs used in search lights are parabolic and not concave spherical.

Reason : In a concave spherical mirrorr the image formed is always virtual.
A. Both assertin and reason are true and
reason is the correct explanation of assertion
B. Both assertion and reason are true but reason is not the correct explanation of assertion
C. Assertion is true but reason is flase

D. Both assertion and reason are false

## Answer: C

32. Assertion : Corpuscular theory fails to explain the velocities of light in air and water. Reason : According to corpuscular theory, light should travel faster in denser media than in rarer media.
a.Both assertin and reason are true and reason is the correct explanation of assertion b.Both assertion and reason are true but reason is not the correct explanation of assertion
c.Assertion is true but reason is flase
d.Both assertion and reason are false
A. Both assertin and reason are true and
reason is the correct explanation of
assertion
B. Both assertion and reason are true but
reason is not the correct explanation of
assertion
C. Assertion is true but reason is flase
D. Both assertion and reason are false

Answer: A

## - Watch Video Solution

33. Assetion In $\alpha$-decay atomic number of daughter nucleus reduces by 2 units from the parent nucleus.

Reason An $\alpha$ particle carries four units of mass.
A. Both assertin and reason are true and
reason is the correct explanation of
B. Both assertion and reason are true but reason is not the correct explanation of assertion
C. Assertion is true but reason is flase
D. Both assertion and reason are false

Answer: A
( Watch Video Solution
34. Assertion angle of deviation depends on
the angle of prism.
Reason For thin prism $=(\mu-1) A$
Where =angle of deviation
`mu=refractive index, $A=$ angle of prism
A. Both assertin and reason are true and
reason is the correct explanation of
assertion
B. Both assertion and reason are true but
reason is not the correct explanation of
C. Assertion is true but reason is flase

## D. Both assertion and reason are false

## Answer: A

## D Watch Video Solution

## Solved papers 2017(JIPMER)

1. A long solonoid carrying a current produces
a magnetic field along its axis. If the current is
doubled and the number of turns per cm is
halved, the new value of the magnetic field is
A. Wire should be multiple of 5 d
B. Wire should be multiple of $d / 3$
C. Wire is independent of $d$
D. Can 't say

Answer: C

## D Watch Video Solution

2. A long straight wire is carrying current I in +
$z$ direction .The $x-y$ plane contains a closed circular loop carrying current $I_{2}$ and not encircling the straight wire.The force on the loop will be
A. $\mu_{0} l_{1} l_{0} / 2 \pi$
B. $\mu_{0} l_{1} l_{0} / 4 \pi$
C. zero
D. depends on the distacne of the centre of
the loop from the wire

## Answer: D

## D Watch Video Solution

3. Two long parallel conducting horizontal rails are connected by a conducting wire at one end. A uniform magnetic field $B$ (directed vertically downwards) exists in the region of space.


A light uniform ring of diameter d which is practically equal to separation between the rails is placed over the rails as shown in Fig. If resistance of ring be $(\lambda)$ per unit length

The force required to pull the ring with uniform velocity $v$ is

$$
\begin{aligned}
& \text { A. } 83^{X \wedge}(214) \\
& \text { B. } 84^{X \wedge}(218) \\
& \text { C. } 84^{X \wedge}(220) \\
& \text { D. } 87^{X \wedge}(223)
\end{aligned}
$$

4. Two uniform spheres $A$ (Hollow) and $B$
(solid) of same radius R (

$$
\begin{aligned}
& \text { A. } \frac{r}{(N R)^{3 / 2}} \\
& \text { B. }\left(N \frac{R}{r}\right)^{1 / 2} \\
& \text { C. }(N R r)^{3 / 2} \\
& \text { D. }(N R r)^{1 / 2}
\end{aligned}
$$

Answer: B
5. Radioactiv edecay will occur as follows

| 220 | 216 |
| :---: | :---: |
| $86 R n \rightarrow$ | $84 \mathrm{PO}+2 \mathrm{He}$ Half life =55s |
|  | 2124 |
| 84 Poarr | $r 82 \mathrm{~Pb}+2 \mathrm{He}$ Half life =0.66s |
|  | 212 |

If a certain mass of radon $(\mathrm{Rn}=220)$ is allowed
to decay in a certain container,then after 5
minutes the element with the greater mass
will be
A. radon

## B. polonium

C. lead
D. bismuth

## Answer: C

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6. White light is used to illuminate the two slits in a Young's double slit experiment. The separation between the slits is $b$ and the screen is at a distance $d(\gg b)$ from the
slits At a point on the screen directly in front of one of the slits, certain wavelengths are missing some of these missing wavelengths are

$$
\begin{aligned}
& \text { A. } \frac{b}{d}, \frac{b}{3 d}, \frac{b}{5 d} \\
& \text { B. } \frac{b^{2}}{2 d} \cdot \frac{b^{2}}{4 d},\left(b^{2}\right),(6 d) \\
& \text { C. } \frac{b^{2}}{d} \cdot \frac{b^{2}}{3 d},\left(b^{2}\right),(5 d) \\
& \text { D. } \frac{b}{2 d}, \frac{b}{4 d}, \frac{b}{6 d}
\end{aligned}
$$

