Exported On *	2023/11/06 9:52:09
Title *	Question Paper Answer Key
OES Exam *	GPSC07202319 / Assistant Professors in Government College in Physics/ Completed / 2023-11-05

1

Question Description	Hamiltonian of spin ½ particle in magnetic field $\vec{B} = B_0\hat{k}$ is $H = \lambda\vec{S}.\vec{B}$ where $\vec{S}$ is its spin (in the unit of $\hbar$) and λ is constant. If the average spin density is $\langle\hat{S}\rangle$ for an ensemble of such non-interacting particles, then $\frac{d\langle S_x\rangle}{dt}$ (A) $-\frac{\lambda}{\hbar}B_0\langle S_y\rangle$ (B) $\frac{\lambda}{\hbar}B_0\langle S_x\rangle$ (C) $\frac{\lambda}{\hbar}B_0\langle S_z\rangle$ (D) $-\frac{\lambda}{\hbar}B_0\langle S_x\rangle$
A	A
B	B
C	C
D	D
E	None of the above
Correct Answer	A
Marks	1

2

Question Description	How many different photons can be emitted by hydrogen atoms that undergo transitions to the ground state from the n=6 state? (Consider there is non-degeneracy)
A	10
B	15
C	12
D	8
E	None of the above
Correct Answer	B
Marks	1

3

Question Description	The electric field $\vec{E}$ and the magnetic filed $\vec{B}$ corresponding to the scalar and vector potentials, $V(x,y,z,t) = 0$, $\vec{A}(x,y,z,t) = \frac{1}{2}\hat{j}\mu_0 A_0(ct+x)$. Where A_0 is a constant, are (A) $\vec{E} = 0$ and $\vec{B} = \frac{1}{2}\hat{j}\mu_0 A_0$ (B) $\vec{E} = \frac{1}{2}\hat{j}\mu_0 A_0 c$ and $\vec{B} = -\frac{1}{2}\hat{j}\mu_0 A_0$ (C) $\vec{E} = -\frac{1}{2}\hat{j}\mu_0 A_0 c$ and $\vec{B} = \frac{1}{2}\hat{k}\mu_0 A_0$ (D) $\vec{E} = 0$ and $\vec{B} = \frac{1}{2}\hat{k}\mu_0 A_0$
A	A
B	B
C	C
D	D
E	None of the above
Correct Answer	C
Marks	1

4

Question Description		
	The potential of a diatomic molecule as a function of the distance r between the atoms is given by $V(r) = -\frac{a}{r^6} + \frac{b}{r^{12}}$. The value of the potential at equilibrium separation between the atoms is:	
	a. $-\frac{4a^2}{b}$	
	b. $-\frac{2a^2}{b}$	
	c. $-\frac{a^2}{2b}$	
	d. $-\frac{a^2}{4b}$	
A	a	
B	b	
C	c	
D	d	
E	None of the above	
Correct Answer	D	
Marks	1	

5	Question Description	Find the displacement current of a material with flux density of 0.5sin2t (A) 2cost (B) cos2t (C) 2sint (D) 2cot2t
	A	A
	B	B
	C	C
	D	D
	E	None of the above
	Correct Answer	B
	Marks	1

6

Question Description	Total power emitted by a spherical black body of radius R at a temperature T is P_1. If P_2 is total power emitted by another spherical black body of radius 2R at a temperature T/2. Then what will be the value of $\frac{P_1}{P_2}$? (A) 2 (B) 4 (C) 6 (D) 8
A	A
B	B
C	C
D	D
E	None of the above
Correct Answer	B
Marks	1

7	**Question Description**	
		Consider a system of non-interacting particles in d-dimensional obeying the dispersion relation $\varepsilon = Ak^s$, where ε is the energy, k is the wave vector; s is an integer, and A is constant. The density of states, $N(\varepsilon)$, is proportional to a. $\varepsilon^{\frac{s}{d}-1}$ b. $\varepsilon^{\frac{d}{s}-1}$ c. $\varepsilon^{\frac{d}{s}+1}$ d. $\varepsilon^{\frac{s}{d}+1}$
	A	a
	B	b
	C	c
	D	d
	E	None of the above
	Correct Answer	B
	Marks	1

