KIPS | ENTRY TESTS PREPARATION

PHYSICS MDCAT

UNIT–1 (A-SERIES)

TOPICS:

✓ **Force and Motion**

Q.1 **The coefficient of restitution for a perfectly elastic collision is**

A. 1 B. 0
C. ∞ D. –1

Q.2 **If car and truck move with same velocity and we applied same force on both which body comes rest first**

A. Car B. Truck
C. Both D. None

Q.3 **SI unit of acceleration is_____**

A. m B. m^2
C. m/s D. m/s^2

Q.4 **Acceleration of object which starts rest to reach 20 m/s in 10 sec is**

A. $2m/s^2$ B. $10m/s^2$
C. $1 m/s^2$ D. $2m.s^2$

Q.5 **A horizontal line in displacement-time graph represents_____**

A. Uniform accelerated motion B. Motion with constant velocity
C. Motion with constant speed D. Body at rest

Q.6 **The slope of velocity-time graph represents**

A. Displacement B. Acceleration
C. Force D. Momentum

Q.7 **The speed of object in particular direction is called**

A. Velocity B. Acceleration
C. Force D. Momentum

Q.8 **Acceleration of a moving train when it start its motion is:**

A. Negative B. Zero
C. Positive D. Infinite

Q.9 **The displacement has:**

A. Magnitude only B. Direction only
C. Magnitude and direction D. No unit

Q.10 **Displacement and distance moved by an object in a straight path is**

A. Zero B. Same
C. Different D. All of these

Q.11 **A ball is dropped from a height 10m. The ball is embedded in sand 1m and stops, then**

A. Only momentum remains conserved B. Only kinetic energy remains conserved
C. Both momentum and K.E are conserved D. Neither K.E nor momentum is conserved

Q.12 **A beetle crawls 2 cm/minute for ten minutes. How far did it crawl?**

A. 8 centimeters B. 20 centimeters
C. 5 centimeters D. 0.20 centimeters

Q.13 **A person can throw a stone to maximum distance of 80m the greatest height to which he can throw the stone is**

A. 100 m B. 50 m
C. 80 m D. 20 m

Q.14 **At the top of trajectory in projectile motion angle between velocity and acceleration is**

A. 90° B. 60°
C. 0° D. 180°

Q.15 **A car accelerates from 4.0 ms^{-1} to 20 ms^{-1} in 5.0 s. Calculate the acceleration of the car**

A. 0.5 ms^{-2} B. 3.2 ms^{-2}
C. 4.0 ms^{-2} D. 4.8 ms^{-2}

Q.16 **When a ball is thrown straight up with no air resistance, the acceleration at its highest point**

A. Is upward B. Is zero
C. Reverses from upward to downward D. Is downward

Q.17 **K.E of projectile at highest point is half of its initial K.E angle of projection is**

A. 30° B. 45°
C. 60° D. None

Q.18 The displacement time graph for two bodies A and B are straight these inclined at 60° and 30° to time axis. Find ratio of their speed is

A. 3 : 1 B. $\sqrt{3}$:1

C. 1 : 3 D. 1: $\sqrt{3}$

Q.19 The speed of a car weighing 1500 kg increases from 36 km/h to 72 km/h uniformly. What will be the change in momentum of the car?

A. 15000 kg km/h B. 15000 kg m/s

C. 54000 kg m/s D. 54000 g m/s

Q.20 Which ball will hit the ground first if dropped at the same time and at the same height in a perfect vacuum?

wood ball Plastic ball metal ball

A. They will all hit at the same time B. Metal first, then plastic, then wood last

C. Wood first, then plastic, then metal last D. None of these

Q.21 The quantity of motion that the body possesses due to its mass and velocity is known as

A. Moment of force B. Force

C. Impulse D. Momentum

Q.22 Two bodies of masses 2 Kg and 7 Kg are moving with velocities of 2 m/s and 7 m/s respectively. What is the total momentum of the system in Kg-m/s?

A. 50 B. 53

C. 28 D. 0

Q.23 A body of mass M collides against a wall with a velocity v and retraces its path with the same speed. The change in momentum is (take the initial direction of the velocity as positive)

A. 2Mv B. –2Mv

C. Mv D. Zero

Q.24 A freight train rolls along a track with considerable momentum. If it rolls at the same speed but has twice as much mass, its momentum is

A. Zero B. Twice

C. Unchanged D. Four times as much

Q.25 A heavy truck has more momentum than a passenger car moving at the same speed because the truck

A. Has greater speed B. Is not streamlined

C. Has a large wheelbase D. Has greater mass

Q.26 A rifle of mass M is initially at rest but free to recoil. It fires a bullet of mass m and velocity v (relative to the ground). After firing, the velocity of the rifle (relative to the ground) is:

A. −Mv/m B. –mv

C. mv/M D. –mv/M

Q.27 A ball is projected with velocity 10 m/sec at angle of 30° with the horizontal surface. The time taken by ball to reach the ground is

A. 1 sec B. 2sec

C. 20 m/sec D.8m/sec

Q.28 If a tennis ball moving with velocity 15 ms^{-1} collides elastically with a wall, then velocity of tennis ball after collision will be

A. 15 ms^{-1} B. 30 ms^{-1}

C. –15 ms^{-1} D. –30 ms^{-1}

Q.29 A graph is drawn with force along Y-axis and time along X-axis. The area under the graph represents

A. Momentum B. Couple

C. Moment of the force D. Impulse of the force

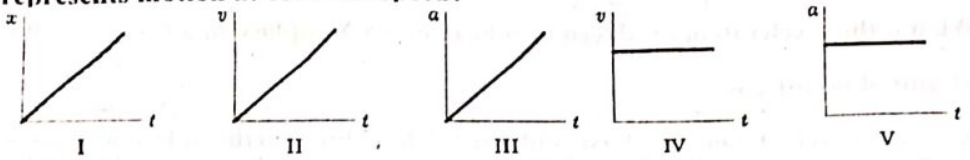
Q.30 When the average velocity of a moving body is equal to its instantaneous velocity then it is moving with

A. Uniform velocity B. Uniform acceleration

C. Variable velocity D. Variable acceleration

Q.31 A newton is the force
A. Of gravity on a 1kg body
B. That gives a 1kg body an acceleration of $1 m/s^2$
C. Of gravity on a 1g body
D. That gives a 1g body an acceleration of $1 cm/s^2$

Q.32 Consider the following five graphs (note the axes carefully). Which of these represents motion at constant speed?



A. IV only
B. I and IV only
C. IV and V only
D. I and II only

Q.33 If H = R then angle of projection is
A. 45°
B. 60°
C. 76°
D. 90°

Q.34 The magnitude of instantaneous velocity is expressed by
A. $v_{ins} = \lim_{\Delta t \to 0} \frac{\Delta t}{\Delta d}$
B. $v_{ins} = \lim_{\Delta t \to 0} \frac{\Delta d}{\Delta t}$
C. $v_{ins} = \lim_{\Delta d \to 0} \frac{\Delta t}{\Delta d}$
D. $v_{ins} = \lim_{\Delta t \to 0} \frac{\Delta d}{\Delta t}$

Q.35 A body, whose momentum is constant, must have constant
A. Force
B. Velocity
C. Acceleration
D. All of these

Q.36 An aeroplane moving horizontally with 50 ms^{-1} drops a packet at 490 m height. Its time of flight is
A. 50 sec
B. 40 sec
C. 10 sec
D. 20 sec

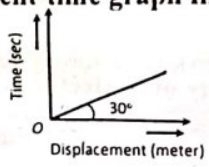
Q.37 A truck weighing 2500 kg and moving with a velocity of 21 ms^{-1} collides with stationary car weighing 1000 kg. The truck and the car move together after the impact. Calculate their common velocity.
A. 15 ms^{-1}
B. 5 ms^{-1}
C. 10 ms^{-1}
D. 20 ms^{-1}

Q.38 A man is in a car is moving with velocity of 36Km/hr. his speed with respect to the car is.
A. 10m/s
B. 36m/s
C. Zero
D. Infinite

Q.39 Instantaneous and average velocities become equal when body.
A. Has zero acceleration
B. Has uniform acceleration
C. Has variable acceleration
D. Moves in a circle

Q.40 An athlete completes one round of a circular track of radius *R* in 40 *sec*. What will be his displacement at the end of 2 min. 20 *sec*
A. Zero
B. 2R
C. $2\pi R$
D. $7\pi R$

Q.41 From the following displacement-time graph find out the velocity of a moving body



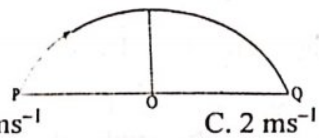
A. $\frac{1}{\sqrt{3}}$ m/s
B. 3 m/s
C. $\sqrt{3}$ m/s
D. $\frac{1}{3}$

Q.42 When two bodies collide elastically, then
A. Kinetic energy of the system alone is conserved
B. Only momentum is conserved
C. Both energy and momentum are conserved
D. Neither energy nor momentum is conserved

Q.43 When the speed of a moving body is doubled
A. Its acceleration is doubled
B. Its momentum is doubled
C. Its kinetic energy is doubled
D. Its potential energy is doubled

Q.44 Third equation of motion is independent of:
A. Time
B. Displacement
C. Velocity
D. Acceleration

Q.45 **What is the velocity of an object when it reaches from point P to point Q in 2 s along a semicircle of radius 2m?**



A. Zero B. 1 ms^{-1} C. 2 ms^{-1} D. 4 ms^{-1}

Q.46 **The SI unit of weight is:**

A. gram B. kilogram C. pound D. newton

Q.47 **What is the acceleration produced by a force of 0.5 N applied on a body mass 0.1 kg?**

A. 0.1 ms^{-2} B. 0.5 ms^{-2} C. 1 ms^{-2} D. 5 ms^{-2}

Q.48 **SI unit of impulse is:**

A. kg ms^{-2} B. Ns C. Ns^{-1} D. Nm

Q.49 **A train travels 4 km due East and then 3 km due North and finally back to the starting position travelling 5 km along South-west direction. What is the net displacement?**

A. 12 km B. 4 km C. 5 km D. Zero

Q.50 **Two particles A and B are projected with the same velocities. A is projected vertically upwards while B is projected at an angle 45° with the horizontal. Which of the following statement is wrong?**

A. The range of B is more than A
B. The height achieved by A is more than B
C. The horizontal component of velocity of B is more than A
D. The vertical component of velocity of B is more than A

Q.51 **When a body is stationary**

A. There is no force acting B. Net force is zero
C. Body is in vacuum D. Force is less than weight

Q.52 **When you walk across the ground and push on it with your feet**

A. There is no effect on the ground
B. The ground pushes back less strongly than your feet
C. The ground pushes back on your feet with equal force
D. The ground pushes back more strongly than your feet

Q.53 ***A person walks along a straight road for the first half time with velocity v_1 and second half time with velocity v_2. Then mean velocity v is given by***

A. $\frac{v_1+v_2}{2}$ B. $\frac{2v_1v_2}{v_1+v_2}$ C. $\frac{\vec{v_1}+\left(-\vec{v_2}\right)}{4}$ D. $\sqrt{v_1v_2}$

Q.54 ***If two equal masse ($m_1 = m_2$) collide elastically in one dimension, where m_2 is at rest and m_1 moving with velocity u_1, then final velocities of the two masses are***

A. $v_1 = v_2 = 0$ B. $v_1 = 0 ; v_2 = u_1$
C. $v_1 = -u_1 ; v_2 = 0$ D. $v_1 = 0 ; v_2 = -u_1$

Q.55 ***Two balls projected at 45° and 60° with same initial velocities. The ratio of their maximum heights is***

A. 1:2 B. 2:3 C. 1:3 D. $1:\sqrt{2}$

Q.56 ***A ball is in free fall. Its acceleration is:***

A. Downward during both ascent and descent
B. Downward during ascent and upward during descent
C. Upward during both ascent and descent
D. Upward during ascent and downward during descent

Q.57 **At the highest point, the velocity of projectile is**

A. Maximum B. Zero
C. Minimum D. Equal to half of x – component of velocity

Q.58 **A projectile is thrown at an angle of 30° with the horizontal has a range R_1, and attains a maximum height h_1 –Another projectile thrown, with the same velocity at an angle 30° with the vertical has a range R_2 and attains a maximum height h_2. The relation between R_1 and R_2 is**

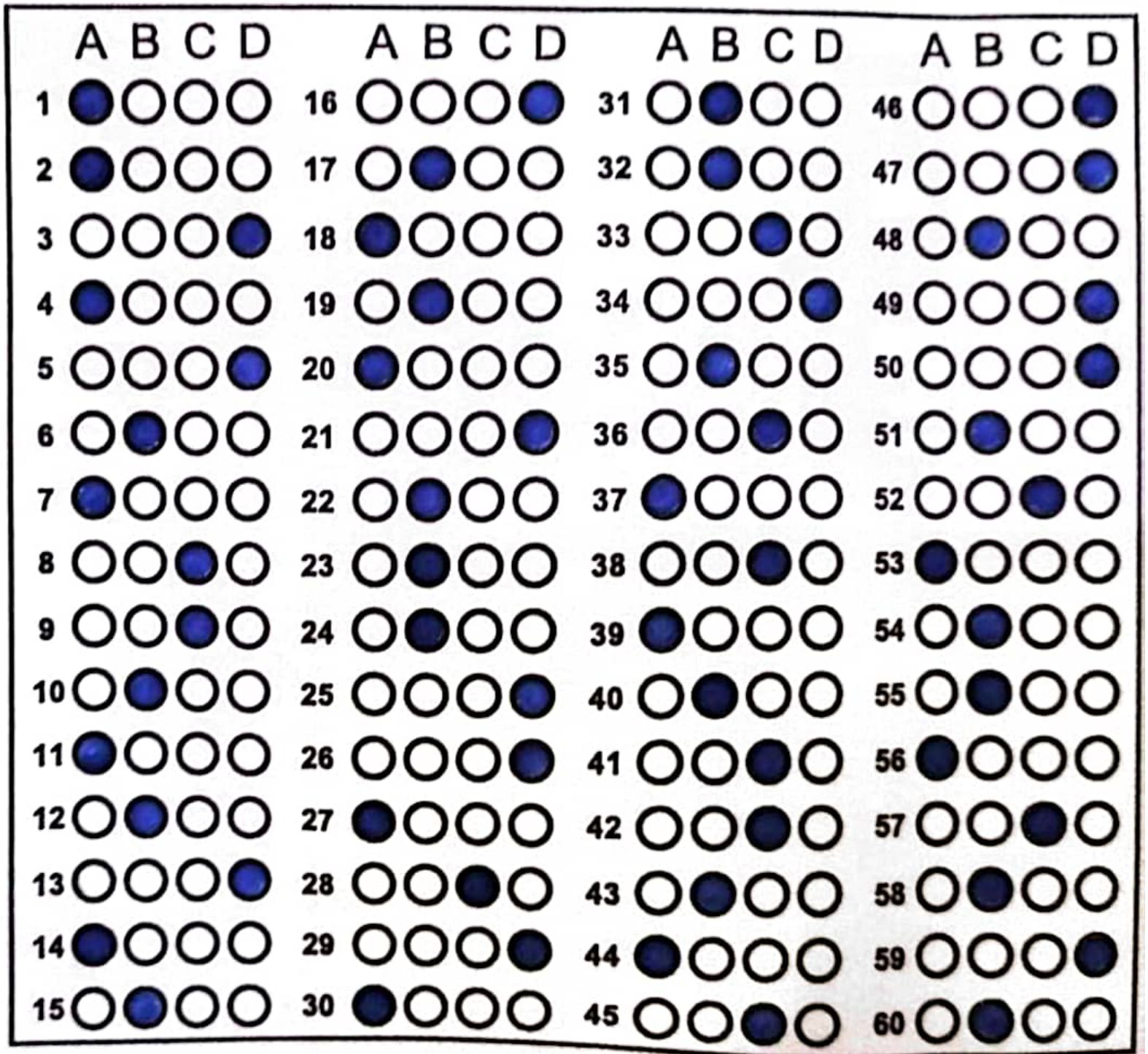
A. $R_1 = \frac{R_2}{2}$ B. $R_1 = R_2$ C. $R_1 = 2R_2$ D. R1 =4 R_2

Q.59 **3rd law of motion explains.**

A. Effect of force B. Existence of a force
C. Existence of two forces D. Existences of pair of forces in nature

Q.60 **A bullet is dropped from the same height when another bullet is fired horizontally. They will hit the ground**

A. One after the other B. Simultaneously
C. Depends on the observer D. None of the above


A B C D
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
A B C D
16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
A B C D
31 32 33 34 35 36 37 38 39 40 41 42 43 44 45
A B C D
46 47 48 49 50 51 52 53 54 55 56 57 58 59 60

PHYSICS MDCAT

UNIT–2 (A-SERIES)

TOPICS:

✓ **Work and Energy**

Q. 1 A body of mass 2 kg is projected at 20m/s making angle 60° with horizontal. Power due to gravitation at highest point is

A. 200 W B. 50 W
C. 100 W D. 0

Q. 2 A horizontal force of 5 N is required to maintain a velocity of 2 m/s for a block of 10 kg mass sliding over a rough surface. The work done by this force in one minute is

A. 0.6 J B. 60 J
C. 6 J D. 600J

Q. 3 Work done is negative if θ is

A. 0 B. 60° C. 30° D. 180°

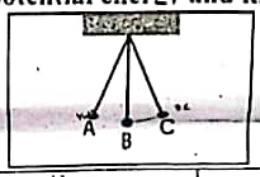
Q. 4 When the bob of simple pendulum swings the work done by tension in string is

A. > 0 B. < 0
C. 0 D. 1

Q. 5 1MWh is equal to _____ joule.

A. 3.6×10^{10} B. 3.6×10^{6}
C. 3.6×10^{9} D. 3.6

Q. 6 In the diagram given below a simple pendulum with mass m swings to and fro. At position B the value of the potential energy and kinetic energy are as follows:



	E_P	E_K
A.	Maximum	Maximum
B.	Maximum	Minimum
C.	Minimum	Minimum
D.	Minimum	Maximum

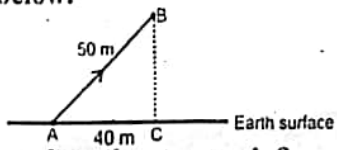
Q. 7 An electric motor creates tension of 5000N in a cable and reels at $2ms^{-1}$ the power of motor is

A. 15 kW B. 9000 kW C. 10 kW D. 205 kW

Q. 8 The kinetic energy of a moving truck is 10^5 kg m^2/sec^2. The truck's brakes fail and it runs into a sugar cane field, coming to rest after 50 m. What is the average retarding force of the sugar cane field?

A. 2000N B. 4000 N
C. 1500 N D. None of the above

Q. 9 A stone of weight 4.0N in the Earth's gravitational field is moved from 'A' to 'B' along the path as shown below.



How much potential energy does the stone gain?

