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India's Number 1 Education App

## PHYSICS

## NTA MOCK TESTS ENGLISH

## NTA NEET SET 74

Physics

1. Tritium with $a$ half-life of 12.5 years
undergoing beta decay. What fraction of a
sample of pure tritium will remain undecayed after 25 years.
A. One half
B. One fourth
C. One third

D. Three fourth

Answer: B
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2. As an electron makes a transition from an excited state to the ground state of a hydrogen - like atom/ion :
A. Kinetic energy decrease , potential
energy increase but total energy
remains same
B. Kinetic energy and total energy decrease
but potential energy increases
C. Its kinetic energy increase but potential
energy and total decrease

# D. Kinetic energy , potential energy and 

 total energy decrease
## Answer: C

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3. A curved road of diameter 1.8 km is banked
so that no friction is required at a speed of 30
$m s^{-1}$. What is the banking angle ?
A. $\tan ^{-1}(0.1)$
B. $\tan ^{-1}(0.3)$
C. $\tan ^{-1}(0.9)$
D. $\tan ^{-1}(1.5)$

Answer: A

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4. The linear momentum of a particle varies
with time t as $p=a+b t+c t^{2}$. Then, whichh of the following is correct?
A. Force varies with time in a quadratic

## manner

B. Force is time - dependent
C. The velocity of the particle is
proportional to time
D. The displacement of the particle is proportional to time.

## Answer: B

5. Two buses $A$ and $B$ are moving around concentric circular pathe of radii $r_{A}$ and $r_{B}$ If the two buses complete the circular paths in the sme time. The ratio on their linear speeds is
A. 1
B. $\frac{r_{A}}{r_{B}}$
C. $\frac{r_{B}}{r_{A}}$
D. None of these

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6. A flywheel rotates about a fixed axis and slows down from 300 rpm to 100 rpm in 2 minutes (i) What is the angular acceleration in rad $\min ^{-2}$ ? (ii) How many revolutions does the wheel complete during this time?

$$
\text { A. } \frac{100}{\pi}
$$

B. 100
C. $100 \pi$

D. $200 \pi$

## Answer: D

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7. A silver wire has a temperature coefficient of resistivity $4 \times 10^{-3} .{ }^{\circ} C^{-1}$ and its resistance at $20^{\circ} \mathrm{C}$ is $10 \Omega$ Neglecting any change in dimensions due to the change in temperature , its resistance at $40^{\circ} C$ is
A. $0.8 \Omega$
B. $1.8 \Omega$
C. $10.8 \Omega$
D. $11.6 \Omega$

## Answer: C

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## 8. The resistance of metal sheet 1 between the

shaded portion is $R_{1}$ and Resistance between
shaded portion for sheet $2 R_{2}$ the $R_{1} / R_{2}$ is

A. 1
B. $1 / 2$
C. 2
D. 4

Answer: A

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9. A circular disc of radius $0.2 m$ is placed in a uniform magnetic fied of induction $\frac{1}{\pi}\left(\frac{W b}{m^{2}}\right)$
in such a way that its axis makes an angle of $60^{\circ}$ with $B$. The magnetic flux linked with the disc is
A. 0.08 Wb
B. 0.01 Wb
C. 0.02 Wb
D. 0.06 Wb

## Answer: C

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10. In an AC circuit, the instantaneous values
of emf and current are $E=200 \sin (300 t) V$
and $I=2 \sin \left(300 t+\frac{\pi}{3}\right) A$ respectively. The average power consumed (in watt) is
A. 200
B. 100
C. 50

## D. 400

## Answer: B

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11. A charge $Q$ is distributed over two concentric conducting thin spherical shells radii r and $\mathrm{R}(R>1)$. If the surface charge densities on the two shells are equal, the
electric potential at the common centre is:


Answer: B

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12. Two identical capacitors have the same capacitance $C$. one of them is charged to potential $V_{1}$ and the other to $V_{2}$. The negative ends of the capacitors are connected together. What the positive eneds are also connected, the decrease in neergy of the combine system is
A. $\frac{C}{4}\left(V_{1}^{2}-V_{2}^{2}\right)$
B. $\frac{C}{4}\left(V_{1}^{2}+V_{2}^{2}\right)$
C. $\frac{C}{4}\left(V_{1}-V_{2}\right)^{2}$
D. $\frac{C}{4}\left(V_{1}+V_{2}\right)^{2}$