## Answer: C

7. A double convex lens of refractive index $m_{1}$
is immersed in a liquid of refractive index $m_{2}$.

This lens will act as:
A. a convex lens
B. a concave lens
C. a glass plate
D. a convexo concave lens

Answer: C

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8. The wavelenths $\gamma$ of a photon and the deBroglie wavelength of an electron have the same value.Find the ratio of energy of photon to the kinetic energy of electron in terms of mass m , speed of light and planck constatn
A. $\frac{\gamma m c}{h}$
B. $\frac{h m c}{\gamma}$
C. $\frac{2 h m c}{\gamma}$
D. $\frac{2 \gamma m c}{h}$

## Answer: D

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9. A non-conducting ring of radius $0.5 m$ carries a total charge of $1.11 \times 10^{-10} \mathrm{C}$ distributed non-uniformly on its circumference producing an electric field E everywhere is space. The value of the integral
$\int_{l=\infty}^{l=0}-E . d I(l=0$ being centre of the ring $)$ in volt is
A. +2
B. -1
C. '-2
D. Zero

Answer: a

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10. A nucleus $\cdot{ }_{Z}^{A} X$ has mass represented by $m(A, Z)$. If $m_{p}$ and $m_{n}$ denote the mass of
proton and neutron respectively and $B E$ the blinding energy (in MeV ), then
A.

$$
B E=\left[m(A, Z)-Z m_{p}-(A-Z) m_{n}\right] C^{2}
$$

B.

$$
\begin{aligned}
& \quad B E=\left[Z m_{p}+(A-Z) m_{n}-m(A, Z) C^{2}\right. \\
& \text { C. } B E=\left[Z m_{p}+A m_{n}-m(A, Z)\right] C^{2} \\
& \text { D. } B E=m(A, Z)-Z m_{p}-(A-Z) m_{N}
\end{aligned}
$$

## Answer: b

11. A certain charge $Q$ is divided into two parts
(q) an $(Q-q)$. Later on the charges are placed at a certain distance. If the force of interaction between the charges is maximum then
A. $Q=2 q$
B. $Q=3 q$
C. $Q=4 q$
D. $Q=4 q+c$

## Answer: a

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12. A charged particle $q$ is shot from a large distance towards another charged particle $Q$ which is fixed, with speed v. It approaches Q up to as closed distance $r$ and then returns. If $q$ were given a speed 2 v , the distasnce of approach would be

A. $r$
B. $2 r$
C. $r / 2$
D. $r / 4$

Answer: d

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13. Draw a ray diagram to illustrate how a ray of light incident obliquely on one face of a
rectangular glass slab of uniform thickness emerges.
A. two points propagating in two different non-parallel directions
B. two points propagating in two different parallel directions
C. one point propagating in two different
directions
D. one point propagating in the same direction.

Answer: b

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14. A plano-convex lens is made of glass of refractive index 1.5. The radius of curvature of its convex surface is R. Its focal length is
A. $\mu R$
B. $R^{2} / \mu$
C. $R /(\mu-1)$
D. $(\mu+1) /(\mu-1) R$

## Answer: c

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15. The maximum number of possible
interference maxima for slit-separation equal
to twice the wavelength in Young's double-slit experiment is
A. infinite
B. five
C. three

D. zero

## Answer: b

## D Watch Video Solution

16. A student is studying a book placed near
the edge of a circular table of radius R. A point source of light is suspended directly above the centre of the table. What should be the height of the source above the table so as to produce
maximum illuminance at the position of the book?
A. $1+\left(\frac{r^{2}}{h^{2}}\right)$
B. $1+\left(\frac{h^{2}}{r^{2}}\right)$
C. $\left\{1+\frac{r^{2}}{h^{2}}\right\}^{3 / 2}$
D. $\left\{1+\frac{r^{2}}{h^{2}}\right\}^{3 / 2}$

Answer: c
( Watch Video Solution
17. In the figure, what is the magnetic, what is
the magnetic field at the point $O$ ?

> A. $\frac{\mu_{0} l}{4 \pi r}$
> B. $\frac{\mu_{0} l}{4 r}+\frac{\mu_{0} l}{2 \pi r}$
> C. $\frac{\mu_{0} l}{4 r}+\frac{\mu_{0} l}{4 \pi r}$
> D. $\frac{\mu_{0} l}{4 r}-\frac{\mu_{0} l}{4 \pi r}$

Answer: c

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18. The half - line period a radioactive element
$X$ is same as the mean life time of another
radioactive element $Y$. Initially both of them have the same number of atoms. Then:
$A . X$ and $Y$ have the same decay rate initially
B. $X$ and $Y$ decay at the same rate always
C. $Y$ will decay at a faster rate than $X$
D. $X$ will decay at a faster rate than $Y$

## Answer: c

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19.