A. 280 J B. 200 J
C. 1200 J D. 120 J

Q. 10 A man pushes a wall but fails to displace it. He does

A. Negative work B. Positive and maximum work
C. Positive but small work D. No work at all

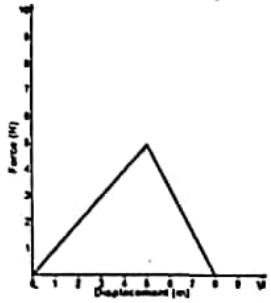
Q. 11 Work done by a variable force making angles at different points with displacement in moving the particle from one point to another is equal to the area under the curve of

A. F Sin θ versus d B. F Cos θ versus d Cos θ
C. F Cos θ versus d D. F versus d Cos θ

Q. 12 For constant force, the shape of the graph between power and velocity will be

A. A circle B. A parabola
C. A hyperbola D. A straight line

Q. 13 The force as a function of displacement of a moving object is presented by the graph. How much work is done when the object moves from 0 m to 5 m?



A. 30 J B. 60 J
C. 12.5 J D. 24 J

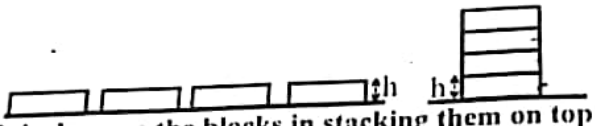
Q. 14 A girl is carrying a bucket of water on her head from water reservoir situated near her house, the work done by her is

A. Maximum B. Zero
C. Minimum D. None

Q. 15 A body is subjected to a constant force $\vec{F} = -\hat{i} + 2\hat{j} + 3\hat{k}$. What is the work done by this force in moving the body through a distance of 4m along z-axis and 3m along y-axis?

A. 6 J B. 12 J C. 18 J D. 24 J

Q. 16 Initially, four identical uniform blocks, each of mass m and thickness h, are spread on a table.



How much work is done on the blocks in stacking them on top of one another?

A. 2mgh B. 4mgh C. 6mgh D. 8mgh

Q. 17 A pump motor is used to deliver water at a certain rate from a given pipe. To obtain twice as much water from the same pipe in the same time, power of the motor has to be increased to.

A. 16 times B. 2 times C. 4 times D. 8 times

Q. 18 No kinetic energy is possessed by:

A. A shooting star B. A rotating propeller on a moving airplane
C. A pendulum at the bottom of its swing D. An elevator standing at the fifth floor

Q. 19 The energy possessed by an oscillating pendulum of a clock is

A. Kinetic energy B. Potential energy
C. Restoring energy. D. Mechanical energy

Q. 20 What is the average power required to lift a mass of 100kg to a height of 50m in 50 seconds?

A. 80 W B. 400 W C. 980 W D. 5000 W

Q. 21 An object is thrown straight up. Which of the following is true about the sign of work done by the gravitational force while the object moves up and then down?

A. Work is positive on the way up, work is positive on the way down
B. Work is negative on the way up, work is negative on the way down
C. Work is negative on the way up, work is positive on the way down
D. Work is positive on the way up, work is negative on the way down

Q. 22 A car accelerates up a hill what happens to its K.E and to its P.E respectively

	Kinetic Energy	Potential Energy
A.	Increases	Decreases
B.	Decreases	Increases
C.	Increases	Increases
D.	Unchanged	Increases

Q. 23 An automobile of mass m is at the top of an incline plane h(m) high and d(m) long, is released and rolls down the hill. If f is frictional force then which of given correctly relate $P.E_{loss}$ and $K.E_{gain}$

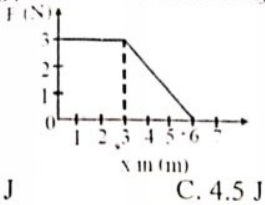
A. $mgh = \frac{1}{2}mv^2 - fh$ B. $mgh = \frac{1}{2}mv^2 + fd$

C. $mgh - fh = \frac{1}{2}mv^2$ D. $mgd = \frac{1}{2}mv^2 + fh$

Q. 24 When the speed of object is halved and the mass is quadrupled then the kinetic energy is:

A. Quartered B. Twice C. One Third D. Remain same

Q. 25 A force F acting on an object varies with distance x as shown here. The force is in N and x in m. The work done by the force in moving the object from x = 0 to x = 6 m is



A. 18.0 J B. 13.5 J C. 4.5 J D. 9.0 J

Q. 26 What happens to the kinetic energy of a moving object if the net work done is positive?

A. The kinetic energy increases B. The kinetic energy remains the same
C. The kinetic energy decreases D. The kinetic energy is zero

Q. 27 Work is independent of:

A. Force B. Time C. Displacement D. All of these

Q. 28 A body at rest may have

A. Energy B. Momentum
C. Speed D. Velocity

Q. 29 Two bodies of 1kg and 2 kg have equal momentum the ratio of their KE is

A. 1:1 B. 2:1 C. 1:2 D. 3:1

Q. 30 Which one of the following is watt

A. $Kg\ ms^{-2}$ B. Nms^{-2}
C. $Kgms^{-3}$ D. Nms^{-1}

Q. 31 A spherical ball of mass 20 kg is stationary at the top of a hill of height 100 m. It rolls down a smooth surface to the ground and then climbs up another hill of height 30 m and finally rolls down to a horizontal base at a height of 20 m above the ground. The velocity attained by the ball is

A. $40\ ms^{-1}$ B. $20\ ms^{-1}$ C. $10\ ms^{-1}$ D. $10\sqrt{30}\ ms^{-1}$

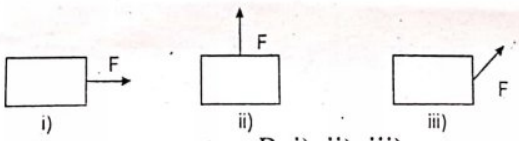
Q. 32 When arrow is released from its bow, its energy is transformed from

A. Heat energy to K.E. B. Chemical energy to elastic P.E.
C. Elastic P.E. to K.E. D. K.E. to elastic P.E.

Q. 33 With increase in height from surface of earth the P.E

A. Increases B. Remain same C. Decrease D. All

Q. 34 From the given options, which one list the amount of work done from smallest to largest if the displacement is in forward direction?

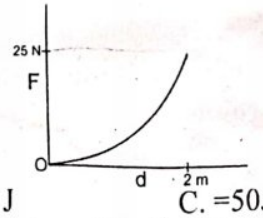


A. ii), iii), i) B. i), ii), iii)
C. iii), ii), i) D. i), iii), ii)

Q. 35 The input power to a motor is 300 W. In 20s it lifts a load of 400 N through a height of 6.0 m. What is the efficiency of the motor?

A. 12% B.25% C. 40% D. 75%

Q. 36 Work done in given graph



A. 100 J B. < 50 J C. =50J D. > 50J

Q. 37 The force constant of a wire is k and that of the another wire is 3k when both the wires are stretched through same distance, if work done are W_1, and W_2, then:

A. $W_2=W_1$ B. $W_2=9W$
C. $W=3W_2$ D. $W_2=3\ W_1$

Q. 38 An example of non-conservative force is:

A. Electric force B. Gravitational Force
C. Frictional force D. Magnetic force

Q. 39 When the speed of your car is doubled, by what factor does its kinetic energy increase?
A. $\sqrt{2}$ B. 2 C. 4 D. 8

Q. 40 A man pulling a bag with force of 15N at angle 60^0 with horizontal plane. If bag covers a distance of 10 m, then work done by the man is
A. 50 J B. 75 J C. 100 J D. 150 J

Q. 41 The area under a curved in a force and displacement graph shows that
A. Work under a constant force B. Work under a variable force
C. Work under a maximum force D. Work under a minimum force

Q. 42 What is the power of an electric motor when it consumes energy of 9×10^3 J in 3 s?
A. 1 hp B. 2 hp C. 3 hp D. 4 hp

Q. 43 When velocity of body mass 10 kg is increased from 2 m s^{-1} to 8 m s^{-1} then the work done of the body is
A. 100 J B. 200 J C. 300 J D. 400 J

Q. 44 Two bodies A and B have velocities in the ratio 2:1, their kinetic energies are in the ratio:
A. 2:1 B. 1:2 C. 4:1 D. 1:4

Q. 45 An electron revolves around the nucleus and completes 50 rev/min. The work done by the Coulomb's force is:
A. 50 J B. 50 Ergs C. 50 Foot pound D. Zero

Q. 46 Unit of Energy
A. joule B. kilo joule C. calorie D. All of these

Q. 47 A field in which the work is done in a moving a body along a closed path is zero is called
A. Electric field B. Conservative field
C. Electromagnetic field D. Gravitational field

Q. 48 The relation between horsepower and watt is
A. 1 hp = 546 watts B. 1 hp = 746 watts
C. 1 hp = 1000 watts D. 1 hp = 946 watts

Q. 49 The slope of the work time graph is equal to
A. Displacement B. Energy
C. Power

Q. 50 A machine does 2500 J of work in 1 min. What is the power developed by the machine?
A. 21 W B. 42 W C. 150 W D. 2500 W

Q. 51 2kg mass is uplifted by the machine through the height of 200m for 10 sec calculate power deliver to the load. ($g = 10m/s^2$)
A. 40W B. 400W C. 440W D. 200W

Q. 52 If the linear momentum of the object is increased by 0.1%, then the kinetic energy is increased by
A. 0.1 % B. 0.2% C. 0.4% D. 0.01%

Q. 53 A spring having spring constant of 10 N/m^2 is stretched to 5 m, what will be the work done:
A. 250 J B. 50 J C. –250 J D. 125 J

Q. 54 An object is displaced from point A (2,3,4) m to point B (1,2,3) m under a constant force $\vec{F} = \left(2\hat{i} + 3\hat{j} + 4\hat{k}\right)$. find the work done by this force in this process
A. 9 J B.0 C. –9 J D. 20 J

Q. 55 Two bodies one light and other heavy, have equal momenta. Which of them have greater kinetic energy?
A. The heavy body B. The light body
C. Both have equal kinetic energy D. Depends upon the direction of momenta

Q. 56 A body of 5N falls through 0.25m height its K.E will be
A. 1.25J B. 125J C. 12.5J D. 0.125J

Q. 57 A 4kg body is thrown vertically upward from the ground with a velocity of 5m/s. Its K.E just before hitting the ground is
A. 25J B. 50J C. 75J D. 100J

Q. 58 What is the average power exerted by a man of 60 kg if he climbs up a ladder of 6 m high in 10 s?
A. 300 W B. 373 W C. 353 W D. 393 W

Q. 59 A girl weighing 400 N runs up a flight of stairs (height 5 m) in a time of 4 seconds. Her rate of working against gravity is
A. 320 W B. 400 W C. 500 W D. 2000 W

Q. 60 Which of the following bodies has the largest kinetic energy?
A. Mass 3M and speed v B. Mass 3M and speed 2v
C. Mass 2M and speed 3v D. Mass M and speed 4v

KIPS
PREPARATIONS

	A	B	C	D		A	B	C	D		A	B	C	D		A	B	C	D
1				✓	16					31					46				
2					17					32					47				
3					18				✓	33					48				
4					19					34					49				
5					20					35					50				
6					21					36					51				
7					22			✓		37					52				
8					23					38					53				
9					24					39					54				
10					25					40					55				
11					26					41					56				
12					27					42					57				
13					28					43			✓		58				
14					29					44					59				
15					30					45					60				

PHYSICS MDCAT

UNIT–3 (A-SERIES)

TOPICS:

✓ **Rotational and Circular Motion**

Q.1 1 rev/min is equal to:

A. $\frac{\pi}{2}$ rads^{-1} B. $\frac{\pi}{15}$ rads^{-1}

C. $\frac{\pi}{20}$ rads^{-1} D. $\frac{\pi}{30}$ rads^{-1}

Q.2 If a body is moving in counter clockwise direction then the direction of angular velocity is:

A. Towards center B. Away from center

C. Along linear velocity D. Perpendicular to v

Q.3 Number of revolutions in 720 degrees.

A. 4 revolutions B. 3 revolutions

C. 2 revolutions D. 9 revolutions

Q.4 The direction of centripetal acceleration is:

A. Towards the center. B. Away from the center

C. Towards the tangent D. None

Q.5 If earth covers 360 degrees in 24 hours, then how many degrees are in two hours

A. 15° B. 30°

C. 45° D. 60°

Q.6 One radian is equal to

A. 67.3° B. 57.3°

C. 87.3° D. 60°

Q.7 When a wheel 1 m in diameter makes 30 rev min^{-1} the linear speed of the point on its rim in ms^{-1} is

A. 2π B. $\pi/2$

C. π D. 20π

Q.8 The angular speed of seconds hand of a watch in rads^{-1} is

A. π B. $\pi/2$

C. $\pi/30$ D. $\pi/180$

Q.9 A body moves with a constant speed in a circular path. It has

A. Acceleration of constant magnitude B. Constant velocity

C. Constant acceleration D. An acceleration which varies with time

Q.10 A motorcyclist going with a constant speed in a circular track has

A. Linear velocity is constant B. Constant acceleration

C. Angular velocity is constant D. Constant force

Q.11 The angular speed of the wheels of a bicycle is 8π radian/sec their period of rotation is:

A. 0.25 sec B. 4 sec

C. $\pi/4$ sec D. 2 sec

Q.12 A car of mass 2000 kg moving in a circular path of radius 10 m at a constant speed of 30m/sec. Find the centripetal force required for this purpose.

A. 1800N B. 18N

C. 180 kN D. 18 kN

Q.13 What is 30 degrees in radians?

A. $\pi/3$ B. $\pi/6$

C. $\pi/2$ D. $\pi/4$

Q.14 The SI unit of angular acceleration is:

A. rad/s^2 B. rad/s

C. rad.s D. rad.s^2

Q.15 If r=1m and θ= 1 degree then what is the value of S

A. 0.01745m B. 1m

C. 2m D. None

Q.16 An electric fan rotating at 3 rev s^{-1} is switched off. It comes to rest in 18.0 s. Assuming deceleration to be uniform, How many revolutions did it turn before coming to rest?

A. 30 rev B. 27 rev

C. 40 rev D. 10 rev

Q.17 A particle of mass 'm' moves with a constant speed along a circular path of radius r under the action of a force F. Its speed is given by

A. $\sqrt{\frac{F}{mr}}$ B. $\sqrt{\frac{Fr}{m}}$ C. $\sqrt{Fmr}$ D. $\sqrt{\frac{F}{r}}$

Q.18 In cycle wheel of radius 0.4 m completes one revolution in one second, then acceleration of the cycle is

A. $0.4\ \pi m/s^2$ B. $1.6\ \pi^2 m/s^2$
C. $0.4\ \pi^2 m/s^2$ D. $0.8\ \pi m/s^2$

Q.19 The angular velocity of a fly wheel increases from 0 to 40 rad/s, in 8 seconds. What is its total angular displacement in this time?

A. 80 rad B. 160 rad
C. 200 rad D. 120 rad

Q.20 A particle moving in a horizontal circle with constant angular velocity will have

A. Constant linear momentum but varying energy
B. Constant energy but varying linear momentum
C. Neither linear momentum nor energy constant
D. Both speed and linear velocity constant

Q.21 A particle of mass m is executing uniform circular motion on a path of radius r. If P is the magnitude of its linear momentum, then, the radial force acting on the particle is,

A. pmr B. $\frac{rm}{p}$ C. $\frac{mp^2}{r}$ D. $\frac{p^2}{rm}$

Q.22 An object is moving along a circular path of radius 4m. What will be its angular displacement if it moves 14m on this circular path?

A. 5.5 radians B. 5.0 radians
C. 3.5 radians D. 4.5 radians

Q.23 A string breaks if its tension exceeds 10 newtons. A stone of mass 250 gm tied to this string of length 10 cm is rotated in a horizontal circle. The maximum angular velocity of rotation can be

A. 20 rad/s B. 40 rad/s
C. 100 rad/s D. 200 rad/s

Q.24 A scooter is going round a circular road of radius 100 m at a speed of 10 m/s. The angular speed of the scooter will be

A. 0.1 rad/s B. 0.01 rad/s
C. 1 rad/s D. 10 rad/s

Q.25 A car is making a turn at speed v. The radius of the turn is r and the centripetal force on the car is F. If the car rounds the same curve at speed 2v, the required centripetal force is

A. ½ F B. 4F
C. 2F D. F

Q.26 A hollow tube lies flat on a table. A ball is shot through the tube. As the ball emerges from the other end, which path does it follow?

A. C B. A
C. B D. None of these

Q.27 The linear acceleration of a body performing uniform circular motion is given by

A. $\vec{a} = r\vec{\omega}$ B. $\vec{a} = \omega^2 \vec{r}$
C. $\vec{a} = -r\vec{\omega}$ D. $\vec{a} = -\omega^2 \vec{r}$

Q.28 In circular motion, the radius vector

A. Changes in direction but has a fixed magnitude
B. Has constant magnitude and direction
C. Changes in magnitude only
D. Changes in magnitude as well as direction

Q.29 For a small θ, angular displacement is quantity

A. Scalar B. Vector
C. Neither scalar nor vector D. None

Q.30 For a particle performing uniform circular motion

A. $\vec{\omega}$ is perpendicular to $\vec{r}$ B. $\vec{\omega}$ is parallel to $\vec{r}$

C. $\vec{\omega}$ is parallel to $\vec{a}$ D. $\vec{\omega}$ is anti-parallel to $\vec{a}$

Q.31 The body of mass m is rotating in vertical circle then tension in the string is maximum

A. At the bottom B. At the top

C. Same at all point D. None of these

Q.32 A ball is fastened to a string and is swung in a vertical circle. When the ball is at the highest point of the circle its velocity and acceleration directions are:

A.  B.  C.  D. 

Q.33 Four particles have the following masses (in terms of m), speeds (in terms of v), and radii (in terms of r). Which two particles have the same centripetal force?