8		
Question Description	Consider the Lagrangian $L = a\left(\frac{dx}{dt}\right)^2 + b\left(\frac{dy}{dt}\right)^2 - 2xy$, where a, b are constants. If p_x and p_y are the momenta conjugate to the coordinates x and y respectively, then the Hamiltonian is (A) $\frac{p_x^2}{2a} + \frac{p_y^2}{4b}$ (B) $\frac{p_x^2}{4a} + \frac{p_y^2}{2b} - xy$ (C) $\frac{p_x^2}{2a} - \frac{p_y^2}{2b} - 2xy$ (D) $\frac{p_x^2}{4a} + \frac{p_y^2}{4b} + 2xy$	
A	A	
B	B	
C	C	
D	D	
E	None of the above	
Correct Answer	D	
Marks	1	

9

Question Description	A fixed point of a one – dimensional harmonic oscillator obeying the
A	Unstable spiral
B	Saddle
C	Stable spiral
D	Elliptic
E	None of the above
Correct Answer	D
Marks	1

10		
Question Description	An electromagnetic wave is propagating in a medium of refractive index $n = 1 - \left(\frac{\omega}{2\omega_o}\right)^2$, then $\frac{v_g}{v_p}$ at $\omega = \frac{\omega_o}{2}$	
	(A) $\frac{15}{13}$	
	(B) $\frac{13}{15}$	
	(C) $\frac{5}{3}$	
	(D) $\frac{3}{5}$	
A	A	
B	B	
C	C	
D	D	
E	None of the above	
Correct Answer	A	
Marks	1	

Question Description		The separations between the adjacent levels of a normal multiplet are found to be 22 cm^{-1} and 33 cm^{-1}. Assume that the multiplet is described well by the LS – coupling scheme and Lande's interval rule, namely E (J)-E(J-1) = A(J), where A is a constant. The term notations for this multiplet is (A) $^3P_{0,1,2}$ (B) $^3F_{2,3,4}$ (C) $^3G_{3,4,5}$ (D) $^3D_{1,2,3}$
A	A	
B	B	
C	C	
D	D	
E	None of the above	
Correct Answer	D	
Marks	1	

12	Question Description	The magnetic field associated with the electric field vector $\mathbf{E} = E_o \sin(kz - \omega t)\,\hat{j}$ is given by
		a. $\mathbf{B} = -\dfrac{E_o}{c}\sin(kz - \omega t)\,\hat{i}$
		b. $\mathbf{B} = \dfrac{E_o}{c}\sin(kz - \omega t)\,\hat{i}$
		c. $\mathbf{B} = -\dfrac{E_o}{c}\sin(kz - \omega t)\,\hat{j}$
		d. $\mathbf{B} = \dfrac{E_o}{c}\sin(kz - \omega t)\,\hat{k}$
A	a	
B	b	
C	c	
D	d	
E	None of the above	
Correct Answer	A	
Marks	1	

13	Question Description	
		The Boolean expression $P + \bar{P}Q$, where P and Q are the inputs to a circuit, represents the following logic gate a. AND b. NAND c. NOT d. OR
	A	a
	B	b
	C	c
	D	d
	E	None of the above
	Correct Answer	D
	Marks	1

14	**Question Description**	A cylinder rolling without slipping down a rough inclined plane of angle θ is an example
	A	Scleronomic, conservative system only
	B	Scleronomic, holonomic, conservative system only
	C	Conservative system only
	D	Scleronomic system only
	E	None of the above
	Correct Answer	B
	Marks	1

15

Question Description	
	Which of the following is an analytic function of z everywhere in the complex plane? a. $\sqrt{z}$ b. z^2 c. $|z|^2$ d. $(z^*)^2$
A	a
B	b
C	c
D	d
E	None of the above
Correct Answer	B
Marks	1