## Answer: C

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13. A body of mass $m$ is placed on the earth's surface. It is taken from the earth's surface to
a height $h=3 R$ where $R$ is the radius of the
earth. The change in gravitational potential energy of the body is

$$
\begin{aligned}
& \text { A. } \frac{3}{2} m g R \\
& \text { B. } \frac{3}{4} m g R \\
& \text { C. } \frac{1}{2} m g R \\
& \text { D. } \frac{1}{4} m g R
\end{aligned}
$$

## Answer: B

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14. Two planets $A$ and $B$ have the same average density. Their radii $R_{A}$ and $R_{B}$ are such that
$R_{A}: R_{B}=3: 1$. If $g_{A}$ and $g_{B}$ are the acceleration due to gravity at the surface of the planets, the $g_{A}: g_{B}$ equals
A. $3: 1$
B. $1: 3$
C. 1:9
D. $\sqrt{3}: 1$

## $50^{\circ} \mathrm{C}$

15. 

Three rods of the same dimension have thermal conductivity $3 \mathrm{~K}, 2 \mathrm{~K}$ and K . They are arranged as shown in the figure below

Then, the temperature of the junction in steady - state is
A. $\frac{200}{3^{\circ}} C$
B. $\frac{100}{3^{\circ}} C$
C. $75^{\circ} C$
D. $\frac{50}{3^{\circ}} C$

Answer: A

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16. A gas expands with temperature according
to the relation $V=K T^{\frac{2}{3}}$. Work done when
the temperature changes by 60 K is.
A. 10R
B. 30 R
C. 40 R
D. 20 R

Answer: C

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17. An ideal gas is taken through the cycle
$A \rightarrow B \rightarrow C \rightarrow A$ as shown in the figure. If
the net heat supplied to the gas in the cycle is

5 J , the work done by the gas in the process
$C \rightarrow A$ is

A. $-5 J$
B. $-10 J$
C. $-15 J$
D. $-20 J$

Answer: A

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18. One mole of an ideal monatomic gas at temperature $T_{0}$ ecpands slowly according to
the law $\frac{P}{V}=$ constant. If the final temperature is $2 T_{0}$, heat supplied to the gas is
A. $2 R T_{0}$
B. $R T_{0}$
C. $\frac{3}{2} R T_{0}$

## D. $\frac{1}{2} R T_{0}$

## Answer: A

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19. $\mathrm{H}^{+}, \mathrm{He}^{+}$and $\mathrm{O}^{2+}$ ions having same
kinetic energy pass through a region of space
filled with uniform magnetic field B directed perpendicular to the velocity of ions. The masses of the ions
$\mathrm{H}^{+}, \mathrm{He}^{+}$and $\mathrm{O}^{2+}$ are respectively, in the ratio $1: 4$ : 16 . As a result
A. $H^{+}$will be least deflected.
B. $H^{+}$and $O^{+2}$ will be deflected equally.
C. $O^{+2}$ will be deflected most.
D. All will be deflected equally.

Answer: B

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20. A bar mangnet has length 3 cm cross sectional area $2 \mathrm{~cm}^{2}$ and magnetic moment 3
$A m^{2}$ the intensity of magnetisation of the bar magnet is
A. $2 \times 10^{5} \mathrm{Am}^{-1}$
B. $3 \times 10^{5} \mathrm{Am}^{-1}$
C. $4 \times 10^{5} \mathrm{Am}^{-1}$
D. $5 \times 10^{5} \mathrm{Am}^{-1}$

## Answer: D

21. A particle shows distance-time curve as given in this figure. The maximum instantaneous velocity of the particle is around the point.

(a) $B$ (b) C (c) D (d) A
A. D
B. A
C. B
D. C

## Answer: D

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22. A bomb is dropped from an aeroplane
flying horizontally with a velocity $469 \mathrm{~ms}^{-1}$ at
an altitude of 980 m . The bomb will hit the ground after a time ( use $g=9.8 m s^{-2}$ )
A. 2 s
B. $\sqrt{2} s$
C. $5 \sqrt{2} s$
D. $10 \sqrt{2} s$

Answer: D
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23. A block of mass kg lies on a horizontal
surface in a truckÂ. The coefficient of stalk friction between the block and the surface is 0.6. If the acceleration of the truck is $5 m s^{-2}$.

The frictional force acting on the block is
A. 5 N
B. 2.5 N
C. 5.88 N
D. 9.8 N

Answer: A

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24. Two masses $A$ and $B$ of 10 kg and 5 kg , respectively, are connected with a string passing over a frictionless pulley fixed at the corner of a table as shown. The coefficient of static friction between $A$ and the table is 0.2 .