The distance between a convex lens and a plane mirror is 10 cm . The parallel rays incident on the convex lens after reflection
from the mirror forms image at the optical centre of the lens. Focal length of lens will be
A. $(1 / 4)$ fold 3
B. $(3 / 4)$ fold
C. $(5 / 54)$ fold
D. $(9 / 4)$ fold

Answer: d

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The following circuit represents:
A. OR gate
B. OR gate
C. AND gate
D. NAND gate

Answer: b
21. Two identical conductiing balls $A$ and $B$ have positive charges $q_{12}$ and $q_{2}$ respectively.

But $q_{1} \neq q_{2}$. The balls are brought together so
that they touchj each each other and then kept in their original positions .The force between them is
A. less than that before the balls touched
B. greater than that before the balls
C. Same as that before the balls touched
D. zero

## Answer: b

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22. A positively charged ball hangs from a long
silk thread. Electric filed at a certain point (at
the same horizontal level of ball) due to this
charge is E . Let us put a positive test charge $q_{0}$
at this point and measure $F / q_{0}$ on this charges. then E
A. $>F / q_{0}$
B. $=F / q$
C. $<F / q_{0}$
D. cannot be estimated

Answer: a
( Watch Video Solution
23. A capacitor $C_{1}$ of capacitance $1 \mu F$ and a capacitor $C_{2}$ of capacitance $2 \mu F$ are separately charged by a common battery for a long time. The two capacitors are then separately discharged through equal resistors. Both the discharge circuits are connected at $t=0$.
A. the current in each of the two discharging circuits is zero at $\mathrm{t}=0$
B. the currents in the two dischrging circuits at $\mathrm{t}=0$ are equal but non-zero
C. the currents in the two discharging circuits at $\mathrm{t}=0$
D. Capacitor $C_{1}$ loses $40 \%$ of initial charge

Answer: b

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24. A uniform electric field and a uniform magnetic field are acting along the same direction in a certain region. If an electron is projected along the direction of the fields with a certain velocity then
A. it will turn towards left of direction of motion
B. it will turn towards right of directin of
motion
C. its velocity will increase

## D. its velocity will decrease

## Answer: d

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25. To reduce the range of voltmeter, its resistance need to be reduced.A voltmeter has resistance $R_{0}$ and range V . Which of the following resistance when connectyed in parallel will convert it into a voltmeter of range $\mathrm{V} / / \mathrm{n}$ ?
A. $n R_{0}$
B. $(n+1) r_{0}$
C. $(n-1) R$
D. 'None of these

Answer: d

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26. The mass of a proton is 1847 times that of an electron $A$ electron and a proton are injected into a unifrom electric field at right
angle to the direction of the field with the same initial K.E.
A. the electron trajectory will be les Icurved
than the proton trajectory.
B. both the trajectories will be straight
C. the proton trajectory will be less curved
than the electron trajectroy
D. both the trajectories will be equally
curved
27. Two condensers, one of capacity $C$ and the other of capacity $C / 2$ are connected to a $V$ volt battery, as shown.


The work done in charging fully both the condensers is
A. $C V^{2}$
B. $\frac{1}{4} C V^{2}$
C. $\frac{3}{4} C V^{2}$
D. $\frac{1}{2} C V^{2}$

## Answer: c

## D Watch Video Solution

28. A capacitor of capacitaance $5 \mu F$ is connected as shown in the figure.The internal resistane of the cvell is $0.5 \omega$ The amount of
charge on the cap[acitor plates is

A. $80 \mu C$
B. $40 \mu C$
C. $20 \mu C$
D. $10 \mu C$

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29. A photo cell is illuminated by a small bright source placed 1 m away When the same source of light is placed 2 m away, the electrons emitted by photo cathode
A. carry one quarter of their previous energy
B. carry one quarter of their previous

## C. are half as numerous

D. are one quarter as numerous

## Answer: d

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30. $A B C$ is a triangular plate of uniform $A$ thickness. The sides are in the ratio shown in the figure. $I_{A B}, I_{B C}, I_{C A}$ are the moments of inertia of the plated about $A B, B C$ and $C A$ respectively. Which one of the following
relation is correct?

A. $l_{1}=I_{2}=l_{3}$
B. $l_{2}>l_{1}>l_{3}$
C. $l_{3}<l_{2}<l_{1}$

## D. $l_{3}>l_{1}>l_{2}$

## Answer: b

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31. The electric potential between a proton and an electron is given by $V=V_{0} \operatorname{In} \frac{r}{r_{0}}$ where $r_{0}$ is a constant . Assuming Bohr's model to be applicable, write a variation of $r_{n}$ with $n, n$ being the principal quantum number.
A. $r_{n} \infty n$
B. $r_{n} 1 / \infty n$
C. $r_{n} \infty n^{2}$
D. $r_{n} 1 / n^{2}$

## Answer: a

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32. You are given resistacne wire of length 50 cm and a battery of negligible resistacne In which of the folowing cases is larges amount of heat generated?
A. When the wire is connected to the battery directly
B. When the wire is divided into two parts
and both the parts are connected to the battery oin parallel
C. When the wire is divided into four parts
and all the four parts are connected to
the battery in parallel
D. When only hjalf of the wire is connected
to the battery

Answer: c

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