16	Question Description	
		If $a^\dagger$ and a are creation and annihilation operators for SHO, then which of the following is not a Hermitian operator? a. $aa^\dagger + a^\dagger a$ b. $aa^\dagger - a^\dagger a$ c. $i(a^\dagger - a)$ d. $i(a^\dagger + a)$
	A	a
	B	b
	C	c
	D	d
	E	None of the above
	Correct Answer	D
	Marks	1

17

Question Description	The entropy S of a system of N spins, which may align either in the upward or in the downward direction, is given by $S = k_B N[\, p \ln(p) + (1 - p) \ln(1 - p)\,]$. Here, k_B is the Boltzmann constant. The probability of alignment in the upward direction is p. The value of p, at which the entropy is maximum, is a. 0.25 b. 0.5 c. 0.75 d. 1.0
A	a
B	b
C	c
D	d
E	None of the above
Correct Answer	B
Marks	1

18	**Question Description**	

		The total power emitted by a spherical black body of radius R at a temperature T is P_1. Let P_2 be the total power emitted by another spherical black body of radius $2R$ kept at temperature $2T$. The ratio $\frac{P_1}{P_2}$ is
		
		  a. 4
		  b. 16
		  c. $\frac{1}{4}$
		  d. $\frac{1}{16}$

A	a	
B	b	
C	c	
D	d	
E	None of the above	
Correct Answer	C	
Marks	1	

19	Question Description	
		The number of ways in which N identical bosons can be distributed in two energy levels, is a. $N + 1$ b. $\frac{N(N+1)}{2}$ c. $\frac{N(N-1)}{2}$ d. N
	A	a
	B	b
	C	c
	D	d
	E	None of the above
	Correct Answer	A
	Marks	1

20	**Question Description**

Using the shell model, find the total angular momentum and the parity of $^{7}_{3}\text{Li}$ nuclei.

(A) $\frac{3}{2}$ with negative parity

(B) $\frac{5}{2}$ with positive parity

(C) $\frac{1}{2}$ with negative parity

(D) $\frac{2}{3}$ with positive parity

A	A
B	B
C	C
D	D
E	None of the above
Correct Answer	A
Marks	1

21

Question Description	
	A particle moves in the one dimensional potential $V(x) = ax^4$, where $a > 0$ is a constant. If the total energy of the particle is E, its time period in a periodic motion is proportional to (A) $E^{\frac{1}{3}}$ (B) $E^{-\frac{1}{4}}$ (C) $E^{\frac{2}{3}}$ (D) $E^{-\frac{1}{2}}$
A	A
B	B
C	C
D	D
E	None of the above
Correct Answer	B
Marks	1

22	**Question Description**	The gauge transforms of $\vec{A}$ and ϕ satisfy the Lorentz conditions, if and only if the gauge functions themselves satisfy
	A	Wave equation
	B	Harmite equation
	C	Legendre equation
	D	Langerre equation
	E	None of the above
	Correct Answer	A
	Marks	1

23

Question Description	Consider electrons in graphene, which is a planar monoatomic layer of carbon atoms. If the dispersion relation of the electrons is taken to be $\varepsilon(k) = ck^2$ (where c is constant) over the entire k-space, then the Fermi energy ε_f depends on the number density of electrons ρ as: (A) $\rho^{\frac{1}{2}}$ (B) ρ (C) ρ^2 (D) ρ^0
A	A
B	B
C	C
D	D
E	None of the above
Correct Answer	B
Marks	1

24	Question Description	
		Consider a differential equation $\frac{dy}{dx} + ay = e^{-bt}$ with initial conditions $y(0) = 0$, then find Laplace transformation of y(t): (A) $\frac{1}{s(s+a)}$ (B) $\frac{1}{(s+a)(s+b)}$ (C) $\frac{1}{a(s+b)}$ (D) $\frac{e^{-as}-e^{-bs}}{2}$
A	A	
B	B	
C	C	
D	D	
E	None of the above	
Correct Answer	B	
Marks	1	

25	**Question Description**	

The dependence of current I on the voltage V of a certain device is given by $I = I_0\left(1 - \frac{V}{V_0}\right)^2$, where I_0 and V_0 are constants. In an experiment, the current I is measured as the voltage V applied across the device increases. The parameters V_0 and $\sqrt{I_0}$ can be graphically determined as

a. the slope and the y -intercept of the $I - V^2$ graph.
b. the negative of the ratio of the y-intercept and the slope, and the y-intercept of the $I - V^2$ graph.
c. the slope and the y-intercept of the $\sqrt{I_0} - V$ graph.
d. the negative of the ratio of the y-intercept and the slope, and the y-intercept of the $\sqrt{I_0} - V$ graph.