The minimum mass $C$ that should be placed
on $A$ to prevent it from moving is equal to

A. 15 kg
B. 5 kg
C. 10 kg
D. 0 kg

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25. A sample contains large number of nuclei.

The probability that a nucleus in sample will decay after four half lives is
A. $\frac{1}{4}$
B. $\frac{3}{4}$
C. $\frac{15}{16}$
D. $\frac{7}{16}$

Answer: C

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26. A $0.2 m L$ sample of a solution containing $1.0 \times 10^{-7}$ curie of.${ }_{1}^{3} H$ is injected to the blood stream of an animal. After sufficient
time for circulatory equilibrium to be established, 0.10 mL of blood is found to have an activity of 20 dpm . Calculate the volume of blood in animal, assuming no change in
activity of sample during circulatory equilibrium.
A. 11110 mL
B. 1110 mL
C. 11010 mL
D. 10110 mL

Answer: B
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27. Two springs with negligible massess and
force constant of $k_{1}=200 \mathrm{Nm}^{-1}$ and
$k_{2}=160 \mathrm{Nm}^{-1}$ are attached to the block of
mass $m=10 \mathrm{~kg}$ as shown in the figure. Initially
the block is at rest at the equilibrium position
the block is at rest at the equilibrium position
ir. Which both springs are neither stretched
nor compressed. At time $t=0$, sharp impulse
of 50 N -s is given to the block in horizontal

## direction.


A. Period of oscillations for the mass $m$ is
$\frac{\pi}{6}$ s
B. Maximum velocity of the mass $m$ during
its oscillation is $10 \mathrm{~ms}^{-1}$
C. Data are insufficient to determine maximum velocity

## Answer: D

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28. Light of two different frequencies whose photons have energies $1 e v$ and 2.5 eV whose work frequency is 0.5 eV successively, Ratio of maximum speeds of emitted electrons will be
A. $1: 4$
B. 1:2
C. 1:1

## D. $1: 5$

## Answer: B

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29. The de-Broglie wavelength of neutron in
thermal equilibrium at temperature T is

$$
\begin{aligned}
& \text { A. } \frac{30.8}{\sqrt{T}} \AA \\
& \text { B. } \frac{0.308}{T} \AA \\
& \text { C. } \frac{0.025}{\sqrt{T}} \AA
\end{aligned}
$$

## D. $\frac{0.25}{\sqrt{T}} \AA$

## Answer: A

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30. A rain drop of radius 0.3 mm has a terminal
velocity I air $1 \mathrm{~ms}^{-1}$. The viscosity of air is
$18 \times 10^{-5}$ poise.Find the viscous force on the rain drops.
A. $101.73 \times 10^{-4}$ dyne
B. $101.73 \times 10^{5}$ dyne
C. $16.95 \times 10^{-4}$ dyne
D. $16.95 \times 10^{-5}$ dyne

Answer: A

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31. Two metal wires $P$ and $Q$ of same length and material are stretched by same load. Yheir masses are in the ratio $m_{1}: m_{2}$. The ratio of elongation of wire $P$ to that of $Q$ is
A. $m_{1}^{2}: m_{2}^{2}$
B. $m_{2}^{2}: m_{1}^{2}$
C. $m_{2}: m_{1}$
D. $m_{1}: m_{2}$

## Answer: C

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32. The distance between an object and the screen is 100 cm . A lens produces an image on
the screen when the lens is placed at either of
the positions 40 cm apart. The power of the lens is nearly
A. 3 D
B. 5 D
C. 7 D
D. 9 D

Answer: B
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33. A biconvex lens of focal length forms a circular image of radius $r$ of sun is focal plane.

Then, which option is correct?
A. $\pi r^{2} \propto f$
B. $\pi r^{2} \propto f^{2}$
C. If lower half part is covered by black
sheet, then area of the image is equal to

$$
\frac{\pi r^{2}}{2}
$$

D. If f is doubled, intensity will increase

Answer: B

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34. A rigid body is made of three identical thin
rods, each with length fastened together in
the form. of letter $H$. The body is free to rotate about a horizontal axis that runs along
the length of one of the arms of $H$. The body
is allowed to fall from rest from a position in
which the plane of the $H$ is horizontal. What is
the angular speed of the body when the plane
of $H$ is vertical?