Particle	Mass	Speed	Radius
1	m	v	r
2	m/2	2v	2r
3	2m	v/2	r
4	1	2v	3r

A. Particle 1 and 2 B. Particles 2 and 3

C. Particles 1 and 3 D. Particles 2 and 4

Q.34 A body of mass 5 kg is moving in a circle of radius 1 m with an angular velocity of 2 rad/s. The centripetal force is,

A. 30 N B. 20 N

C. 10 N D. 40 N

Q.35 When a body moves along a circular path, it velocity:

A. Remains constant B. Becomes zero

C. Changes continuously D. Always increases

Q.36 The linear acceleration of a car is $10m/s^2$. If the wheels of the car have a diameter of 1m, the angular acceleration of the wheels will be

A. 10 rad/sec^2 B. 1 rad/sec^2

C. 2 rad/sec^2 D. 20 rad/sec^2

Q.37 The centripetal force required to keep the body in circular path is F_1. What would be centripetal force if radius becomes two times (keeping 'v' constant)

A. $2F_1$ B. $\frac{F_1}{2}$ C. $4F_1$ D. $\frac{F_1}{4}$

Q.38 The shaft of a motor rotates at a constant angular speed of 360rev/min. Angle turned through in 1 sec in radian is

A. π B. 3π

C. 6π D. 12π

Q.39 If a particle moves with uniform speed that its tangential acceleration will be

A. Zero B. Constant

C. Infinite D. None of these

Q.40 Angle between centripetal acceleration and radius vector is

A. 90° B. 180° C. 0° D. 45°

Q.41 All particles of a rigid body rotating about a fixed axis may not have same

A. Speed B. Axis of rotation

C. Angular displacement D. Direction of angular velocity

Q.42 Torque due to centripetal force is

A. Zero B. Negative

C. Infinity D. Positive

Q.43 Direction of angular acceleration is always along:

A. x-axis B. y-axis

C. z-axis D. The axis of rotation

Q.44 A bicycle wheel of radius 0.70 m is turning at an angular speed of 6.3 rad/s as it rolls on a horizontal surface without slipping. What is the linear speed of the wheel?
A. 1.4 m/s B. 0.11 m/s
C. 28 m/s D. 4.4 m/s

Q.45 Angular velocity of an hour hand of a watch
A. $\frac{\pi}{43200}$ rad/s B. $\frac{\pi}{21600}$ rad/s C. $\frac{\pi}{30}$ rad/s D. $\frac{\pi}{1800}$ rad/s

Q.46 Angle swept by minute hand in one complete rotation is
A. 30° B. 60°
C. 90° D. 360°

Q.47 What is the circumference of a circle, having radius of 50cm?
A. 3.12 m B. 3.14 m
C. 3.16 m D. 3.18 m

Q.48 What is the angular velocity of a particle when it frequency is 50 Hz?
A. 312 rad s^{-1} B. 313 rad s^{-1}
C. 314 rad s^{-1} D. 315 rad s^{-1}

Q.49 Vectorially, angular velocity of a rotating body is represented.
A. Along the radius towards the centre B. Along the radius away from the centre
C. Along the axis of rotation D. None of the above

Q.50 Relation between torque and angular momentum is similar to the relation between:
A. Acceleration and velocity B. Mass and moment of inertia
C. Force and momentum D. Energy and displacement

Q.51 A block of mass 'm' at the end of a string is whirled round in a verticle circle of radius r. The critical speed of the block at the top of its swing below which the string would slacken before block reaches top is:
A. $\sqrt{2rg}$ B. $\sqrt{3rg}$ C. $\sqrt{rg}$ D. $\sqrt{5rg}$

Q.52 The maximum drag force on a sphere falling with zero acceleration is 9.8N. Its real weight is
A. Zero B. 9.8 N
C. 4.9 N D. 19.6 N

Q.53 The apparent weight of a person of mass m in an elevator is 2mg. the elevator is moving
A. Up with an acceleration of $\frac{g}{2}$ B. Up with an acceleration of g
C. Up with an acceleration of 2g D. Down with an acceleration of g

Q.54 Circular motion of a particle while attached to a string centripetal acceleration is provided by
A. Tension in string B. Gravitational force
C. Normal force D. None of these

Q.55 A stone is tied to one end of a string. Holding the other end, the string is whirled in a horizontal plane with progressively increasing speed. It breaks at some speed because
A. Gravitational forces of the earth are greater than the tension in the string
B. The required centripetal force is greater than the tension sustained by the string
C. The required centripetal force is less than the tension in the string.
D. The centripetal force is greater than the weight of the stone

Q.56 The tension in the string revolving in a horizontal circle with a mass m is.
A. $\frac{mv^2}{r}$ B. $\frac{mv^2}{r}+mg$ C. $\frac{mv^2}{r}-mg$ D. mg

Q.57 A car is moving with high velocity when it has a turn. A force act on it outwardly because of
A. Centripetal force B. Centrifugal force
C. Gravitational force D. All the above

Q.58 The angular speed in radians/hours for daily rotation of our earth is
A. 2π B. 4π C. $\frac{\pi}{6}$ D. $\frac{\pi}{12}$

Q.59 The angular velocity of a wheel increases from 100 rps to 300 rps in 10s. The number of revolutions made during that time is
A. 600 B. 1500 C. 1000 D. 2000

Q.60 A particle comes round a circle of radius 1 *m* once. The time taken by it is 10 *sec.* The average velocity of motion is
A. 0.2 πm/s B. 2 πm/s
C. 2 m/s D. Zero

KIPS
PREPARATIONS

	A	B	C	D		A	B	C	D		A	B	C	D		A	B	C	D
1	○	○	○	●	16	○	●	○	○	31	●	○	○	○	46	○	○	○	●
2	○	○	○	●	17	○	●	○	○	32	●	○	○	○	47	○	●	○	○
3	○	○	●	○	18	○	●	○	○	33	●	○	○	○	48	○	○	●	○
4	●	○	○	○	19	○	●	○	○	34	○	●	○	○	49	○	○	●	○
5	○	●	○	○	20	○	●	○	○	35	○	○	●	○	50	○	○	●	○
6	○	●	○	○	21	○	○	○	●	36	○	○	○	●	51	○	○	●	○
7	○	●	○	○	22	○	○	●	○	37	○	●	○	○	52	○	●	○	○
8	○	○	●	○	23	●	○	○	○	38	○	○	○	●	53	○	●	○	○
9	●	○	○	●	24	●	○	○	○	39	●	○	○	○	54	●	○	○	●
10	○	○	●	○	25	○	●	○	○	40	○	●	○	○	55	○	●	●	○
11	●	○	○	○	26	●	●		○	41	●	○	○	○	56	●	○	○	○
12	○	○	●	○	27	○	○	○	●	42	●	○	○	○	57	○	●	○	○
13	○	●	○	○	28	●	○	○	○	43	○	○	○	●	58	○	○	○	●
14	●	○	○	○	29	○	●	○	○	44	○	○	○	●	59	○	○	○	●
15	●	●	○	○	30	●	○	○	○	45	○	●	○	○	60	●	○	○	●

60 → Total displacement is zero so avg is zero

(54) → string for Fc circle vertical / not defined

PHYSICS MDCAT

UNIT–4 (A-SERIES)

TOPICS:

✓ **Waves**

Q.1 The speed of sound waves having a frequency of 256 Hz, compared with the speed of sound waves having a frequency of 512Hz is
A. Half as great
B. Four times as great
C. Twice as great
D. Same

Q.2 With the propagation of a longitudinal wave through a material medium, the quantities transferred in the direction of propagation are
A. Energy, momentum and mass
B. Energy and mass
C. Energy and momentum
D. Energy

Q.3 At what temperature the speed of sound in air will be 1.5 times its value at 27°C in air?
A 102°C
B. 204°C
C. 204°C
D. 402°C

Q.4 With rise in temperature, the speed of sound in a gas
A. Increases
B. Decreases
C. Remains same
D. May increase or decrease depending upon air pressure

Q.5 The velocity of sound in air is 330 ms^{-1}. The fundamental frequency of an organ pipe open at both ends and length 0.3 m will be.
A. 200 Hz
B. 300 Hz
C. 275 Hz
D. 550 Hz

Q.6 In simple harmonic motion; the restoring force must be proportional to the
A. Amplitude
B. Displacement
C. Both A and B
D. Velocity

Q.7 A tight wire is clamped at two points 2 m apart. It is plucked near one end, what are the three longest wavelengths produced on the vibrating wire:
A. 2 m, 1 m, 0.67 m
B. 4 m, 2 m, 1.33 m
C. 4 m, 2 m, 1 m
D. 1 m, 0.5 m, 0.33 m

Q.8 An object attached to one end of a spring makes 20 vibrations in 10 s. Its angular frequency is
A. 0.79 rad/s
B. 12.6 rad/s
C. 6.3 rad/s
D. 2.0 rad/s

Q.9 An organ pipe with both ends open is 0.85 m long. Assuming that the speed of sound is 340 m/s, the frequency of the third harmonic of this pipe is:
A. 200 Hz
B. 300 Hz
C. 400 Hz
D. 600 Hz

Q.10 Doppler effect is applicable for
A. Sound wave
B. Light waves
C. Both 'A' and 'B'
D. None of above

Q.11 Radio waves are sent towards a moving aeroplane by a radar and the reflected waves are received by the radar. If the aeroplane is moving towards the radar, then the wavelength of the reflected wave_____
A. Increases
B. Decreases
C. Both A and B
D. None

Q.12 Four wires of identical lengths, diameters and material and stretched on a sonometer box. The ratio of their tension is 1 : 4 : 9 : 16. the ratio of their fundamental frequencies is
A. 1 : 6 : 9 : 16
B. 4 : 3 : 2 : 1
C. 1 : 2 : 3 : 4
D. 1 : 4 : 9 : 16

Q.13 A sound wave has a wavelength of 3.0 m. The distance between the center of a compression and the center of the next adjacent rarefaction is ____.
A. 0.75 m
B. 1.5 m
C. 3.0 m
D. 6.0 m

Q.14 A vibrating object with a frequency of 200 Hz produces sound which travels through air at 360 m/s. The number of meters separating the adjacent compressions in the sound wave is____.

A. 0.90 B. 1.8 C. 3.6 D. 7.2

Q.15 Which of the following phenomenon cannot take place with sound wave?
A. Reflection B. Polarization
C. Diffraction D. Interference

Q.16 Audible waves have a frequency
A. 0 – 10,000 Hz B. 20 – 20 kHz
C. 20 – 40 kHz D. 20 – 10,000 Hz

Q.17 In a stationary wave the strain is_____
A. Maximum at nodes B. Maximum at antinodes
C. Constant throughout D. All of these

Q.18 The colour of a star is changing from blue to red. This indicates that the star is_____
A. Approaching the earth B. Going away from the earth
C. Is stationary D. Emitting waves of only blue and red lights

Q.19 Pure constructive interference occurs between two waves when they have the same:
A. Frequency and are in phase B. Frequency and are out of phase
C. Amplitude and are in phase D. Amplitude and are out of phase

Q.20 The frequency of the note produced by plucking a given string increases as
A. The length of the string increases
B. The tension in the string increases
C. The tension in the string decreases.
D. The mass per unit length of the string increases

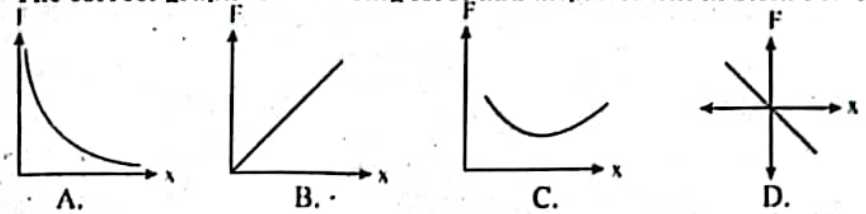
Q.21 A resonating column of air contains
A. Stationary longitudinal waves B. Stationary transverse waves
C. Transverse progressive waves D. Longitudinal progressive waves

Q.22 In simple harmonic motion:
A. The period depends on the amplitude
B. The velocity is greatest at the maximum displacement
C. The acceleration is greatest at the maximum displacement
D. The acceleration is constant

Q.23 In sound waves during the compressions
A. Density of medium is maximum B. Density of the medium is minimum
C. Pressure of medium is maximum D. Both 'A' and 'C'

Q.24 A plane produces a sonic boom only when
A. It emits sound waves of very long wavelength
B. It emits sound waves of high frequency
C. It flys faster than the speed of sound
D. It flys on a curved path

Q.25 The correct graph for restoring force and displacement in S.H.M is



Q.26 For undersea communication which waves are especially preferable:
A. Ultrasonic B. Infrasonic
C. Infrared D. Microwaves

Q.27 The v_o and v_t are speeds of sound in a gas at 0°Cand t°C then $\frac{"v_t"}{v_o}$ is _____
A. $v_o + 0.6t$ B. 1+546t
C. $1+\frac{t}{546}$ D. $1+\frac{546}{t}$

Q.28 Time period of simple pendulum is 4 seconds, if its length is increased by 4 times, then its period become?
A. 16 s B. 12 s C. 8 s D. 4 s

Q.29 A particle is performing simple harmonic motion with amplitude A and angular velocity ω. The ratio of maximum velocity to maximum acceleration is
A. ω B. 2ω
C. 1/ω D. 2/ω

Q.30 In strings, the position of antinodes is obtained at

A. $\lambda, 2\lambda, 3\lambda$ B. $2\lambda, 4, 6\lambda$

C. $0, \frac{\lambda}{2}, \lambda$ D. $\frac{\lambda}{4}, \frac{3\lambda}{4}, \frac{5\lambda}{4}$

Q.31 The displacement of a body performing S.H.M is $x = 0.25 \cos\left(\frac{\pi}{8}\right)t$, the amplitude of motion will be

A. 0.2 B. 0.25

C. 0.3 D. 0.125

Q.32 A S.H.M has period of 0.01s and amplitude 0.2m velocity at mean position is

A. 20π B. 40π

C. 60π D. 80π

Q.33 If the number of loops of a stationary wave are increasing, then $S = n\lambda$.

A. λ increases B. λ remains same

C. λ decreases D. None of these

Q.34 Sound travels a distance of 80 m in 40 vibrations of tuning fork, what is its wavelength

A. 0.5 m B. 3 m

C. 2 m D. 4 m

Q.35 When a string of mass 'm' per unit length is stretched by a force 'T', its frequency is given by

A. $\frac{1}{2l}\sqrt{\frac{T}{m}}$ B. $\frac{n}{2l}\sqrt{\frac{T}{m}}$ C. $2l\sqrt{\frac{T}{m}}$ D. $\frac{1}{2}\sqrt{\frac{T}{m}}$

Q.36 In open organ pipe, if fundamental frequency is f then the other frequencies are

A. f, 2f, 3f, 4f B. f, 2f, 4f, 8f

C. f, 3f, 5f D. 2f, 4f, 6f

Q.37 The time period of a simple pendulum at Karachi and Murree are related as

A. $T_K = T_M$ B. $T_K > T_M$

C. $T_K < T_M$ D. $2T_K = 3T_M$

Q.38 In an isolated system the total energy of vibrating mass and spring is

A. Variable B. Low

C. High D. Constant

Q.39 While deriving the equation of time period for simple pendulum which quantity should be kept small?

A. Length of simple pendulum B. Amplitude

C. Mass of the bob D. Gravitational acceleration g

Q.40 To make the frequency double of a spring oscillation, we have to:

A. Reduce the mass to one fourth B. Quadruple the mass

C. Double the mass D. Half the mass

Q.41 Two springs of spring constant k_1 and k_2 are joined in series. The effective spring constant of the combination is given by

A. $\frac{k_1 + k_2}{2}$ B. $k_1 + k_2$

C. $\frac{k_1 k_2}{k_1 + k_2}$ D. $\sqrt{k_1 k_2}$

Q.42 What is the value of a spring constant when a 100g mass is attached to a spring and it is accelerated 0.5m s^{-2} through a displacement of 5 cm? $K = \frac{am}{x}$.

A. 0.1 N m^{-1} B. 0.5 N m^{-1}

C. 1 N m^{-1} D. 5 N m^{-1}

Q.43 When a body is performing S.H.M then at its extreme position.

A. Displacement is zero B. Amplitude is zero

C. Velocity is zero D. P.E is zero

Q.44 The time period of a body attached to a spring depends upon.

A. Amplitude B. Mass

C. Length D. Displacement

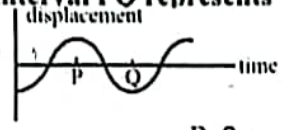
Q.45 The phase angle between two points is 3π. The distance between these points is 15 cm. What is the wavelength of the wave?
A. 30 cm B. 45 cm
C. 5 cm D. 10 cm

Q.46 Which of the following phenomenon is based on superposition principle?
A. Interference B. Standing waves
C. Beats D. All of these

Q.47 A second's pendulum is one who has time period of
A. 1 s B. 2 s C. $\frac{1}{2}s$ D. 0.2 s

Q.48 In S.H.M., at what distance from mean position in terms of amplitude x_o, K.E. and P.E both will have equal value?
A. $0.51x_o$ B. $0.61\ x_o$
C. $0.71x_o$ D. $0.81\ x_o$

Q.49 In the diagram below, the interval PQ represents



A. Wavelength/2 B. 2 × amplitude
C. Wavelength D. Period/2

Q.50 Longitudinal wave consists of;
A. Crests and troughs B. Compression and rarefactions
C. Crests and compressions D. Troughs and rarefactions

Q.51 Which one of the following parameters of a wave does not change when it transmits through two different media?
A. Amplitude B. Velocity
C. Frequency D. Tidal

Q.52 If the tension in the string is doubled and its mass per unit length is reduced to half. Then the speed of transverse wave on it is
A. Doubled B. Halved
C. Constant D. One fourth

Q.53 If the amplitude of a wave is doubled, then its intensity is
A. Doubled B. Halved
C. Quadrupled D. One forth

Q.54 In a S.H.M. the energy of the system
A. Is independent of the amplitude B. Is directly proportional to the amplitude
C. Is inversely proportional to the amplitude D. Is proportional to the amplitude squared

Q.55 The maximum potential energy of a simple harmonic oscillator of mass m, angular frequency ω and amplitude x_o is given by:
A. $\frac{1}{2}m\omega^2x_o^2$ B. $\frac{1}{2}m\omega x_o^2$
C. $m\omega x_o^2$ D. $m\omega^2x_o$

Q.56 A body is moving in a circle with uniform speed. Its motion is
A. Periodic and S.H.M B. Periodic but not S.H.M
C. Variable D. None of these

Q.57 The displacement of particle in S.H.M. in one-time period, if its amplitude of its motion is "A" will be
A. Zero B. 2A
C. A D. 4A

Q.58 What is phase difference between two successive troughs in the transverse wave?
A. 2π B. $\frac{3}{\pi}$ C. $2\pi/2$ D. $\pi/2$

Q.59 What is the velocity of transverse waves travelling along a thin copper wire of length 50 cm and mass1 gram, if it is stretched by a weight of 4 kg?
A. 60 m/s B. 90 m/s
C. 110 m/s D. 140 m/s

Q.60 A 40 cm long plastic tube is open at both ends and resonating in its first harmonic. The wavelength of the sound which will produce this resonance is ____.
A. 20. cm B. 40. cm
C. 80. cm D. 160 cm

3→ $T_2 = n^2 T_1$

$= \frac{15}{10} \times \frac{15}{10} \times 300$

$= 675 - 273$

$= 402°C$

KIPS PREPARATIONS

	A	B	C	D		A	B	C	D		A	B	C	D		A	B	C	D
1	○	○	○	●	16	○	●	○	○	31	○	●	○	○	46	○	○	○	●
2	○	○	●	○	17	●	○	○	○	32	○	●	○	○	47	○	●	○	○
3	○	●	○	●	18	○	●	○	○	33	○	○	●	○	48	○	○	●	○
4	●	○	○	○	19	●	○	○	○	34	○	○	●	○	49	○	○	○	●
5	○	○	○	●	20	○	●	○	○	35	○	●	○	○	50	○	●	○	○
6	○	●	○	○	21	●	○	○	○	36	●	○	○	○	51	○	○	●	○
7	○	●	○	○	22	○	○	●	○	37	○	○	●	○	52	●	○	○	○
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9	○	●	○	●	24	○	●	●	○	39	○	●	○	○	54	○	○	○	●
10	○	○	●	○	25	○	○	○	●	40	●	○	○	○	55	●	○	○	○
11	○	●	○	●	26	●	○	○	●	41	○	○	●	○	56	○	●	○	○
12	○	○	●	○	27	○	○	●	○	42	○	○	●	○	57	●	○	○	○
13	○	●	○	○	28	○	○	●	○	43	○	○	●	○	58	●	○	○	○
14	○	●	○	○	29	●	○	●	○	44	○	●	○	○	59	○	●	○	●
15	○	●	○	○	30	○	○	○	●	45	○	○	○	●	60	○	○	●	○

PHYSICS MDCAT

UNIT–5 (A-SERIES)

TOPICS:

✓ **Thermodynamics**

Q.1 For an ideal gas, the potential energy associated with its molecules is:

A. Maximum B. Zero C. $\frac{1}{2}kx^2$ D. $\frac{1}{2}kx$

Q.2 The internal energy of system does not depend upon:

A. Temperature B. Pressure
C. Path D. Initial and final state

Q.3 The SI unit of product of pressure and volume is:

A. Watt B. Joule C. Pascal D. N m

Q.4 Which is not the example of adiabatic process:

A. Rapid escape of air from burst tyre
B. Rapid expansion of air
C. Conversion of water into ice in a refrigerator
D. Cloud formation in the atmosphere

Q.5 According to first law of thermodynamics the quantity which is conserved is:

A. Force B. Momentum
C. Power D. Energy

Q.6 The ratio of $\frac{C_p}{C_v} = \gamma$ for diatomic gas like air is:

A. 1.40 B. 1.30 C. 1.29 D. 1.67

Q.7 For a diatomic gas $C_v = \frac{5R}{2}$, then "γ" for this

A. $\frac{5}{7}$ B. $\frac{4}{35}$ C. $\frac{7}{5}$ D. $\frac{35}{4}$

Q.8 A gas in an insulated cylinder is compressed rapidly and its internal energy increases by 25 J. Work done during this process is

A. 25 J B. 50 J
C. –25 J D. –50 J

Q.9 If volume of gas is doubled without changing its temperature, the pressure of gas is

A. Doubled B. Reduced to one fourth of original value
C. Reduced to half of original value D. Not changed

Q.10 If C_P for a gas is 2R then the value of C_V will be:

A. $\frac{3R}{2}$ B. $\frac{5R}{2}$ C. $\frac{9R}{2}$ D. R

Q.11 Pressure changes from 30Pa to 10Pa and volume changes from $2m^3$ to $5m^3$ in a process where Boyle's law applicable. Then change in internal energy is

A. 10 J B. 20 J
C. 40 J D. 0J

Q.12 In which process the P–V indicator diagram is straight line parallel to volume axis?