A	a
B	b
C	c
D	d
E	None of the above
Correct Answer	D
Marks	1

26

<table>
<tr><td colspan="2">**Question Description**</td></tr>
<tr><td></td><td>

The function $f(x) = e^{\sin x}$ is expanded as a Taylor series in x, around $x = 0$, in the form $f(x) = \sum\limits_{n=0}^{\infty} a_n x^n$. The value of $a_0 + a_1 + a_2$ is

a. 0

b. $\dfrac{3}{2}$

c. $\dfrac{5}{2}$

d. 5

</td></tr>
<tr><td>**A**</td><td>a</td></tr>
<tr><td>**B**</td><td>b</td></tr>
<tr><td>**C**</td><td>c</td></tr>
<tr><td>**D**</td><td>d</td></tr>
<tr><td>**E**</td><td>None of the above</td></tr>
<tr><td>**Correct Answer**</td><td>C</td></tr>
<tr><td>**Marks**</td><td>1</td></tr>
</table>

27	Question Description	
		Consider a system whose three energy levels are given by ε, 2ε and 3ε. The energy level 2ε is two-fold degenerate and the other two are non-degenerate. Find the partition function of the system if $\beta = \frac{1}{k_B T}$.
		(A)$e^{-\beta\varepsilon}(1 - e^{-\beta\varepsilon})^2$
		(B)$(1 - e^{-\beta\varepsilon})^2$
		(C)$e^{-\beta\varepsilon}(1 + e^{-\beta\varepsilon})^2$
		(D)$e^{-\beta\varepsilon}$
A	A	
B	B	
C	C	
D	D	
E	None of the above	
Correct Answer	C	
Marks	1	

28 | **Question Description**

The value of the integral $I = \int_0^{2\pi} \frac{d\theta}{(5+4Cos\theta)^2}$ is

A) $\frac{10\pi}{49}$

B) $\frac{10\pi}{27}$

C) $\frac{8\pi}{25}$

D) $\frac{10\pi}{9}$

A	A
B	B
C	C
D	D
E	None of the above
Correct Answer	B
Marks	1

29	Question Description	In case of a Geiger-Muller (GM) counter, which one of the following statements is CORRECT?
	A	Energy of the particles detected can be distinguished
	B	Operating voltage of the detector is few tens of Volts
	C	Multiplication factor of the detector is of the order of 10^{10}
	D	Type of the particles detected can be identified
	E	None of the above
	Correct Answer	C
	Marks	1

Question Description	
	The Legrongion equation of motion for a simple pendulum is A) $\ddot{\theta} = \frac{-g}{e} \sin \theta$ B) $\ddot{\theta} = \frac{g}{e} \sin \theta$ C) $\ddot{\theta} = \frac{g}{e} \cos \theta$ D) $\ddot{\theta} = \frac{-g}{e} \cos \theta$
A	A
B	B
C	C
D	D
E	None of the above
Correct Answer	A
Marks	1

31	Question Description	
		A ring of radius R carries a linear charge density λ. It rotates with angular speed ω . The magnetic field at its center is
		a. $\dfrac{3\mu_0\lambda\omega}{2}$
		b. $\dfrac{\mu_0\lambda\omega}{2}$
		c. $\dfrac{3\mu_0\lambda\omega}{\pi}$
		d. $\dfrac{3\mu_0\lambda\omega}{2\pi}$
A		a
B		b
C		c
D		d
E		None of the above
Correct Answer		B
Marks		1

32

Question Description	What is the angle between the surfaces $y^2 + z^2 = 2$ and $y^2 - x^2 = 0$ at the point $(1, -1, 1)$? a. $0°$ b. $15°$ c. $30°$ d. $60°$
A	a
B	b
C	c
D	d
E	None of the above
Correct Answer	D
Marks	1