A. $\sqrt{\frac{g}{L}}$
B. $\frac{1}{2} \sqrt{\frac{g}{L}}$
C. $\frac{3}{2} \sqrt{\frac{g}{L}}$
D. $2 \sqrt{\frac{g}{L}}$

## Answer: C

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35. The coefficient of friction between the two two blocks is 0.3 where as the surface $A B$ is smooth

A. Friction will act in the forward direction
B. Friction will act in the backward direction
C. Frictional force will not act
D. Frictional force will be $\mu M g$

## Answer: C

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36. A p-n junction in series with a resistance of
$5 k \Omega$ is connected across a 50 V DC source . If
the forward bias resistance of the junction is
$50 \Omega$, the forward bias current is
A. 1 mA
B. 2 mA
C. 20 mA
D. 9.9 mA

## Answer: D

37. Given the following truth table where A, B are inputs and $Y$ the output:
$A \quad B \quad Y$
$\begin{array}{lll}0 & 0 & 1\end{array}$
$1 \quad 0 \quad 1$
$\begin{array}{lll}0 & 1 & 1\end{array}$
110
The output Y is :
A. $A \bar{B}$
B. $\bar{A} B$
C. $A B$

## D. $\overline{A B}$

## Answer: D

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38. A steel wire, of uniform area $2 m m^{2}$, is heated up to $50^{\circ} \mathrm{C}$ and is stretched by tying
its ends rigidly. The change in tension, when
the temperature falls from $50^{\circ} \mathrm{C}$ to $30^{\circ} \mathrm{C}$ is
(Take
$\left.Y=2 \times 10^{11} \mathrm{Nm}^{-2}, \alpha=1.1 \times 10^{-5^{\circ} \mathrm{C}-1}\right)$
A. $1.5 \times 10^{10} N$
B. 5 N
C. 88 N
D. $2.5 \times 10^{-10} N$

Answer: C

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39. Select the dimensional formula of $\frac{B^{2}}{2 \mu 0}$
A. $\left[M^{1} L^{1} T^{2}\right]$

> B. $\left[M^{-1} L^{1} T^{2}\right]$
> C. $\left[M^{-1} L^{-1} T^{-2}\right]$
> D. $\left[M^{1} L^{-1} T^{-2}\right]$

## Answer: D

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40. If $\theta$ is the polarising angle for two optical media whose critical angles are $C_{1}$ and $C_{2}$, then the correct relation is

> A. $\sin \theta=\frac{\sin C_{2}}{\sin C_{1}}$
> B. $\theta=\frac{\sin C_{2}}{\sin C_{1}}$
> C. $\tan \theta=\frac{\sin C_{1}}{\sin C_{2}}$
> D. $\sin \theta=\frac{\sin C_{1}}{\sin C_{2}}$

## Answer: C

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41. At the first minimum adjacent to the central maximum of a single-slit diffraction pattern, the phase difference betwee the
huygen's wavelet from the edge of the slit and
the wavelet from the midpoint of the slit is:
A. $\frac{\pi}{2} \mathrm{rad}$
B. $\pi r a d$
C. $\frac{\pi}{8} r a d$
D. $\frac{\pi}{4} \mathrm{rad}$

Answer: B

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42. An object of specific gravity $\rho$ is hung from a thin steel wire. The fundamental frequency for transverse standing waves in the wire is 300 Hz . The object is immersed in water, so that one half of its volume is submerged. The new fundamental frequency (in Hz ) is
(a) $300\left(\frac{2 \rho-1}{2 \rho}\right)^{\frac{1}{2}}$
(b) $300\left(\frac{2 \rho}{2 \rho-1}\right)^{\frac{1}{2}}$
(c) $300\left(\frac{2 \rho}{2 \rho-1}\right)$
(d) $300\left(\frac{2 \rho-1}{2 \rho}\right)$
A. $300\left(\frac{2 \rho-1}{2 \rho}\right)^{\frac{1}{2}}$
B. $300\left(\frac{2 \rho}{2 \rho-1}\right)^{\frac{1}{2}}$
C. $300\left(\frac{2 \rho}{2 \rho-1}\right)$
D. $300\left(\frac{2 \rho-1}{2 \rho}\right)$

Answer: A

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43. Two sound waves of wavelength $1 m$ and
$1.01 m$ in a gas produce 10 beats in 3 s . The
velocity of sound in the gas is
A. $150 m s^{-1}$
B. $115.2 m s^{-1}$
C. $336.6 m s^{-1}$
D. $200 m s^{-1}$

Answer: C
44. A uniform chain of length $2 m$ is kept on a table such that a length of 60 cm hangs freely from the edge of the table. The total mass of the chain is $4 k g$ What is the work done in pulling the entire the chain the on the table?
A. 7.2 J
B. 3.6 J
C. 120 J
D. 1200 J

Answer: B

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