A. Isobaric B. Adiabatic
C. Isothermal D. Isochoric

Q.13 If the heat capacity of a 10g of a substance is 300 JK^{-1} then the heat capacity of 100g of same substance would be equal to

A. 300 JK^{-1} B. 3 JK^{-1}
C. 3000 JK^{-1} D. 30 JK^{-1}

Q.14 The amount of heat energy required to raise the temperature of a body of mass 1 kg through 1 K is called:

A. Specific heat B. Molar specific heat
C. Heat capacity D. Heat of vaporization

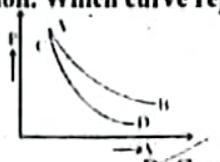
Q.15 C_V of a gas is 8 $calK^{-1}mol^{-1}$. Find C_P/C_V. Assume R = 2 $calK^{-1}mol^{-1}$.

A. 1.4 B. 1.33
C. 1.25 D. 1.8

Q.16 As $C_p - C_v = R$ shows that $C_p > C_v$. What is also true?

A. $\Delta T_p > \Delta T_v$ B. $\Delta U_p > \Delta U_v$
C. Both "A" and "B" D. $\Delta U_p = \Delta U_v$

Q.17 **In the figure curves AB and CD represent the relation between pressure P and volume V of an ideal gas. One of the curves represents on isothermal expansion and the other represents an adiabatic expansion. Which curve represents an adiabatic expansion?**

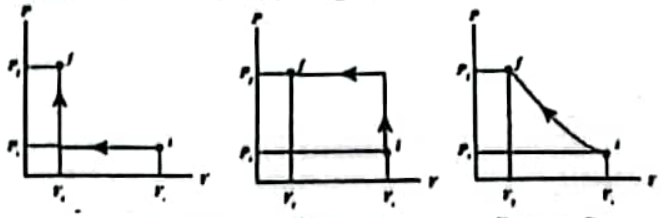


A. Curve AB
B. Curve CD
C. Both "A" and "B"
D. None of these

Q.18 **Internal energy of a system is defined as**
A. The sum of kinetic energies of all molecules of the system
B. The sum of kinetic and potential energies of all molecules of the system
C. The sum of potential energies of the system
D. The average kinetic energy of all molecules

Q.19 **The heat capacity of sodium metal is 1500 JK^{-1}, if the mass of the sodium metal is 75 kg, the specific heat capacity would be**
A. 20 J kg^{-1} $°C^{-1}$
B. 40 J kg^{-1} $°C^{-1}$
C. 10 J kg^{-1} $°C^{-1}$
D. 80 J kg^{-1} $°C^{-1}$

Q.20 **An ideal gas is taken from (P_i, V_i) to (P_f, V_f) in three different ways. Identify the process in which the work done on the gas the most.**



Process A Process B Process C

A. Process A
B. Process B
C. Process C
D. Equal work is done in Process A, B & C

Q.21 **In Which process all the heat supplied is converted into work done?**
A. Isothermal
B. Isochoric
C. Isobaric
D. Isentropic

Q.22 **If 1 mole of an ideal gas is heated at constant pressure, then**
A. $Q_p = C_v \Delta T$
B. $Q_p = C_p \Delta T$
C. $Q_v = C_v \Delta T$
D. $Q_v = C_p \Delta T$

Q.23 **When the piston of a bicycle pump with a blocked outlet is pushed rapidly to decrease the volume of air; then which one of the following is incorrect for the air inside the pump**
A. Internal energy increases
B. Mean translational K.E of molecules increases
C. Temperature increases
D. Work done is positive

Q.24 **The internal energy of a body is maximum when its temperature is**
A. 0 K
B. 273 K
C. –273 K
D. –273 °C

Q.25 **Two thermometers X and Y are placed inside an enclosure. Whose walls are maintained at a steady temperature T. When equilibrium in established, X and Y will give the same reading T.**
A. Under all circumstance
B. Only if both one perfect absorber
C. Only if they absorb radiation at equal rates
D. Only if they have equal thermal capacities

Q.26 **Which of the following is not a thermodynamics co-ordinate?**
A. P B. T C. V D. R

Q.27 **The ratio of $W_{isothermal}$ to $W_{adiobatic}$ during same expansion is**
A. > 1
B. = 1
C. < 1
D. Zero

Q.28 **For 1 mole of gas the relation PΔV=**
A. RΔT
B. RΔV
C. RΔP
D. PΔT

Q.29 A 2 kg mass of copper is heated for 40s by a heater that produces 100J/s. The specific heat capacity of copper is 400j/(kg K). What is the rise in temperature?
A. 5K B. 10 K C. 50K D. 20 K

Q.30 Which of the following is true for a closed system?
A. Mass does not enter or leave the system
B. Mass entering can be more or less than mass leaving
C. Mass entering = mass leaving
D. None of these

Q.31 A point on p-V diagram represent
A. Work done in cyclic process B. A thermodynamic process
C. Heat supplied to system D. State of thermodynamic system

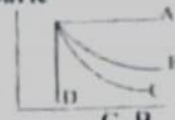
Q.32 When compressed gas is suddenly allowed to expand, which of the following equation determines the P – V relationship with γ being the gas constant?
A. $PV = \gamma$ B. PV^{γ} = constant C. VP^{γ} = constant D. PV/γ = constant

Q.33 Thermodynamic is the study of relationship between
A. Heat & Surrounding B. Heat & other form of energy
C. Heat & Liquid D. Heat & chemical energy

Q.34 The curve represents isothermal process is called
A. Isotherm B. Adiabatic C. Both 'A' and 'B' D. Either A or B

Q.35 Consider the ratios of the heat capacities $\gamma = C_p/C_v$ for the three types of ideal gases: monatomic, diatomic, and polyatomic.
A. γ is the greatest for monatomic gases
B. γ is the greatest for polyatomic gases
C. γ is the same only for diatomic and polyatomic gases
D. γ is the same only for monatomic and diatomic gases

Q.36 Which PV curve shown in fig is isobaric



A. A B. C C. B D. D

Q.37 When heat in given to a gas in an isobaric process, then
A. The work is done by the gas B. Internal energy of the gas increases
C. Both 'A' and 'B' D. None of these

Q.38 The rapid expansion and compression of air through which a sound wave is passing, obeys
A. Isothermal process B. Isochoric process
C. Adiabatic process D. Isobaric process

Q.39 In an adiabatic process, PV^{γ} = constant; the value 'γ' is
A. $\frac{C_v}{C_p}$ B. $\frac{R}{C_v} - 1$ C. $1 - \frac{R}{C_v}$ D. $1 + \frac{R}{C_v}$

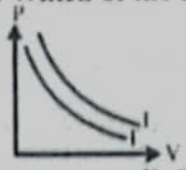
Q.40 Consider boiling water converting into steam. Under this condition, the specific heat of water is
A. Less than zero B. Slightly greater than zero
C. Zero D. Infinite

Q.41 The internal energy of a monoatomic ideal gas is
A. Only kinetic energy B. Partly kinetic and partly potential energies
C. Only potential energy D. None of these

Q.42 Assume we can change the equilibrium state of a system via two different processes. Assume that the initial and the final state are the same. Which of the quantities ΔU, ΔQ, ΔW, and ΔT must be the same for the two processes?
A. only ΔQ and ΔW B. only ΔU and ΔT
C. only ΔQ and ΔT D. only ΔU and ΔW

Q.43 Which substance possesses the largest internal energy at t°C
A. Solid B. Liquid C. Gas D. All of these

Q.44 Figure shows the pressure P versus volume V graphs for a certain mass of a gas at two constant temperatures T_1 and T_2. Which of the following inferences is correct?



A. $T_1 = T_2$ B. $T_1 < T_2$
C. $T_1 > T_2$
D. No inference can be drawn due to insufficient information

Q.45 A thermos bottle containing hot coffee is vigorously shaken. Consider coffee as the system, then its temperature
A. Increase B. Decreases below than 0°C
C. Remains the same D. Decreases

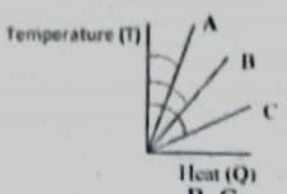
Q.46 Internal energy of a substance is defined in terms of
A. P and V B. P and T C. T and V D. P, V and T

Q.47 The ratio between work done and heat energy is equal to:
A. Adiabatic constant B. Joul's constant
C. Specific head constant D. Real gas constant

Q.48 First law of thermodynamics is based upon law energy is called;
A. Mass B. Energy C. Momentum D. Charges

Q.49 The equation $\Delta Q = \Delta U$ represents a process
A. Isochoric B. Isobaric C. Isothermal D. None

Q.50 Which of the substances A, B or C has the highest specific heat? The temperature vs heat graph is



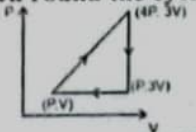
A. A B. C
C. B D. All have equal specific heats

Q.51 A process in which the system remains at thermal equilibrium in known as:
A. Isobaric B. Isochoric C. Isothermal D. Adiabatic

Q.52 The quantity of matter or region of space whose behavior is being studied is
A. Closed system B. Isolated system
C. Open system D. System

Q.53 During adiabatic compression of a gas, its temperature:
A. Remains constant B. Becomes zero C. Falls D. Rises

Q.54 An ideal monatomic gas has taken round the cycle, work done during the cycle is:



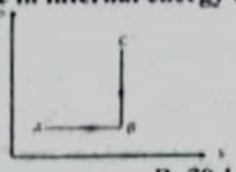
A. Zero B. 6PV
C. 3 PV D. 9PV

Q.55 First law of thermodynamics can be witter as $C_v\Delta T = \Delta Q - P\Delta V$. In a change for which Boyle's law is observed, which of the following would necessarily zero?
A. ΔQ B. ΔT C. ΔV D. C_v

Q.56 A thermodynamics system undergoes a process in which its internal energy decreases by 300J. If at the same time 120J of work is done on the system, then the heat lost by the system will be
A. 420J B. – 420J C. 3420J D. – 180J

Q.57 What can be calculated from the curve under PV graph
A. Heat B. Work done C. Temperature D. Force

Q.58 The P-V diagram of a system undergoing thermodynamic transformation is shown in figure. The work done by the system in going from A→B→C is 30J and 40J heat is given to the system. The change in internal energy between A and C



A. 10 J B. 70 J
C. 84 J D. 134 J

Q.59 Given that $P = 10^4\ Nm^{-2}$, area of the piston is equal to $0.1\ m^2$ and distance moved by the piston is equal to 10^{-1} cm, then work done by the gas is:
A. 1J B. 104 J C. 105 J D. 10J

Q.60 An ideal gas is heated from 20°C to 40°C under constant pressure the change in internal energy is:
A. Zero under constant pressure B. Double the original value
C. Proportional to change in volume D. Proportional to change in temperature

KIPS
PREPARATIONS

	A	B	C	D		A	B	C	D		A	B	C	D		A	B	C	D
1	○	●	○	○	16	○	○	●	●	31	○	○	○	●	46	○	○	●	●
2	○	○	●	○	17	○	●	○	○	32	○	●	○	○	47	○	●	○	○
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8	○	○	●	○	23	○	○	○	●	38	○	○	●	○	53	○	○	○	●
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10	○	○	○	●	25	●	○	○	●	40	○	○	○	●	55	○	●	○	○
11	○	○	○	●	26	○	○	○	●	41	●	●	○	○	56	○	●	○	○
12	●	○	○	○	27	●	○	○	○	42	○	●	○	○	57	○	●	○	○
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15	○	○	●	○	30	●	○	○	○	45	●	○	○	○	60	○	○	○	●

Physics units os: Thermodynamics.

13. $Q = mc\Delta T$ $\quad \therefore Q = C\Delta T$

$C\Delta T = mc\Delta T \Rightarrow \boxed{C \propto m}$

15 $C_p - C_v = R$ $\quad \Rightarrow C_p/C_v = 1.25$

$C_p = C_v + R = 10$

19 $\frac{1500}{75} = 20$

19 $C_{SH} = \frac{1}{m} C_{H.C} \rightarrow \boxed{C_{H.C} \propto m}$

27 $W_{isothermal} > W_{adiabatic}$.

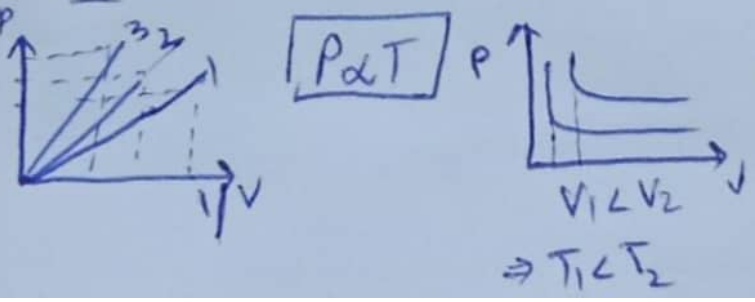
29 $\frac{Q}{t} = mc\frac{\Delta T}{t} \Rightarrow 100 = 2 \times 400 \times \frac{\Delta T}{40} \Rightarrow 5\,K$

39 $C_p - C_v = R$

$C_v\left(\frac{C_p}{C_v} - 1\right) = R$

$C_v(\gamma - 1) = R \Rightarrow \gamma - 1 = \frac{R}{C_v} \Rightarrow \gamma = 1 + \frac{R}{C_v}$

43 Gases $T \propto K.E \propto U$

44 

Imp

47 $\frac{W}{Q} \Rightarrow$ joule's constant.

54 $W = P\Delta V$

$(3p)(2v) = 6PV$

$6PV \times \frac{1}{2} \Rightarrow 3PV$

56 $Q = U + W$

$= -300 - 120 \Rightarrow -420$

58 $Q = U + W \rightarrow U = Q - W = 10\,J$

59 $W = P.(A\Delta y)$

$10^4 \times \frac{1}{10} \times 10^{-3}$

$10^4 \times 10^{-4} = 1$

PHYSICS MDCAT

UNIT–6 (A-SERIES)

TOPICS:

✓ **Electrostatics**

Q. 1 **The force of proton in electric field of magnitude 10^6 N/C is:**

A. 1.6×10^{-15}N
B. 1.6×10^{13}N
C. 1.6×10^{9}N
D. 1.6×10^{-13}N

Q. 2 **A capacitor of 1.0 F will:**

A. Store 1.0C charge at the potential difference of 1.0V
B. Discharge in 1 second when connected across resistor of 1.0Ω
C. Be fully charged in 1 second by a current of 1A
D. Block the alternating current

Q. 3 **If a 10 F capacitor is to have an energy content of 20 J, it must be placed across a potential difference of**

A. 4 volts
B. 9 volts
C. 2 volts
D. 1 volts

Q. 4 **The electrostatic force between two-point charges is independent of one of the following quantities:**

A. Magnitude of charges
B. Temperature of the charges
C. Distance between charges
D. Medium between charges

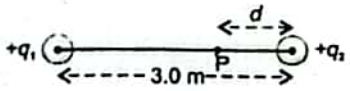
Q. 5 **Two charges q_1 and q_2 are kept at a certain distance in air. If a dielectric (glass slab) is introduced between them, the force between the charges will_____**

A. Increase
B. Decrease
C. Remain unchanged
D. Be doubled

Q. 6 **The electric potential due to the nucleus of the hydrogen atom at a distance of 5.3×10^{-11} m is 27.2 V. What is the potential due to the helium nucleus at the same distance?**

A. 27.2V
B. 54.4 V
C. 13.6 V
D. 27.2 V

Q. 7 **Two positive point charges $q_1=16.0\mu C$ and $q_2=4.0\mu C$ are separated by a distance of 3.0 m, as shown in Fig. Find the spot on the line joining the two charges where electric field is zero.**



A. 1m
B. –1m
C. 2m
D. None of these

Q. 8 **An electric charge produces an electric intensity of 500 N/C, at a point in air. If the air is replaced by a medium of dielectric constant 2.5, then the intensity of the electric field due to the same charge at the same point will be_____**

A. 100 N/C
B. 150 N/C
C. 200 N/C
D. 300 N/C

Q. 9 **The separation between the plates of a charged parallel plate capacitor is doubled by keeping the charge constant. In this case_____**

A. Potential difference is halved
B. The capacitance is doubled
C. The p.d. between the plates is doubled
D. The capacitance is halved but the energy of the capacitor is not changed