33	Question Description	In a conical ensemble, a system A of fixed volume is in contact with large reserve B then
	A	A can exchange neither energy nor particles with B
	B	A can exchange only energy with B
	C	A can exchange only particles with B
	D	A can exchange both energy and particles with B
	E	None of the above
	Correct Answer	B
	Marks	1

34 **Question Description**	The full scale voltage of an n-bit Digital-to-Analog Convener is V. The resolution that can be achieved in it is a. $\dfrac{V}{n}$ b. $\dfrac{V}{2^{2n}}$ c. $\dfrac{V}{2^{n}-1}$ d. $\dfrac{V}{2^{n}+1}$
A	a
B	b
C	c
D	d
E	None of the above
Correct Answer	C
Marks	1

35	**Question Description**	
		In Young's double-slit experiment, there are two slits of unequal widths, one being four times wider than the other. If I_{max} and I_{min} denote the intensities at a neighbouring maximum and a minimum, then the ratio $\dfrac{I_{min}}{I_{max}}$ is a. 0 b. $\dfrac{1}{4}$ c. $\dfrac{3}{5}$ d. $\dfrac{1}{9}$
A	a	
B	b	
C	c	
D	d	
E	None of the above	
Correct Answer	D	
Marks	1	

36

Question Description	In the case of fields of arbitrary moving charges, the magnetic field vectors is such that
	A) $\vec{B} = \frac{\hat{n} \times \vec{E}}{c^2}$
	B) $\vec{B} = \frac{\hat{n} \times \vec{E}}{c}$
	C) $\vec{B} = \frac{\hat{n} \cdot \vec{E}}{c}$
	D) $\vec{B} = \frac{\hat{n} \cdot \vec{E}}{c}$
A	A
B	B
C	C
D	D
E	None of the above
Correct Answer	B
Marks	1

37	Question Description	
		A particle of charge q and mass m, which is moving in a one-dimensional harmonic potential of frequency ω, is subject to a weak electric field $\mathcal{E}$ in the x-direction. What is the energy of the nth state to the first non-zero correction?
		a. $E_n = (n + \frac{1}{2})\hbar\omega - \frac{q^2\mathcal{E}^2}{2m\omega^2}$
		b. $E_n = (n + \frac{1}{2})\hbar\omega - \frac{3q^2\mathcal{E}^2}{2m\omega^2}$
		c. $E_n = (n + \frac{1}{2})\hbar\omega - \frac{2q^2\mathcal{E}^2}{m\omega^2}$
		d. $E_n = (n + \frac{1}{2})\hbar\omega - \frac{4q^2\mathcal{E}^2}{3m\omega^2}$
A	a	
B	b	
C	c	
D	d	
E	None of the above	
Correct Answer	A	
Marks	1	

38	Question Description	The number of flip – flops required to build a MOD – 31 counter is
	A	15 flip - flops
	B	31 flip - flops
	C	5 flip - flops
	D	8 flip - flops
	E	None of the above
	Correct Answer	C
	Marks	1

39	Question Description	The criterion for application of quantum statistics is
	A	A material should be at high temperature
	B	A material should be at high condensed
	C	The de Broglie wavelength of particle constituting the particle is greater than mean fee path
	D	Chemical potential is high
	E	None of the above
	Correct Answer	C
	Marks	1

40	Question Description	
		The first order correction in ground state energy of one dimension infinite potential box of width L. If it is subjected to perturbation $H_p = \alpha x$ is (A) 0 (B) $\frac{\alpha}{L}\left(\frac{L^2}{2} - \frac{\sqrt{3}}{4\pi}\right)$ (C) $\frac{\alpha L}{2}$ (D) $\frac{\alpha L}{4}$
	A	A
	B	B
	C	C
	D	D
	E	None of the above
	Correct Answer	C
	Marks	1