Q. 10 **Which is the correct relation?**

A. Charge = Potential/ Capacity
B. Capacity = Potential x Charge
C. Potential = Charge/ Capacity
D. Potential = Capacity x Charge

Q. 11 **The electric field at a point inside a sphere uniform surface density of charge is_____**

A. Constant
B. Directly proportional to the distance of the point from the centre
C. Zero
D. Inversely proportional to the square of the distance of the point from the centre

Q. 12 **If the test charge is free to move, it will always move in the direction of**

A. Electric field intensity
B. Opposite to electric field
C. Magnetic field
D. All of these

Q. 13 Two large metal sheets having surface charge density $+\sigma$ and $-\sigma$ are kept parallel to each other at a small separation distance d. The electric field at any point in the region between the plates is

A. σ/ε_0 B. $\sigma/2\varepsilon_0$ C. $2\sigma/\varepsilon_0$ D. $\sigma/4\varepsilon_0$

Q. 14 Each plate of a capacitor stores a charge of magnitude 1 mC when a 100V potential difference is applied. The capacitance is:

A. 5 μF B. 10 μF C. 50 μF D. 100 μF

Q. 15 Which of the following remains unchanged if a dielectric is placed between a charged capacitor?

A. Q B. E C. F_e D. V

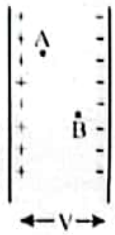
Q. 16 The potential gradient between the two charged plates having separation of 0.5 cm and potential difference of 12 volts is:

A. 240 NC^{-1} B. 24 NC^{-1} C. 2.4 NC^{-1} D. 2400 NC^{-1}

Q. 17 The main function of a capacitor is to

A. Block current flow B. Store energy
C. Help current flow D. Dissipate heat

Q. 18 Two protons A and B are placed is between the two plates of a parallel plate capacitor charged to a potential difference V as shown in figure. The force on two protons are F_A and F_B; then



A. $F_A > F_B$ B. $F_A < F_B$
C. $F_A = F_B$ D. Nothing can be predicted

Q. 19 The potential inside a hollow spherical conductor

A. Is constant
B. Varies directly as the distance from the centre
C. Varies inversely as the distance from the centre
D. Varies inversely as the square of the distance from the centre

Q. 20 When potential in a capacitor rises from 0 to V, then average potential difference is

A. V B. $\frac{V+V}{2}$ C. –V D. $\frac{V}{2}$

Q. 21 The coulomb's force between the 2-point charges 10μC and 5μC placed at a distance of 150cm is

A. 0.2 N B. 0.5 N C. 2 N D. 10 N

Q. 22 A capacitor charges and discharges:

A. Rapidly B. Linearly
C. Exponentially D. Logarithmically

Q. 23 Potential gradient is defined as

A. The maximum value of rate of change of potential with distance
B. The minimum value of rate of change of potential with distance
C. The maximum value of rate of change of potential with time
D. None of these

Q. 24 The value of K depends upon

A. Quantity of charges B. Nature of medium between the charges
C. Both A and B D. None of these

Q. 25 Which of the following is equivalent to SI unit of potential?

A. N m C^{-1} B. N^3 m C^{-2} C. N^2 m C^{-1} D. N m

Q. 26 In central region of a parallel plate capacitor the electric field lines are

A. Perpendicular B. Orthogonal C. Parallel D. Curved

Q. 27 Electric field intensity is a

A. Scalar quantity B. Linear quantity
C. Vector quantity D. None of these

Q. 28 The coulomb's law is valid for the charges which are

A. Moving and point charges B. Stationary and point charges
C. Moving and non-point charges D. Stationary and large size charges

Q. 29 On removing the dielectric from a charged capacitor, its energy

A. Increases B. Decreases
C. Remains unchanged D. None of the above

Q. 30 The work done in placing a charge of 8×10^{-18} C on a capacitor of capacitance of 100 μF is

A. 32×10^{-32} J B. 3.1×10^{-26} J C. 16×10^{-32} J D. 4×10^{-10} J

Q. 31 A pellet carrying a charge of 0.5C is accelerated through a Potential difference of 2000 volt, it attains a kinetic energy equal to:

A. 1000 erg
B. 1000 joule
C. 1000 kWh
D. 500 erg

Q. 32 Due to polarization_____between the plates of capacitor _____

A. E, decreases
B. σ decreases
C. V, decrease
D. All of these

Q. 33 Let k denote $1/4\pi\ \varepsilon_o$. The magnitude of the electric field at a distance r from an isolated point particle with charge q is:

A. kq/r
B. kr/q
C. kq/r^3
D. kq/r^2

Q. 34 Electrostatic force as compared to the gravitational force is

A. Very weak
B. Equal
C. Very strong
D. Half of the gravitational field

Q. 35 The force between two neutrons placed at a distance of 1cm from each other is:

A. 9×10^9N
B. Zero
C. 4×10^4N
D. 1.6×10^{-19}N

Q. 36 When an RC circuit is connected across a battery amount of charge deposited on plates is .....times the equilibrium charge after one time constant.

A. 0.63
B. 0.67
C. 0.75
D. 0.86

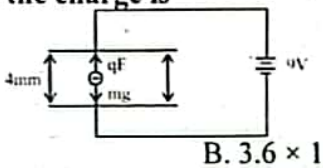
Q. 37 What will be the new surface density if electric intensity is increased to 3 times?

A. 9σ
B. $\sigma/3$
C. 3σ
D. $\sigma/27$

Q. 38 The electric lines are farther apart where field is

A. Strong
B. Weak
C. Zero
D. None of these

Q. 39 The electric field acting on the charge is



A. $4.4 \times 10^{-4}NC^{-1}$
B. $3.6 \times 10^2NC^{-1}$
C. $36\ NC^{-1}$
D. $2.3 \times 10^3NC^{-1}$

Q. 40 A soap bubble is give a negative charge, then its radius

A. Decreases
B. Remains same
C. Increases
D. Bubble will disappear

Q. 41 Coulomb's Force is

A. Adhesive Force
B. Opposing Force
C. Force of friction
D. Mutual Force

Q. 42 A capacitor with air as the dielectric is charged to a potential of 100 *volts*. If the space between the plates is now filled with a dielectric of dielectric constant 10, the potential difference between the plates will be

A. 1000 volts
B. 100 volts
C. 10 volts
D. Zero

Q. 43 The electric field created by positive charge is

A. Radially outward
B. Circular
C. Radially inward
D. Zero

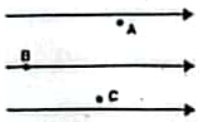
Q. 44 An electron is moving around the nucleus of a hydrogen atom in a circular orbit of radius r. The coulomb force $\vec{F}$ between the two is

A. $-K\frac{e^2}{r^3}\hat{r}$
B. $K\frac{e^2}{r^3}\vec{r}$
C. $-K\frac{e^2}{r^3}\vec{r}$
D. $K\frac{e^2}{r^2}\hat{r}$

Q. 45 The expression for electric potential V_r at a distance 'r' from 'q' is

A. $V_r = \frac{1}{4\pi\epsilon_o}\frac{q}{r^2}$
B. $V_r = K\frac{q}{r}$
C. $V_r = \frac{1}{4\pi\epsilon_o}\frac{q}{r}$
D. Both 'B' & 'C'

Q. 46 What is the electric potential of the points A, B, and C which are in a uniform electric field?



A. The electric field is the same at all three points A, B, and C
B. Maximum at A
C. Maximum at B
D. Maximum at C

Q. 47 What is the initial current while charging a capacitor?
A. High
B. Low
C. 0
D. Cannot be determined

Q. 48 Electric potential difference can be defined as:
A. $\Delta V = \Delta U - q$
B. $\Delta V = \Delta U / q$
C. $\Delta V = \Delta U + q$
D. $\Delta V = \Delta U q$

Q. 49 If a metallic conductor is charged negatively then its weight
A. Remains same
B. First increases then decrease
C. Decreases then increase
D. Increases for a while

Q. 50 Two particles, each with charge Q, and a third particle, with charge q, are placed at the vertices of an equilateral triangle as shown. The total force on the particle with charge q is:

A. Parallel to the left side of the triangle
B. Parallel to the right side of the triangle
C. Parallel to the bottom side of the triangle
D. Perpendicular to the bottom side of the triangle

Q. 51 Capacitors C_1, C_2 and C_3 have voltage drops 2V, 3V and 5V respectively. Calculate the total voltage in the circuit.
A. 10V
B. 2V
C. 5V
D. 0V

Q. 52 Two conducting spheres of radius r_1 and r_2 are at the same potential. The ratio of their charges is:
A. $\left(\frac{r_1^2}{r_2^2}\right)$
B. $\left(\frac{r_2^2}{r_1^2}\right)$
C. $\left(\frac{r_1}{r_2}\right)$
D. $\left(\frac{r_2}{r_1}\right)$

Q. 53 The dielectric constant of metals is_____
A. One
B. Zero
C. Infinity
D. Greater than one

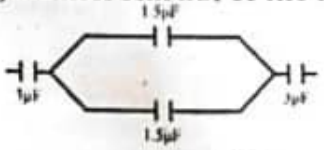
Q. 54 When we rub a glass rod with a silk cloth then
A. Glass rod acquires negative charge while silk acquires a positive charge
B. Glass rod acquires positive charge while silk acquires negative charges
C. Both glass rod and silk acquire a negative charge
D. Both glass rod and silk acquire a positive charge

Q. 55 A negative charge is moved from a low potential to a high potential point then the electric potential energy.
A. Increase
B. Will remain the same
C. Decrease
D. Nothing definite can be predicted

Q. 56 When two capacitors of capacitance 1μ F and 2 μ F are connected is series then the effective capacitance will be
A. $\frac{2}{3}\mu F$
B. $\frac{3}{2}\mu F$
C. $3\mu F$
D. $4\mu F$

Q. 57 Charges of +2μc and –2μc are placed at points (P) and (Q) respectively. Tell the location at which electric potential is zero.
A. Right from Q
B. Left from P
C. Both 'A' and 'B'
D. Mid way between (P) and (Q)

Q. 58 The equivalent capacitance, in microfarad, of the network given below is



A. 1
B. 2
C. 1.5
D. 3

Q. 59 The potential at a point, where a charge of 1×10^{-3} C is placed at a distance of 10 m is:
A. 1 mV
B. 1.6 kV
C. 900 kV
D. 0.15 kV

Q. 60 Area under Q –V graph for a capacitor represents
A. Charged stored
B. Electric field strength
C. Energy stored
D. Potential difference

KIPS
PREPARATIONS

	A	B	C	D		A	B	C	D		A	B	C	D		A	B	C	D
1	○	○	○	●	16	○	○	○	●	31	○	●	○	○	46	○	○	●	○
2	●	○	○	○	17	○	●	○	○	32	○	○	○	●	47	●	○	○	○
3	○	○	●	○	18	○	○	●	○	33	○	○	○	●	48	○	●	○	○
4	○	●	○	○	19	●	○	○	○	34	○	○	●	○	49	○	○	○	●
5	○	●	○	○	20	○	○	○	●	35	○	●	○	○	50	○	○	○	●
6	○	●	○	○	21	●	○	○	○	36	●	○	○	○	51	●	○	○	○
7	●	○	○	○	22	○	○	●	○	37	○	○	●	○	52	○	○	●	○
8	○	○	●	○	23	●	○	○	○	38	○	●	○	○	53	○	○	●	○
9	○	○	●	○	24	○	●	○	○	39	○	○	○	●	54	○	●	○	○
10	○	○	●	○	25	●	○	○	○	40	○	○	●	○	55	○	○	●	○
11	○	○	●	○	26	○	○	●	○	41	○	○	○	●	56	●	○	○	○
12	●	○	○	○	27	○	○	●	○	42	○	○	●	○	57	○	○	○	●
13	●	○	○	○	28	○	●	○	○	43	●	○	○	○	58	●	○	○	○
14	○	●	○	○	29	●	○	○	○	44	○	○	●	○	59	○	○	●	○
15	●	○	○	○	30	●	○	○	○	45	○	○	○	●	60	○	○	●	○

PHYSICS MDCAT

UNIT–7 (A-SERIES)

TOPICS:

✓ **Current Electricity**

Q. 1 A wire connected to a power supply of 230 V has power dissipation P_1. Suppose the wire is cut into two equal pieces and connected parallel to the same power supply. In this case power dissipation is P_2. The ratio P_2 / P_1 is

A. 1 B. 2
C. 3 D. 4

Q. 2 The internal resistance of a 2.1 V cell which gives a current of 0.2 A through a resistance of 10 Ω is

A. 0.2 Ω B. 0.5 Ω
C. 0.8 Ω D. 1.0 Ω

Q. 3 If a certain piece of copper is to be shaped into a conductor of minimum resistance, its length (L) and cross-sectional area (A) shall respectively be:

A. L, 2A B. L/2, 2A
C. 2L, 2A D. 2l, A/2

Q. 4 An electron is circulating in a circular path with a frequency of 50 Hz. What is the associated current?

A. 0.8×10^{-17} A B. 8×10^{-17}A
C. 0.4×10^{-17}A D. 80×10^{-17}A

Q. 5 The emf of a battery is 6V and its internal resistance 0.2Ω. It can deliver maximum power

A. 30 W B. 60 W
C. 90 W D. 45 W

Q. 6 Terminal potential difference of a battery is equal to its emf when its internal resistance is

A. Zero B. Neither zero nor infinity
C. Very high D. Very low

Q. 7 A heater coil is cut into two equal parts and only one part is now used in heater. The heat generated will now be

A. Four times B. Halved
C. Doubled D. One fourth

Q. 8 The drift velocity of free electrons in a conductor is v when a current I is flowing in it. If both the radius and current are doubled, then drift velocity will be;

A. V B. V/4
C. V/2 D. V/8

Q. 9 Three bulbs are rating 40W 60W and 100W designed to work on 220V mains. Which bulb will burn most brightly if they are connected in series across 220 V mains?

A. 40 W bulb B. 60 W blub
C. 100 W blub D. All will burn equally brightly

Q. 10. Which one of the following bulbs has the least resistance?

A. 100-watt B. 200 watt
C. 300-watt D. 60 watt

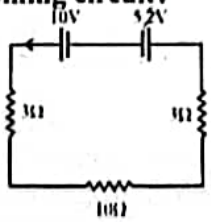
Q. 11 A toaster operating at 240 V has a resistance of 120 Ω. The power is

A. 400 W B. 2 W
C. 480 W D. 240 W

Q. 12 Which one of the following is the practical unit of power?

A. Watt (W) B. Kilowatt hour (kWh)
C. Horse power (hp) D. Kilojoule (kJ)

Q. 13 Calculate current I in the adjoining circuit?



A. 0.1 amp B. 0.4 amp
C. 0.2 amp D. 0.3 amp

Q. 14 During the verification of Ohm's law:
A. Ammeter and voltmeter should be connected in series
B. Ammeter should be connected in series and voltmeter in parallel
C. Ammeter should be connected in parallel and voltmeter in series
D. Ammeter and voltmeter should be connected in parallel

Q. 15 Two wires of A and B with circular cross section made up of the same material with equal lengths. Suppose $R_A = 3\ R_B$, then what is the ratio of radius of wire A to that of B?

A. 3 B. $\sqrt{3}$ C. $\frac{1}{\sqrt{3}}$ D. 1/3

Q. 16 Which of the following relation is significant for metals when the temperature increases?
A. Resistivity increases and conductivity decreases
B. Resistivity decreases and conductivity decreases
C. Resistivity and conductivity do not change with temperature
D. Temperature dependence is non-linear

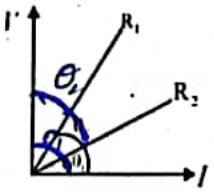
Q. 17 In an open circuit, the current flowing through the circuit is:
A. Infinite B. Finite
C. Zero D. Maximum

Q. 18 A 100 W electric bulb is lighted for 2 hrs daily and four 40-watt bulbs are lighted for 4 hrs every day. Calculate the energy consumed in kWh in 30 days.
A. 30 kWh B. 28 kWh
C. 25.2 kWh D. 32 kWh

Q. 19 The unit of electrical conductivity is
A. mho/metre B. mho/sq.m
C. ohm/metre D. ohm/sq.m

Q. 20 Two bulbs are working in parallel order. Bulb A is brighter than bulb B. If R_A and R_B are their resistance respectively then
A. $R_A > R_B$ B. $R_A = R_B$
C. $R_A < R_B$ D. None of these

Q. 21 The V-I graph of a conductor at two different temperatures as shown in Fig. The relation between resistance will be



A. $R_1 > R_2$ B. $R_1 = R_2$
C. $R_2 > R_1$ D. $R_1 = 2\ R_2$

Q. 22 A total charge of 100C flows through 12W bulb in a time of 50 second. What is the potential difference across the bulb during this time?
A. 0.12 V B. 2.0 V
C. 6.0 V D. 24V

Q. 23 At what temperature will the resistance of a copper wire become three times its value at 0°C (Temperature coefficient of resistance for copper = 4×10^{-3} per °C.
A. 400°C B. 500°C
C. 450°C D. 550°C

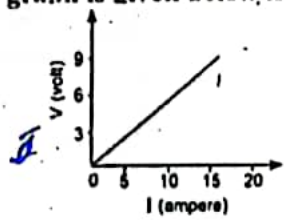
Q. 24 Two wires A and B are made of copper both wires are 1m long but wire A is 1mm thick and wire B is 2mm Thick. The specific resistance
A. More for wire A B. Same for both wires A and B
C. More for wire B D. Cannot be compared

Q. 25 The positive temperature coefficient of resistance is for
A. Carbon B. Germanium
C. Copper D. An electrolyte

Q. 26 A cell of e.m.f. 1.5 V having a finite internal resistance is connected to a load resistance of 2Ω. For maximum power transfer the internal resistance of the cell should be
A. 4 ohm B. 0.5 ohm
C. 2 ohm D. None of these

Q. 27 Emf is most closely related to
A. Mechanical force
B. Potential difference
C. Electric field
D. Magnetic field

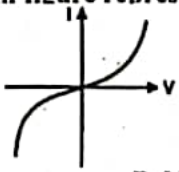
Q. 28 The resistance whose V-I graph is given below is



A. $\frac{5}{3}\Omega$ B. $\frac{3}{5}\Omega$ C. $\frac{5}{2}\Omega$ D. $\frac{2}{5}\Omega$

Q. 29 A current of 2A flows in a wire offering a resistance of 10 ohm. Calculate the energy dissipated by the wire in 0.5 hours.
A. 72Wh B. 72kJ C. 7200J D. 72kJh

Q. 30 The I-V characteristics shown in figure represents



A. Ohmic conductors
B. Non-ohmic conductors
C. Insulators
D. Superconductors

Q. 31 Bulbs in street lighting are all connected in
A. Parallel
B. Series
C. Series-parallel
D. End-to-end

Q. 32 A carbon resistor connected to a battery of 50V and 2A current passing it. If voltage is increased to 75V the current will be
A. 1.5 A B. 3 A C. 6 A D. 4.5 A