41

Question Description

The Hamiltonian for a particle of mass m is $H = \dfrac{p^2}{2m} + kqt$, where q and p are the generalized coordinate and momentum, respectively, t is time and k is a constant. For the initial condition, $q = 0$ and $p = 0$ at $t = 0$, $q(t) \propto t^\alpha$, the value of α is

  a. 3
  b. 2
  c. -3
  d. -2

A	a
B	b
C	c
D	d
E	None of the above
Correct Answer	A
Marks	1

42	Question Description	Which of the following statements is incorrect?
	A	Indistinguishable particles obey Maxwell-Boltzmann statistics.
	B	All particles of an ideal Bose gas occupy a single energy state at $T = 0$.
	C	The integral spin particles obey Bose-Einstein statistics.
	D	Protons obey Fermi-Dirac statistics
	E	None of the above
	Correct Answer	A
	Marks	1

43	Question Description
	An electron in a hydrogen atom is in the state $n = 3$, $l = 2$, $m = -2$. Let, $\widehat{L_y}$ denote the y-component of the orbital angular momentum operator. If $\left(\widehat{\Delta L_y}\right)^2 = \frac{\alpha^2 h^2}{4\pi^2}$, the value of α is a. 0 b. $\frac{1}{2}$ c. 1 d. 2
A	a
B	b
C	c
D	d
E	None of the above
Correct Answer	C
Marks	1

44	**Question Description**	
	X-ray of wavelength $\lambda = a$ is reflected from the $[1\ 1\ 0]$ plane of a simple cubic lattice. If the lattice constant is a, the corresponding Bragg angle (in radians) is (A) $\frac{\pi}{3}$ (B) $\frac{\pi}{4}$ (C) $\frac{\pi}{6}$ (D) $\frac{\pi}{2}$	
A	A	
B	B	
C	C	
D	D	
E	None of the above	
Correct Answer	B	
Marks	1	

45	Question Description

The value of integral $I = \oint \frac{dz}{z^2 \sinh z}$ on the contour $C : |z| = 1$ is

(A) 0

(B) $\frac{2\pi i}{6}$

(C) $-\frac{2\pi i}{6}$

(D) $\frac{2\pi i}{3}$

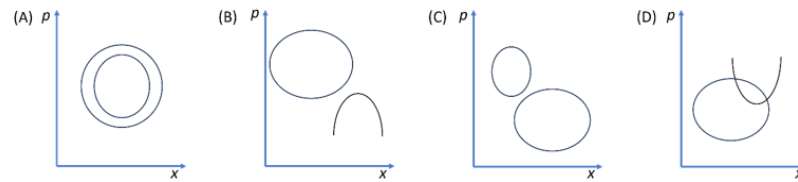| A	A
B	B
C	C
D	D
E	None of the above
Correct Answer	C
Marks	1

46

Question Description	
	Which of the following set of phase-space trajectories is not possible for a particle obeying Hamiltonian equations of motion
A	A
B	B
C	C
D	D
E	None of the above
Correct Answer	D
Marks	1

47	Question Description	Which of the following statement is correct:
	A	The hall coefficient R_H is positive for negative charge carriers.
	B	The hall coefficient R_H is negative for positive charge carriers.
	C	The lower the carrier concentration, the greater the magnitude of the hall coefficient.
	D	The higher the carrier concentration, the greater the magnitude of the hall coefficient.
	E	None of the above
	Correct Answer	C
	Marks	1

48

Question Description	Let's say we have a gas sample whose temperature is varying from T_1 to T_2 at a constant pressure of P. If the relation between Pressure P, Volume V and Temperature T is given by the relation $P = \frac{\alpha T - \beta T^2}{V}$ then find the word done by the gas. (A) $\alpha(T_2 - T_1) - \beta(T_2^2 - T_1^2)$ (B) $\alpha(T_2 + T_1) - \beta(T_2^2 - T_1^2)$ (C) $\alpha(T_2 - T_1) - \beta(T_2^2 + T_1^2)$ (D) $\alpha(T_2 + T_1) - \beta(T_2^2 + T_1^2)$
A	A
B	B
C	C
D	D
E	None of the above
Correct Answer	A
Marks	1