Q. 33 Calculate the rate at which energy is transferred by 220V main supply which provide a current of 0.1 to a LED?
A. 2.2 kW B. 2.2 W
C. 22 kW D. 22 W

Q. 34 A current of 1 A is drawn by a filament of an electric bulb. Number of electrons passing through a cross-section of the filament in 16 seconds would be roughly
A. 10^{20} B. 10^{16}
C. 10^{18} D. 10^{23}

Q. 35 Electrical appliances are not connected in series because
A. Series circuit is complicated
B. Power loss is more
C. Appliances have different current ratings
D. Appliances have same current ratings

Q. 36 Two electric bulbs (60W and 100W respectively) are connected in series. The current passing through them is
A. More in 100W bulb
B. More in 60W bulb
C. Same in both
D. None of these

Q. 37 The terminal potential difference of a cell is greater than its emf when it is
A. Being discharged
B. In open circuit
C. Being charged
D. Being either charged or discharged

Q. 38 Calculate the ratio of the resistivity of 2 wires having the same length and same resistance with area of cross section $2m^2$ and $5m^2$ respectively.
A. 5:7 B. 5:2 C. 2:5 D. 7:5

Q. 39 Which of the following is the most conductive element?
A. Aluminum
B. Lead
C. Silver
D. Hydrogen

Q. 40 If a bulb has a 20W power. If it is working at 60% efficiency, then its output power is
A. 12W B. 15W C. 20W D. 18W

Q. 41 Kirchhoff's voltage law is based on law of conservation of
A. Momentum
B. Current
C. Charge
D. Energy

Q. 42 The temperature coefficient of resistance of a material is expressed as

A. $\alpha = \frac{R_o - R_t}{R_o t}$ B. $\alpha = \frac{R_o + R_t}{R_o t}$ C. $\alpha = \frac{R_t - R_o}{R_o t}$ D. $\alpha = \frac{\rho_t - \rho_o}{R_o t}$

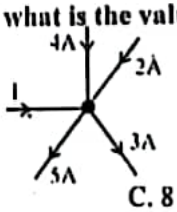
Q. 43 One kilowatt hour is the amount of energy delivered during
A. One second B. One day
C. One minute D. One hour

Q. 44 The circuit which gives continuously varying potential is called
A. Complex network B. Wheat stone bridge
C. Potential divider D. All of above

Q. 45 The electrical device which is being used to compare the e.m.f. of two cells is known as
A. Rheostat B. Wheatstone Bridge
C. Potentiometer D. Galvanometer

Q. 46 Maximum power deliver by battery is
A. $P_{max}=\frac{\varepsilon^2}{4r}$ B. $P_{max}=\varepsilon^2 4r$ C. $P_{max}=VI$ D. Unlimited

Q. 47 In the given current distribution, what is the value of I?



A. 3 A B. 2 A C. 8 A D. 5 A

Q. 48 The resistivity of two wires is ρ_1 and ρ_2 which are connected in series. If their dimensions are same then the equivalent resistivity of the combination will be
A. $(\rho_1+\rho_2)$ B. $\frac{1}{\rho_1}+\frac{1}{\rho_2}$ C. $\frac{\rho_1+\rho_2}{2}$ D. $\frac{\rho_1}{\rho_2}$

Q. 49 A current of 10A flows in conductors of 10Ω resistance for 1 minute the heat produce will be:
A. 10^2J B. 6×10^2J
C. 6×10^3J D. 6×10^4J

Q. 50 The relation for potentiometer is given by
A. $\frac{\varepsilon_1}{\varepsilon_2}=\frac{l_1}{l_2}$ B. $\frac{\varepsilon_2}{\varepsilon_1}=\frac{l_1}{l_2}$ C. $\frac{\varepsilon_1}{\varepsilon_2}=\frac{l_2}{l_1}$ D. $\varepsilon_1 l_1=\varepsilon_2 l_2$

Q. 51 A wire of length L and resistance R is cut into four equal pieces. Resistance of each piece would be:
A. R B. R/2 C. 2R D. R/4

Q. 52 The value of resistance depends upon:
A. Nature B. Physical state
C. Dimension D. All of them

Q. 53 A car battery is rated at 80Ah. An ampere-hour is a unit of:
A. Power B. Current C. Energy D. Quantity of charge

Q. 54 If the potential difference across a resistor is doubled:
A. Only the current is doubled B. Only the resistance is doubled
C. Only the current is halved D. Only the resistance is halved

Q. 55 Resistances of 2.0 Ω, 4.0 Ω and 6.0 Ω and a 24 V emf device are all in parallel. The current in the 2.0 Ω resistor is:
A. 12A B. 2.4A C. 4.0A D. 2.0A

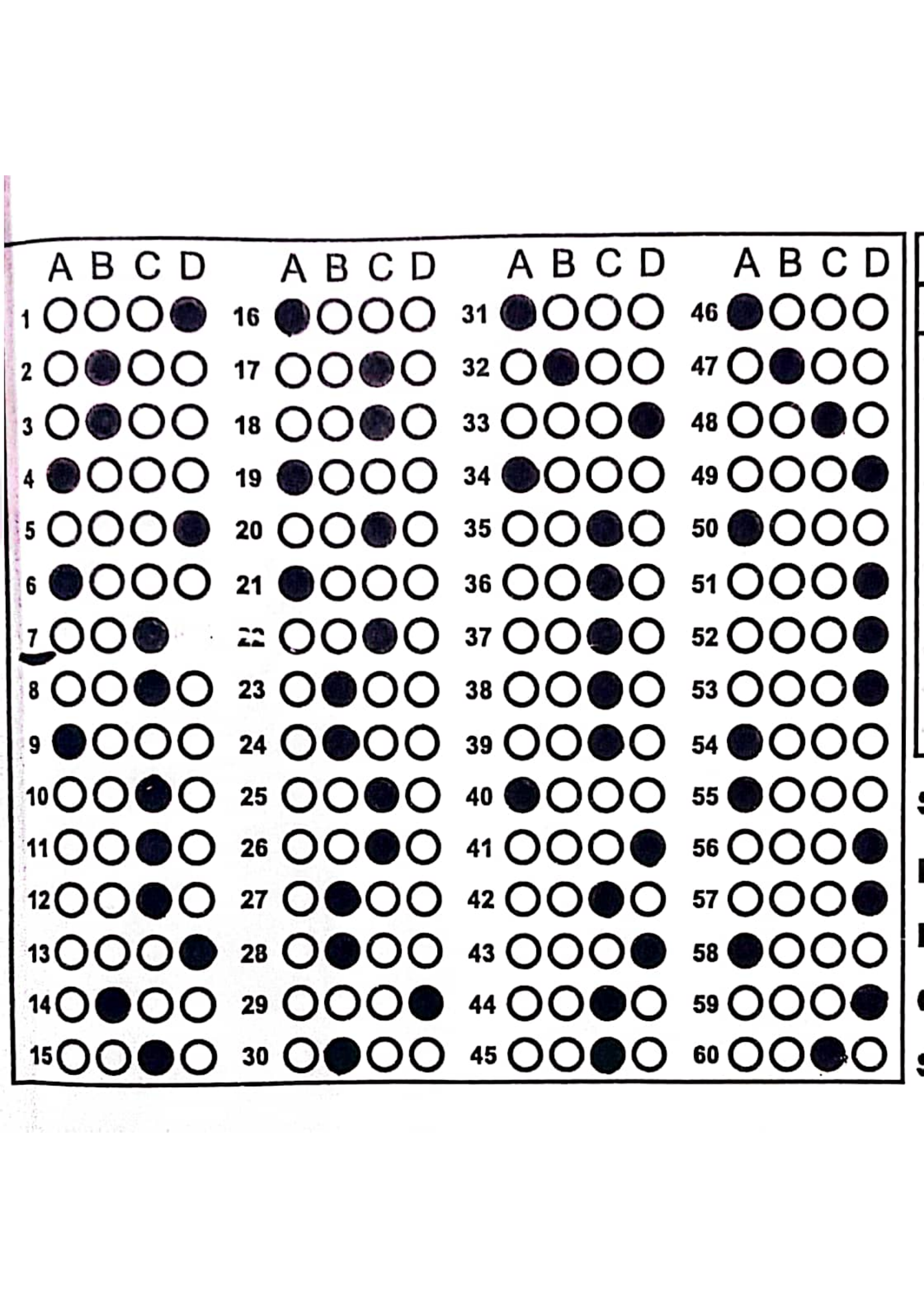
Q. 56 A current of 0.3A is passed through a lamp for 2 minutes using a 6 V power supply. The energy dissipated by this lamp during the 2 minutes is:
A. 1.8 J B. 36 J C. 20 J D. 216 J

Q. 57 If the resistance of a certain length wire, diameter 5 mm is 10 Ω if the diameter is charge to 10 mm, then new resistance is:
A. 40 B. 20 C. 5 D. 2.5

Q. 58 When a wire is stretched and its radius becomes r/2, then its resistance will be:
A. 16R B. 2R C. 4R D. 0

Q. 59 For measurement of potential difference, potentiometer is preferred in comparison to voltmeter because
A. Potentiometer is more sensitive than voltmeter
B. The resistance of potentiometer is less than voltmeter
C. Potentiometer is cheaper than voltmeter
D. Potentiometer does not take current from circuit

Q. 60 When a potentiometer draws no current from the source under observation then it measures
A. Potential difference B. Terminal potential difference
C. emf D. None


A B C D
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
31 32 33 34 35 36 37 38 39 40 41 42 43 44 45
46 47 48 49 50 51 52 53 54 55 56 57 58 59 60

PHYSICS MDCAT

UNIT-8 (A-SERIES)

TOPICS:

- ✓ **Electromagnetism**
- ✓ **Electromagnetic Induction**

Q.1 **If current is passed in a spring with a weight hung on it, then the spring:**
A. Will be compressed
B. Will expand
C. Compression and expansion both will occur
D. There will be no change in state of compressions

Q.2 **If a proton is projected in a direction perpendicular to a uniform magnetic field with velocity v and an electron is projected along the lines of force, what will happen to the proton and the electron?**
A. The electron will travel along a circle with constant speed and the proton will travel along a straight line
B. The proton will move in a circle with constant speed and there will be no effect on the motion of the electron
C. There will not be any effect on the motion of the electron and the proton
D. The electron and the proton both will follow the path of a parabola

Q.3 **When a charged particle moves in a uniform magnetic field:**
A. It gains energy from the field
B. It loses energy to the field
C. It neither gains nor changes energy and momentum
D. Momentum changes but not energy

Q.4 **A metallic ring with a cut is held horizontally and a magnet is allowed to fall vertically through the ring; then the acceleration of the magnet is:**
A. Equal to g
B. Less than g
C. More than g
D. Sometimes less and sometimes more than g

Q.5 **If the angular speed of rotation of an armature of alternating current generator is doubled, then the induced electromotive force will be:**
A. Twice
B. Four times
C. No change
D. Half

Q.6 **A transformer is used to light 140-watt 24-volt lamp from 240-volt AC mains; the current in the main cable is 0.7 amp. The efficiency of the transformer is:**
A. 63.8%
B. 84%
C. 83.3%
D. 48%

Q.7 **A coil of area 4 m^2 is subjected to a normal magnetic field which changes from 2T to 1T in 25 sec. What is the induced e.m.f. generated across the coil?**
A. 0.20V
B. 0.16V
C. 0.30V
D. 0.25V

Q.8 **One proton beam enters a magnetic field of 10^{-4}T normally, Specific charge = 10^{11}C/kg. velocity = 10^7m/s. What is the radius of the circle described by it**
A. 0.1 m
B. 1 m
C. 10 m
D. None

Q.9 **A charged particle of mass m and charge q travels on a circular path of radius r that is perpendicular to a magnetic field B. the time taken by the particle to complete one revolution is**
A. $\frac{2\pi m}{qB}$ B. $\frac{2\pi qB}{m}$ C. $\frac{2\pi q^2 B}{m}$ D. $\frac{2\pi mq}{B}$

Q.10 **One 0.1 Wbm^{-2} is equal to**
A. 10^3 gauss
B. 10^{-2} gauss
C. 10^4 gauss
D. 10^{-4} gauss

Q.11 **When a particle of charge q and mass m enters into a uniform magnetic field B moving with a velocity v perpendicular to the direction for the field it describes a circular path of radius**
A. R=qB/mV
B. R=mV/qB
C. R=qmV/B
D. R=qmB/V

Q.12 **Transformer is based on the principle of**
A. Self-induction
B. Eddy current
C. Mutual induction
D. None of these

Q.13 **A hydrogen atom that has lost its electron is moving east in a region where the magnetic field is directed from south to north. It will be deflected:**
A. Up B. Down
C. North D. South

Q.14 **An electron is injected into a uniform magnetic field with components of velocity parallel to and normal to the field direction. The path of the electron is a**
A. Helix B. Parabola
C. Circle D. Straight line

Q.15 **The core of a transformer is laminated because:**
A. Rusting of core may be prevented
B. Ratio of voltage in primary and secondary may be increased.
C. Energy losses due to eddy current may be minimized
D. The weight of transformer may be reduced

Q.16 **When the conductor is moved in a stationary magnetic field in such a way that the flux linking it changes in magnitude. Then the emf induced in this way is called**
A. Dynamically induced emf (as in a DC generator)
B. Statically induced emf (as in a transformer)
C. Statically induced emf (as in a DC generator)
D. Dynamically induced emf (as in a transformer)

Q.17 **The device in which induced emf is statically induced emf is**
A. Transformer B. AC generator
C. AC motor D. Dynamo

Q.18 **A device which is used to increase or decrease the value of alternating voltage is called**
A. A.C generator B. D.C motor C. A.C motor D. Transformer

Q.19 **If a core of transformer is of substance whose hysteresis loop area is decreased, then the efficiency of transformer is;**
A. Increased B. Same as original
C. Decreased D. None of these

Q.20 **Force on a proton of charge 2e in a magnetic field of B at 45° while moving with $2ms^{-1}$ is**
A. $2\sqrt{2}eB$ B. 4eB C. 2eB D. eB

Q.21 **Work done by magnetic force is**
A. Maximum B. Zero C. Fm dcos0 D. Fm dsin0

Q.22 **The induced emf in a coil is proportional to**
A. Magnetic flux through the coil
B. Area of the coil
C. Rate of change of magnetic flux through the coil
D. Product of magnetic flux and area of the coil

Q.23 **A straight copper wire is moved in a uniform magnetic field such that it does not cut the magnetic lines of force. Then**
A. Emf will not be induced
B. Emf will be induced
C. Sometimes emf will be induced and sometimes not
D. Nothing can be predicted

Q.24 **A dynamo converts _____**
A. Mechanical energy into electrical energy B. Electrical energy into mechanical energy
C. Magnetic energy into electrical energy D. All of these

Q.25 **A transformer is used to light a 55 W and 110 V lamp from a 220 V mains. If the main current is 0.5 A, the efficiency of the transformer is approximately.**
A. 10% B. 50 % C. 30% D. 90 %

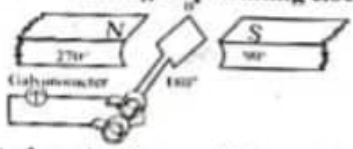
Q.26 **The magnetic flux through a wire loop in a magnetic field does not depend on**
A. The area of the loop
B. The magnitude of the field
C. The shape of the loop
D. The angle between the plane of the loop and the direction

Q.27 **To construct a step-down transformer:**
A. $N_s < N_p$ B. $N_s = N_p$ C. $N_p < N_s$ D. $N_s . N_p = 1$

Q.28 **A square coil $10^{-2}m^2$ area is placed perpendicular to a uniform magnetic field of strength $10^3 Wb/m^2$. The magnetic flux through the coil**
A. 10 weber B. 10^{-5}weber C. 10^5 weber D. 10^9 weber

Q.29 **What is increased in step-down transformer?**
A. Voltage B. Current C. Power D. Current density

Q.30 The diagram below shows a conducting loop rotating clockwise in a uniform magnetic field



As the loop rotates, the induced voltage will be maximum

A. At 0° and 90°
B. At 90° and 270°
C. At 0° and 180°
D. At 180° and 270°

Q.31 A proton (or charged particle) moving with velocity v is acted upon by electric field E and magnetic field B. The proton will move undeflected if

A. E is perpendicular to B
B. E is parallel to v and perpendicular to B
C. E, B and v are mutually perpendicular and v=E/B
D. E and B both are parallel to v

Q.32 A charged particle moves with velocity $\vec{v}$ in a uniform magnetic field $\vec{B}$. The magnetic force experienced by the particle is

A. Always zero
B. Never zero
C. Zero if $\vec{B}$ and $\vec{v}$ are perpendicular
D. Zero if $\vec{B}$ and $\vec{v}$ are parallel

Q.33 The diagram shows how the e.m.f. of a simple generator varies with time. What is the frequency and the maximum value of the e.m.f.?

	Frequency / Hz	Maximum e.m.f. / V
A.	200	2.0
B.	200	4.0
C.	400	2.0
D.	400	4.0

Q.34 Eddy currents can be decreased by

A. Using a soft iron core
B. Increasing the number of turns in primary
C. Using laminated sheets for core
D. All of these

Q.35 A 300 mm long conductor is carrying a current of 10 A and is situated at right angles to a magnetic field having a flux density of 0.8 T; the force on the conductor will be

A. 240 N
B. 2.4 N
C. 24 N
D. 0.24 N

Q.36 When a current carrying conductor is placed in a magnetic field. It moves from a region of

A. Stronger to weak field
B. Strong to weak if current is large
C. Weak to strong field
D. Weak to strong if current is large

Q.37 When a charged particle moves at right angles to the magnetic field, the variable quantity is?

A. Momentum
B. Speed
C. Energy
D. None of these

Q.38 Order of e/m ratio of proton, α-particle and electron is

A. e > p > α
B. p > α > e
C. e > α > p
D. None of these

Q.39 A circular loop of radius 3 m placed having area in the direction of magnetic field of 100T, flux will be:

A. 1296 Wb
B. 1190 Wb
C. 12.96 Wb
D. 2826 Wb

Q.40 The secondary voltage is 440 Volt and primary voltage is 220 Volt, then a comparison of the secondary coil and primary coil is

A. 4/1
B. 5/2
C. 2/1
D. 7/5

Q.41 The expression of current generated by A.C generator

A. $I_o = I\sin(2\pi ft)$
B. $I = I_o\sin(2\pi ft)$
C. $I = \frac{I_o}{\sqrt{2}}$
D. $I = I_o\cos(2\pi ft)$

Q.42 Diagram shows three parallel wires carrying equal currents. The resultant force o the middle wire is

A. To the left
B. Zero
C. To the right
D. Remain stationary

Q.43 **A magnet is moved towards a coil (i) quickly (ii) slowly, then the induced e.m.f. is**
A. Larger in case (i)
B. Smaller in case (i)
C. Equal to both the cases
D. Larger or smaller depending upon the radius of the coil

Q.44 **An electron and a proton with equal momentum enter perpendicularly into a uniform magnetic field, then**
A. The path of proton shall be more curved than that of electron
B. The path of proton shall be less curved than that of electron
C. Both are equally curved
D. Path of both will be straight line

Q.45 **A straight wire of length 0.5 metre and carrying a current of 1.2 ampere placed in a uniform magnetic field of induction 2 Tesla. The magnetic field is perpendicular to the length of the wire. The force on the wire**
A. 2.4 N B. 1.2 N C. 3.0 N D. 2.0 N

Q.46 **Which among the following quantities, is not affected by the magnetic field?**
A. Moving charge B. Change in magnetic flux
C. Current flowing in a conductor D. Stationary charge

Q.47 **When a wire loop is rotated in a magnetic field, the direction of induced emf changes in every**
A. 1 revolution B. 1/2 revolution C. 1/4 revolution D. 2 revolution

Q.48 **An ideal transformer will have maximum efficiency at a load such that**
A. Copper loss > iron loss B. Cannot be determined
C. Copper loss = iron loss D. Copper loss < iron loss

Q.49 **If the supply frequency (f) of a transformer decrease, the effect of frequency on the transformer's secondary output voltage?**
A. Decreases B. Increases C. Remain same D. All of these

Q.50 **When is the magnetic flux said to be positive maximum?**
A. $\theta = 180°$ B. $\theta = 360°$ C. $\theta = 0°$ D. $\theta = 90°$

Q.51 **A power station generates 600 MW of electrical power which is fed to a transmission line. If the input voltage is 300 KV, then what current would flow in the transmission line?**
A. 5×10^3 A B. 10×10^3 A C. 2×10^3 A D. 7×10^3 A

Q.52 **A circular loop of area 200 cm² lies in x-z plane, then a uniform magnetic field $B = (0.3i + 0.4j)$ is applied on it, find the magnetic flux through the loop:**
A. 0.8 wb B. 8 wb C. 0.008 wb D. None

Q.53 **A metallic ring is attached to the wall room. When the north pole of a magnet is brought near the ring, the induced current in the ring is:**
A. Zero B. In clockwise direction
C. In anticlockwise direction D. Infinite

Q.54 **The magnetic field in a certain region is given by $40\hat{i} - 18\hat{k}$. How much flux passes through a 5.0 cm² area loop in this region if loop lies flat in YZ plane?**
A. 90×10^{-4} Wb B. 2×10^{-2} Wb C. 2×10^{2} Wb D. 9×10^{-4} Wb

Q.55 **The necessary condition to make the velocity selector**
A. $F_l > F_M$ B. $F_l < F_M$ C. $F_l = F_M$ D. $F_l \geq F_M$

Q.56 **V=20 sin200πt, then frequency of this A.C voltage will be:**
A. 200π Hz B. 100Hz C. 200Hz D. 50Hz

Q.57 **A conducting rod of length L is falling with velocity V in a uniform horizontal magnetic field B normal to the rod. The induced emf between the ends of the rod will be**
A. $2Bvl$ B. Zero C. Blv D. $\frac{Bvl}{2}$

Q.58 **The armature of a generator consists of a flat square coil of side 4 cm and 200 turns. The coil rotates in a magnetic field of 0.75T. The angular speed so that a maximum emf of 1.6V is generated is _____**
A. $\frac{20}{3}$ rad s^{-1} B. $\frac{20}{3}$ rotations/s C. $\frac{20}{3}$ rpm D. None

Q.59 **The magnetic force on a charged particle in a magnetic field, produce in its motion**
A. Anguiar acceleration B. Linear acceleration
C. Centripetal acceleration D. No acceleration

Q.60 **An ideal transformer steps up or steps down**
A. Energy B. A.C voltage C. D.C voltage D. Power

KIPS PREPARATIONS

Class

	A	B	C	D		A	B	C	D		A	B	C	D		A	B	C	D
1	●	○	○	○	16	●	○	○	○	31	○	○	●	○	46	○	○	○	●
2	○	●	○	○	17	●	○	○	○	32	○	○	○	●	47	○	●	○	○
3	○	○	○	●	18	○	○	○	●	33	●	○	○	○	48	○	○	●	○
4	●	○	○	○	19	●	○	○	○	34	○	○	●	○	49	●	○	●	○
5	●	○	○	○	20	●	○	○	○	35	○	●	○	○	50	○	○	●	○
6	○	○	●	○	21	○	●	○	○	36	●	○	○	○	51	○	○	●	○
7	○	●	○	○	22	○	○	●	○	37	●	○	○	○	52	○	○	●	○
8	○	●	○	○	23	●	○	○	○	38	●	○	○	○	53	○	○	●	○
9	●	○	○	○	24	●	○	○	○	39	○	○	○	●	54	○	●	○	○
10	●	○	○	○	25	○	●	○	○	40	○	○	●	○	55	○	○	●	○
11	○	●	○	○	26	○	○	●	○	41	○	●	○	○	56	○	●	○	○
12	○	○	●	○	27	●	○	○	○	42	●	○	○	○	57	○	○	●	○
13	●	○	○	○	28	●	○	○	○	43	●	○	○	○	58	●	○	○	○
14	●	○	○	○	29	○	●	○	○	44	○	○	●	○	59	○	○	●	○
15	○	○	●	○	30	○	●	○	○	45	○	●	○	○	60	○	●	○	○

Roll No.

0	0	0	0	0	0	0
1	1	1	1	1	1	1
2	2	2	2	2	2	2
3	3	3	3	3	3	3
4	4	4	4	4	4	4
5	5	5	5	5	5	5
6	6	6	6	6	6	6
7	7	7	7	7	7	7
8	8	8	8	8	8	8
9	9	9	9	9	9	9

1. Use Blue Ball Point Pe
2. Please Fill In The Roll No
3. It Is Important That The
   Completely And Correctly
   In The Example Below,

Correct Example: ○ ●

Incorrect Examples ○ ○ ○ ○

SUBJECT: Physics CH/UNIT# 08

NAME: _____

R. NO. (IN WORDS): _____

CLASS: _____ SESSION: _____

SIGN: _____ DATE: _____

PHYSICS MDCAT

UNIT–9 (A-SERIES)

TOPICS:

- ✓ **Electronics**
- ✓ **Dawn of modern physics**

Q. 1 **The momentum of a photon having energy E is:**
A. E/c
B. E/c^2
C. E/h
D. Zero

Q. 2 **Work function is the energy required:**
A. To produce X-rays
B. To excite an atom
C. To explore an atom
D. To eject an electron just out of the surface

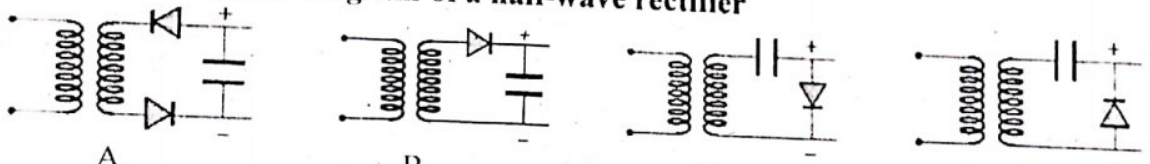
Q. 3 **In photoelectric effect, the photocurrent:**
A. Increases with increase of frequency of incident photon
B. Decreases with increase of frequency of incident photon
C. Does not depend on the frequency of photon but depends only on the intensity of incident light
D. Depends both on intensity and frequency of the incident photon

Q. 4 **Wave is associated with matter**
A. When it is stationary
B. When it is in motion with the velocity of light only
C. When it is in motion with any velocity
D. None of the above

Q. 5 **The de-Broglie wavelength associated with the particle of mass m moving with velocity v is**
A. h/mv
B. mv/h
C. mh/v
D. 4×10^{4}

Q. 6 **The momentum of a photon in an X-ray beam of 10^{-10} metre wavelength is**
A. $1.5\times10^{-23}\,kg$ m/sec
B. $6.6\times10^{-24}\,kgm/\text{sec}$
C. $6.6\times10^{-41}\,kgm/\text{sec}$
D. $2.2\times10^{-52}\,kgm/\text{sec}$

Q. 7 **Which is the correct diagram of a half-wave rectifier**



A. B. C. D.

Q. 8 **Select the correct statement**
A. In a full wave rectifier, two diodes work alternately
B. In a full wave rectifier, two diodes work simultaneously
C. The efficiency of full wave and half wave rectifiers is same
D. The full wave rectifier is bi-directional

Q. 9 **The work function of a photoelectric material is 3.3 eV. The threshold frequency will be equal to**
A. 8×10^{4}Hz
B. 8×10^{56}Hz
C. 8×10^{10}Hz
D. 8×10^{14}Hz

Q. 10 **In photoelectric effect if the intensity of light is doubled then maximum kinetic energy of photoelectrons will become**
A. Double
B. Half
C. Four-time
D. No change

Q. 11 **When light is incident on a metal surface the maximum kinetic energy of emitted electrons**
A. Vary with intensity of light
B. Vary with frequency of light
C. Vary with speed of light
D. Vary irregularly

Q. 12 **Compton effect proves the**
A. Photon theory of light
B. Dual nature of light
C. Wave nature of light
D. Uncertain nature of light

Q. 13 **The de-Broglie wavelength of a neutron at 27°C is λ. What will be its wavelength at 927°C?**
A. $\lambda/2$
B. $\lambda/3$
C. $\lambda/4$
D. $\lambda/9$

Q. 14 The energy of a photon in a beam of infrared radiation of wave length 1240 nm is about
A. 1.5 MeV
B. 1 eV
C. 1 MeV
D. 1.5 eV

Q. 15 The voltage which appears across load resistance R is called
A. Input voltage
B. Output voltage
C. Reverse voltage
D. Zero voltage

Q. 16 Electrically, photons are
A. Positively charged
B. Negatively charged
C. Neutral
D. Strongly charged, may be positive or negative

Q. 17 In a half wave rectifier, the current through load resistance flows only in
A. Positive half cycle
B. Both half cycles
C. Negative half cycle
D. One half cycle

Q. 18 Output voltage of rectifier is not smooth; it can be made by a circuit known as:
A. Wheat stone circuit
B. Filter circuit
C. Bridge circuit
D. Ripple circuit

Q. 19 Which of the following electromagnetic radiations has photons with the greatest momentum?
A. Blue light
B. Radio waves
C. Microwaves
D. X rays

Q. 20 Of the following, Compton scattering from electrons is most easily observed for:
A. Microwaves
B. Infrared light
C. Visible light
D. X rays

Q. 21 Minimum energy required for pair production is:
A. 939 MeV
B. 942 MeV
C. 1.02 MeV
D. 0.51 MeV

Q. 22 A full wave rectifier is operating from 50Hz mains. Fundamental frequency of ripple will be
A. 100 Hz
B. 25 Hz
C. 50 Hz
D. 200 Hz

Q. 23 *Which light has more velocity*
A. He-Ne laser
B. Yellow
C. White
D. All are equal

Q. 24 p-n junction when reversed biased acts as a _____
A. Capacitor
B. Inductor
C. On switch
D. Off switch

Q. 25 During the half wave rectification, when diode is reverse biased, the voltage drop across load resistance is
A. Maximum
B. Half of maximum
C. Three times of maximum value
D. Zero

Q. 26 De-Broglie waves are associated with
A. Moving charged particles only
B. Moving neutral particles only
C. Accelerated charged particle
D. All particles in motion

Q. 27 Einstein's Photoelectric equation is $E_K = hf - \phi$ in this equation E_K measure
A. K.E of all the emitted electron
B. No electron energetic than E_k
C. Mean K.E of emitted electrons
D. Maximum K.E of emitted electrons

Q. 28 Ultraviolet radiation of 6.2 eV falls on an aluminum surface having work function ϕ = 4.2 eV. The kinetic energy of the fastest electron emitted is
A. 4eV
B. 2.2eV
C. 2eV
D. 1.2eV

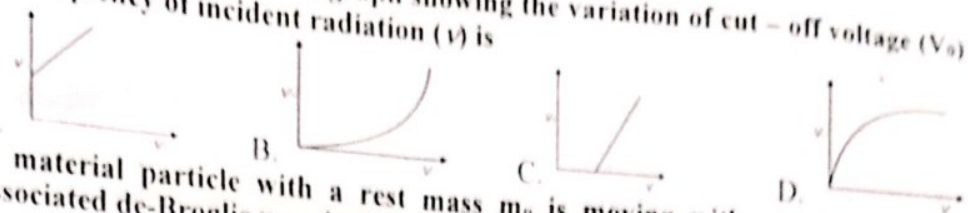
Q. 29 The stopping potential to prevent electrons from flowing across a photo electric cell is 4.0V. What maximum K.E is given to the electrons by the incident light?
A. 3.2×10^{-19}J
B. 6.4×10^{-19}J
C. 3.2×10^{19}J
D. 6.4×10^{19}J

Q. 30 Let n_r and n_b be respectively the number of photons emitted by a red bulb and a blue bulb of equal power in a given time. Then
A. $n_r = n_b$
B. $n_r < n_b$
C. $n_r > n_b$
D. The information is insufficient to get a relation between n_r and n_b

Q. 31 Full wave rectifier called center-tap design, uses
A. Transformer with center-taped secondary winding
B. Inductor with center-taped secondary winding
C. Resistor with center-taped secondary winding
D. Comparator with center-taped secondary winding

Q. 32 In half wave rectifier the peak inverse voltage (PIV) is the maximum voltage that the rectifying diodes has to withstand, when it is
A. Reverse biased
B. Forward biased
C. Both A and B
D. None of these

Q. 33 In photoelectric effect, the graph showing the variation of cut – off voltage (V_0) with the frequency of incident radiation (ν) is



Q. 34 A material particle with a rest mass m_0 is moving with speed of light c. The associated de-Broglie wavelength is given by
A. $\frac{h}{m_0 c}$
B. $\frac{m_0 c}{h}$
C. 0
D. ∞

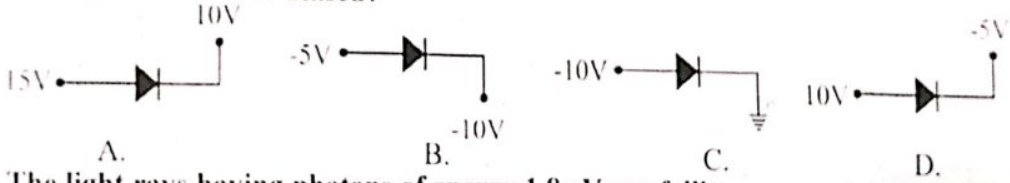
Q. 35 When the frequency of incident photon is just equal to threshold frequency, the $K.E_{max}$ of photoelectron is
A. Zero
B. Infinite
C. Half of its maximum value
D. None of these

Q. 36 For a photosensitive surface, the work function is 3.3×10^{-19} J. Calculate the threshold frequency.
A. 15×10^{14} Hz
B. 25×10^{14} Hz
C. 5×10^{14} Hz
D. 55×10^{14} Hz

Q. 37 Photons are deflected by
A. Electric field only
B. Magnetic field only
C. Electromagnetic field
D. None of these

Q. 38 An electric bulb of 100 W converts 3 % of electrical energy into light energy. If the wavelength of light emitted is 6625 Å, the number of photons emitted in 1 s is _____ ($h = 6.625 \times 10^{-34}$ J.sec)
A. 10^{17}
B. 10^{19}
C. 10^{21}
D. 10^{15}

Q. 39 Which one is reverse-biased?



Q. 40 The light rays having photons of energy 1.8 eV are falling on a metal surface having a work function 1.2 eV. What is the stopping potential to be applied to stop the emitting electrons?
A. 3 V
B. 1.2 V
C. 0.6 V
D. 1.4 V

Q. 41 Potassium cathode in photocell emit electrons for a light:
A. Visible
B. Ultra violet
C. Infra-red
D. X-rays

Q. 42 Bridge rectifier is a
A. Full wave rectifier
B. Peak rectifier
C. Half wave rectifier
D. None of the mentioned

Q. 43 Two beams, one of red light and the other of blue light, of the same intensity are incident on a metallic surface to emit photoelectrons. Which emits electrons of greater energy?
A. Blue light
B. Red light
C. Both 'A' and 'B'
D. Neither

Q. 44 The basic purpose of filter is to
A. Minimize variations in ac input signal
B. Suppress harmonics in rectified output
C. Remove ripples from the rectified output
D. Stabilize dc output voltage

Q. 45 If peak Voltage across a full wave rectifier is 20V then V_{rms} is
A. 7.07
B. 14.14 v
C. 16.8V
D. 12V

Q. 46 In annihilation process..... are produced:
A. Positron
B. Photons
C. Electrons
D. B & C are correct

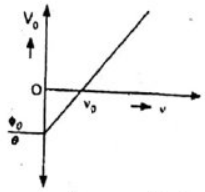
Q. 47 Platinum wire becomes yellow at a temperature of _____ °C.
A. 900
B. 500
C. 1300
D. 1600

Q. 48 According to Compton's effect, the increase in wave length
A. Depends on the wavelength of incident photon
B. Is independent of the wavelength of incident photon
C. Depends on the velocity of incident photon.
D. Is not defined by any of there

Q. 49 Mathematically form of Stephen-Boltzmann law is:
A. $E=\sigma T^2$
B. $E=\sigma T^3$
C. $E=\sigma T^4$
D. $E=\sigma T^6$

Q. 50 The process of pair production cannot be performed using
A. Radio waves
B. Ultra violet rays
C. Micro waves
D. All of these

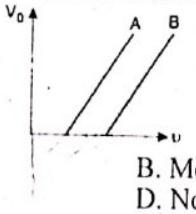
Q. 51 The slope of the stopping potential versus 'frequency graph for photoelectric effect is equal to



A. h
B. he
C. h/e
D. e

Q. 52 In a semiconductor diode, the barrier offers opposition to only
A. Majority carries in both regions
B. Free electron in the n-regions
C. Minority carries in both regions
D. Holes in the p-regions

Q. 53 The figure shows threshold frequencies f_0 for two different metallic surfaces A and B. The work function of A, as compared to that of B is



A. Less
B. More
C. Equal
D. Nothing can be said

Q. 54 The energy of photon of wavelength 450 nm is
A. 2.5×10^{-17} J
B. 1.25×10^{-17} J
C. 4.4×10^{-19} J
D. 2.5×10^{-19} J

Q. 55 Blackbody shows a_____spectra.
A. Continuous
B. Discrete
C. Both 'A' and 'B'
D. None of these

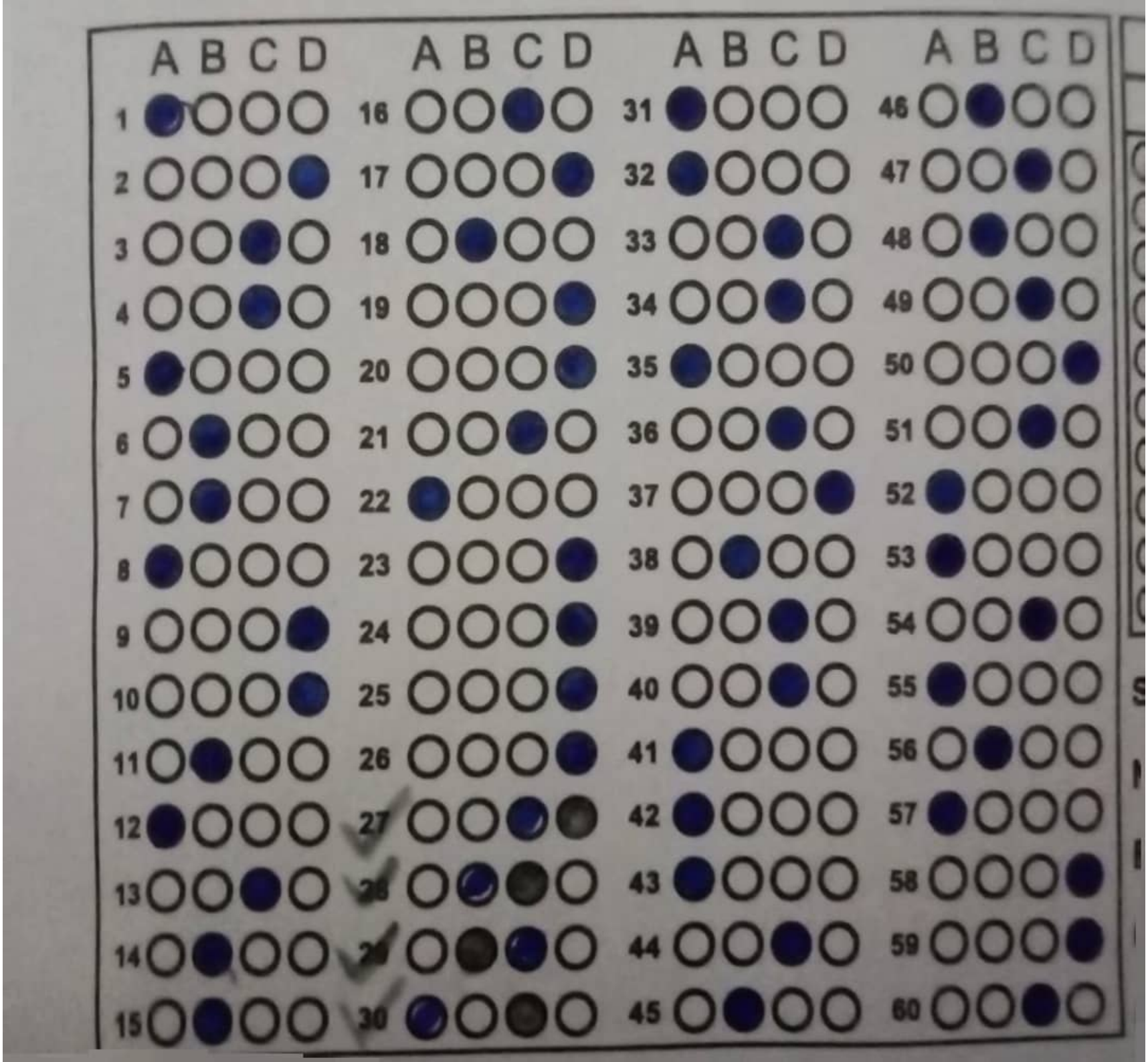
Q. 56 Pair production cannot take place in vacuum because.
A. Mass is not conserved
B. Momentum is not conserved
C. Energy is not conserved
D. Charge is not conserved

Q. 57 Rest mass energy of electron is equal to
A. 0.51×10^3 k eV
B. 0.51×10^6 k eV
C. 0.51 eV
D. 0.51×10^{-6} M eV

Q. 58 If the wavelength of incident radiation in a photoelectric experiment is decreased, then
A. The photoelectric current will decrease
B. The photoelectric current will increase
C. The stopping potential will decrease
D. The stopping potential will increase

Q. 59 For a given speed, which of the following has the shortest de-Broglie wavelength?
A. Electron
B. Proton
C. Deuteron
D. α-particle

Q. 60 When a photon collides with an electron which of the following of photon increases?
A. Frequency
B. Energy
C. Wavelength
D. None


A B C D
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
31 32 33 34 35 36 37 38 39 40 41 42 43 44 45
46 47 48 49 50 51 52 53 54 55 56 57 58 59 60

PHYSICS MDCAT

UNIT–10 (A-SERIES)

TOPICS:

- ✓ **Atomic Spectra**
- ✓ **Nuclear Physics**

Q.1 **Curie is a unit of**
A. Length
B. It is not any unit
C. Activity
D. Atomic number

Q.2 **The ratio of the frequencies of the long wavelength limits of Lyman and Balmer series of hydrogen spectrum is**
A. 27 : 5
B. 5 : 27
C. 4 : 1
D. 1 : 4

Q.3 **Number of spectral lines in hydrogen atom is**
A. 3
B. 6
C. 15
D. Infinite

Q.4 **The ratio of the largest to shortest wavelengths in Lyman series of hydrogen spectra is**
A. $\frac{25}{9}$ B. $\frac{3}{4}$ C. $\frac{9}{5}$ D. $\frac{4}{3}$

Q.5 **Which of the following particles are constituents of the nucleus?**
A. Protons and electrons
B. Protons and neutrons
C. Neutrons and electrons
D. Neutrons and positrons

Q.6 **Which of the following pairs is an isobar?**
A. ${}_1H^1$ and ${}_1H^2$
B. ${}_1H^2$ and ${}_1H^3$
C. ${}_6C^{12}$ and ${}_6C^{13}$
D. ${}_{15}P^{30}$ and ${}_{14}Si^{30}$

Q.7 **The sodium nucleus $^{23}_{11}Na$ contains**
A. 11 electrons
B. 12 protons
C. 23 protons
D. 12 neutrons

Q.8 **Paschen series is obtained when all the transitions of electron terminate on.**
A. 2nd orbit
B. 4th orbit
C. 3rd orbit
D. 5th orbit

Q.9 **A count rate 240 per minute reduce to 30 counts per min in 1 hour. The half-life of source is**
A. 20 min
B. 80 min
C. 30 min
D. 100 min

Q.10 **A thorium nucleus is formed when a uranium nucleus emits an α-particle. Atomic number of thorium is**
A. 92
B. 90
C. 82
D. 94

Q.11 **γ- radiation are emitted due to**
A. De-excitation of atom
B. De-excitation of nucleus
C. Excitation of atom
D. Excitation of nucleus

Q.12 **Absorbed dose is defined as**
A. D = E/m
B. D = m/ E
C. D = Em
D. D = 1/mE

Q.13 **The percentage of the original of a radioactive material left after five half-lives is approximately:**
A. 1% B. 3% C. 5% D. 20%

Q.14 **The radioactivity of a nucleus becomes 1/64 of its initial value in 60 seconds. The half-life of nuclide is**
A. 5 s
B. 10 s
C. 20 s
D. 30 s

Q.15 **The decay constant of a radioactive element is 0.01 per second. Its half-life period is**
A. 693 sec
B. 6.93 sec
C. 0.693 sec
D. 69.3 sec

Q.16 **Half-life of a radioactive substance depends upon**
A. Temperature
B. Pressure
C. Nature of substance
D. Electric and magnetic field

Q.17 **Consider a radioactive material of half-life 1.0 *minute*. If one of the nuclei decays now, the next one will decay**

A. After 1 minute

B. After $\frac{1}{\log_e 2}$ minute

C. After $\frac{1}{N}$ minute, where N is the number of nuclei present at that moment

D. After any time

Q.18 **1 Sv =**

A. 1 Gy x RBE
B. 1 Gy/RBE
C. 2 Gy x RBE
D. RBE/1 Gy

Q.19 **The value of A in the following reaction is** ${}_4Be^9 + {}_2He^4 = {}_6C^A + {}_0n^1$

A. 14
B. 10
C. 12
D. 16

Q.20 **What is the absorbed dose D of a sample of 2 kg which is given an amount of 100 J of radioactive energy?**

A. 200 Gy
B. 50 Gy
C. 102 Gy
D. 98 Gy

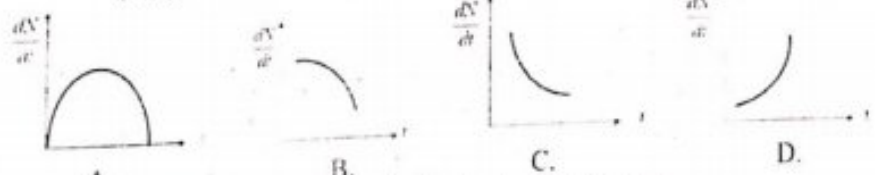
Q.21 **What is the respective number of α and β particles emitted in the following radioactive decay** ${}_{90}X^{200} \rightarrow {}_{80}Y^{168}$?

A. 6 and 8
B. 8 and 8
C. 6 and 6
D. 8 and 6

Q.22 **Which of the following transitions in a hydrogen atom emits photon of the highest frequency?**

A. $n = 1$ to $n = 2$
B. $n = 2$ to $n = 1$
C. $n = 2$ to $n = 6$
D. $n = 6$ to $n = 2$

Q.23 **Radioactive element decays to form a stable nuclide, then the rate of decay of reactant $\left(\frac{dN}{dt}\right)$ will vary with time (t) as shown in figure**



A. B. C. D.

Q.24 **Which of the following have Maximum Ionization Power?**

A. α-rays
B. γ-rays
C. β-rays
D. Same for all

Q.25 **The decay constant λ of a radioactive sample is the probability of decay of an atom in unit time:**

A. λ decreases as the atoms become older
B. λ is independent of the age of atoms
C. λ increases as the age of atoms increases
D. None of these

Q.26 **The activity of a radioactive sample is 1.6 curie and its half-life is 2.5 days. Its activity after 10 days will be:**

A. 0.8 curie
B. 0.4 Curie
C. 0.1 Curie
D. 0.16 Curie

Q.27 **To ionize hydrogen atom from its ground state energy required is**

A. 13.6 eV
B. −13.6 eV
C. 3.4 eV.
D. −3.4eV

Q.28 **C^{14} has half-life 5700 years. At the end of 11400 years, the actual amount left is**

A. 0.0625 of original amount
B. 0.5 of original amount
C. 0.25 of original amount
D. 0.125 of original amount

Q.29 **The top quark contains_____ charge**

A. $-\frac{1}{3}e$
B. $+\frac{1}{3}e$
C. $+\frac{2}{3}e$
D. $+\frac{2}{3}e$

Q.30 **If an electron jumps from 1st orbital to 3rd orbital, then it will.**
A. Absorb energy
B. Release energy
C. No gain of energy
D. None of these

Q.31 **During radioactive series parent nucleus is $^{232}_{90}X$ and last daughter nucleus is $^{208}_{82}Y$. How many α and β-particles are emitted during this change**
A. 6α, 3β
B. 4α, 4β
C. 6α, 2β
D. 4α, 6β

Q.32 **In a radioactive phenomenon, observation shown in figure where α deviates lesser than β in same electric or magnetic field (not shown in the figure). What is the reason of less deviation of α?**

A. α is a lighter particle
B. α is heavier particle
C. α is very fasting moving particle
D. None of these

Q.33 **The activity of radioactive sample:**
A. Is constant
B. Decreases linearly with time
C. Increases with time
D. Decreases exponentially with time

Q.34 **Three quarks make up a**
A. Lepton
B. Baryon
C. Meson
D. Quark

Q.35 **A certain radioactive nuclide of mass number 'x' decay by β–emission and α–emission to a second nuclide of mass number 't', which of the following correctly relates 'x' and 't'?**
A. x = t–4
B. x + 3 =t
C. x = t+4.
D. x –1 = t

Q.36 **When an electron in an atom goes from a lower to a higher orbit its**
A. K.E increases, P.E. decreases
B. K.E increases, P.E. increases
C. K.E. decreases, P.E. increases
D. K.E decreases, P.E. decreases

Q.37 **The mother and daughter elements with the emission of β – rays, are called:**
A. Isotopes
B. Isomers
C. Isobars
D. Isodiapheres

Q.38 **α , β and γ radiations come out of radioactive substance**
A. Spontaneously
B. When it is heated
C. When it is put in a reactor
D. Under pressure

Q.39 **In the Bohr's hydrogen atom model, the radius of the stationary orbit is directly proportional to (n = principle quantum number)**
A. β
B. n
C. n^{-2}
D. n^2

Q.40 **In which radioactive disintegration, neutron dissociates into proton and electron?**
A. He^{++} emission
B. γ–emission
C. β^- emission
D. Positron emission.

Q.41 **The greater the decay constant**
A. The less the activity
B. The greater the activity
C. The greater the size of atom
D. The less the size of atom

Q.42 **Number of Quarks in hydrogen atom**
A. 1
B. 2
C. 3
D. 4

Q.43 **In beta decay**
A. The parent and daughter nuclei have same number of protons
B. The daughter nucleus has one proton more than the parent nucleus
C. The daughter nucleus has one proton less than the parent nucleus
D. The daughter nucleus has one neutron more than the parent nucleus

Q.44 **The half-life of $^{234}Th_{90}$ is 24 days. If 8 kilogram of this isotope is present initially, what amount remains after 72 days?**
A. 2 kg
B. 5 kg
C. 1 kg
D. 4 kg

Q.45 **The half-life of sodium Na-24 is**
A. 15 hours.
B. 6 hours
C. 45 hours
D. 60 days

Q.46 Ionization potential of hydrogen atom is 13.6 V. Hydrogen atoms in the ground state are excited by monochromatic radiation of photon energy 12.1 eV. The spectral lines emitted by hydrogen atoms according to Bohr's theory will be

A. One
B. Three
C. Two
D. Four

Q.47 According to Bohr's theory the moment of momentum of an electron revolving in second orbit of hydrogen atom will be

A. $2\pi h$
B. h/π
C. πh
D. $2h/\pi$

Q.48 Radioactive decay obeys which one of the following laws?

A. $N = N_o e^{-\lambda t}$
B. $N = N_o e^{\lambda t}$
C. $N = N_o e^{-\lambda t/2}$
D. $N_o = N(1+e^{\lambda t})$

Q.49 The most useful tracer is

A. Sr-90
B. I-131
C. Na-24
D. C-14

Q.50 When a radioactive substance emits an α-particle, its position in the periodic table is lowered by which of the following?

A. One place
B. Two places
C. Three places
D. Four places

Q.51 Which one of the following is NOT a member of the lepton family?

A. Electron
B. Muon
C. Proton
D. Neutrino

Q.52 If J be the angular momentum of an electron in Bohr orbit, then radius of orbit is equal to

A. $\frac{J}{mv}$ B. $\frac{J}{2mv}$ C. $\frac{J}{2\pi m}$ D. $\frac{mJ}{2\pi v}$

Q.53 As per radioactive decay law, the small amount of disintegration of the isotope in a small period is equal to

A. $-\lambda N$
B. λN
C. $-2\lambda N$
D. $2\lambda N$

Q.54 The equation of Rydberg constant is given by:

A. $R_H = \frac{h_o}{m^o}$
B. $R_H = \frac{E_v}{\lambda}$
C. $R_H = \frac{E_v}{hc}$
D. $R_H = \frac{1}{he}$

Q.55 An archaeologist analyses the wood in a prehistoric structure and finds that C^{14} (Half-life = 5700 years) to C^{12} is only one- fourth of that found in the cells buried plants. The age of the wood is about

A. 5700 years
B. 2850 years
C. 11,400 years
D. 22,800 years

Q.56 Activity is proportional to number of

A. Daughter nuclei
B. Decayed nuclei
C. Undecayed nuclei
D. Father nuclei

Q.57 Particles that have less mass than protons

A. Mesons
B. Baryons
C. Photon
D. Meons

Q.58 Spin of photon

A. 1
B. 1/2
C. 1/3
D. ¼

Q.59 Fraction of the un-decayed atoms in a radioactive sample after 'n' half-lives will be

A. $\frac{1}{2}$ B. 2^n C. $\frac{1}{2^n}$ D. $\left(1-\frac{1}{2^n}\right)$.

Q.60 The ratio of the kinetic energy and T.E of the electron in the hydrogen atom according to Bohr's theory is

A. 1:–1
B. 1:1
C. 1:2
D. 1:–2

Physics # unit NO 10

2) Lyman Series $= \frac{1}{\lambda_{max}} = R\left(\frac{1}{1^2} - \frac{1}{2^2}\right) \rightarrow \frac{3R}{4} \rightarrow \lambda_{max} = \frac{4}{3R}$

Balmer Series $= \frac{1}{\lambda_{max}} = R\left(\frac{1}{2^2} - \frac{1}{3^2}\right) \Rightarrow \frac{5R}{36}$

$\frac{\lambda_{max}}{\lambda_{max}} \rightarrow \frac{4/3R}{36/5R} = \frac{4}{3} \times \frac{5}{36} = \frac{5}{27} \rightarrow 27:5$ for f.

9) $240 \xrightarrow{1} 120 \xrightarrow{2} 60 \xrightarrow{3} 30$ $(n=3) \Rightarrow t = nT \rightarrow 60$ sec.

14 $t = nT \rightarrow 60 = 6T \rightarrow T = 10$ sec.

→ For α: $n_\alpha = \frac{\Delta A}{4} \rightarrow \frac{A' - A}{4}$

For β: $n_\beta = 2\alpha - (\Delta Z)$

26 $N = N_0 \times \frac{1}{2^n} \rightarrow 1.6 \times \frac{1}{2^4} \rightarrow \frac{1.6}{16} \rightarrow 0.1$ $(n=4)$

27 $N = \frac{N_0}{2} \rightarrow \frac{1}{4} N_0 = 0.25$

28 ${}_{y}X^{x} \xrightarrow{\beta} y^{x} \xrightarrow{\alpha} y^{t=x-4} \rightarrow x = t+4$

41- . Activity → $A = \Delta N/\Delta t$ (Law of decay) $\therefore -\lambda N = A$

. $N = N_0 e^{-\lambda t}$ (Law of radioactivity) (Law of radioactive decay)

46 Difference $= 13.6 - 12.1 \rightarrow -1.5$ (1.5 ev is energy of 3rd orbit)

$\therefore \frac{n(n-1)}{2} \Rightarrow \frac{3(3-1)}{2} \rightarrow \frac{3(2)}{2} \rightarrow 3$

42 $mvr = \frac{nh}{2\pi}$ 52 $L = mvr \rightarrow J = mvr \rightarrow \frac{J}{mv} = r$

55 $t = nT \rightarrow 2 \times 5700 \rightarrow 11400$

59- Undecay $= \frac{1}{2^n}$. Decay $= \left(1 - \frac{1}{2^n}\right)$

1-c
2-a
3-d
4-d
5-b
6-d
7-d
8-c
9-a
10-b
11-b
12-a
13-b
14-b
15-d
16-c
17-d
18-a
19-c
20-b
21-d
22-d
23-c
24-a
25-b
26-c
27-a
28-c
29-c
30-a
31-c
32-b
33-d
34-b
35-c
36-c
37-c
38-a
39-d
40-c
41-b
42-c
43-b
44-c
45-a
46-b
47-b
48-a
49-d
50-b
51-c
52-a
53-a
54-c
55-c
56-a
57-a
58-a
59-c
60-a

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