49	Question Description	A dual slope ADC uses
	A	Counters
	B	OP - Amps
	C	An integrator
	D	Differentiator
	E	None of the above
	Correct Answer	C
	Marks	1

50	Question Description	

<table>
<tr><td rowspan="1"></td><td>Question Description</td><td>

The value of the electric and magnetic fields in a particular reference frame (in suitable units) are

$$E = 2\hat{i} + \hat{j} + 2\hat{k}, \quad B = \sqrt{\tfrac{71}{32}}\hat{i} + \tfrac{3}{4}\hat{j} - \sqrt{\tfrac{71}{32}}\hat{k}$$

In another inertial frame, which moves at a constant velocity with respect to the first frame, the electric field and magnetic field consistent with the previous observations are

a. $E' = 3\hat{i} + 5\hat{j} + \sqrt{71}\hat{k},$ $\qquad$ $B' = 4\hat{i} + \tfrac{3}{2}\hat{j}$

b. $E' = \sqrt{3}\hat{i} + \sqrt{\tfrac{33}{4}}\hat{j},$ $\qquad$ $B' = \sqrt{\tfrac{3}{16}}\hat{i} + \sqrt{\tfrac{113}{16}}\hat{k}$

c. $E' = \sqrt{\tfrac{71}{32}}\hat{i} + \tfrac{3}{4}\hat{j} - \sqrt{\tfrac{71}{32}}\hat{k},$ $\qquad$ $B' = 2\hat{i} + \hat{j} + 2\hat{k}$

d. $E' = \hat{i} + \hat{j} + \tfrac{3}{4}\hat{k},$ $\qquad$ $B' = 4\hat{i} - 4\hat{j} + \hat{k}$

</td></tr>
<tr><td>A</td><td colspan="2">a</td></tr>
<tr><td>B</td><td colspan="2">b</td></tr>
<tr><td>C</td><td colspan="2">c</td></tr>
<tr><td>D</td><td colspan="2">d</td></tr>
<tr><td>E</td><td colspan="2">None of the above</td></tr>
<tr><td>Correct Answer</td><td colspan="2">B</td></tr>
<tr><td>Marks</td><td colspan="2">1</td></tr>
</table>

| 51 | Comprehension | Read the following passage and answer the questions below:

Americans, I am aware, believe that they will produce Literature and Art, as they produce coal and steel and oil, by the judicious application of intelligence and capital; but here they do themselves injustice. The qualities that are making them masters of the world, unfit them for slighter and less serious pursuits. The future is for them the kingdom of elevators, of telephones, of motor-cars, of flying machines. Let them not idly hark back, misled by the effete traditions, to the old European dream of the kingdom of heaven …let them say, "for Europe, Letters and Art", let America rule the world by syndicates and trusts!" For such is her true destiny, and that she conceives it to be such, is evidenced by the determination with which she has suppressed all irrelevant activities. Every kind of disinterested intellectual operation she has severely repudiated. |
|---|---|---|
| | Question Description | The essence of American character, as suggested in the passage, lies in the phrase |
| | A | disinterested intellectual operation |
| | B | production of coal and steel and oil |
| | C | desire for mastery over the world |
| | D | sane use of intelligence and wealth |
| | E | None of the above |
| | Correct Answer | D |
| | Marks | 1 |

52	Comprehension	Read the following passage and answer the questions below:
		Americans, I am aware, believe that they will produce Literature and Art, as they produce coal and steel and oil, by the judicious application of intelligence and capital; but here they do themselves injustice. The qualities that are making them masters of the world, unfit them for slighter and less serious pursuits. The future is for them the kingdom of elevators, of telephones, of motor-cars, of flying machines. Let them not idly hark back, misled by the effete traditions, to the old European dream of the kingdom of heaven …let them say, "for Europe, Letters and Art", let America rule the world by syndicates and trusts!" For such is her true destiny, and that she conceives it to be such, is evidenced by the determination with which she has suppressed all irrelevant activities. Every kind of disinterested intellectual operation she has severely repudiated.
	Question Description	The statement "For such is her destiny", indicates that America is inclined to strive for
	A	the kingdom of elevators
	B	political power over the world
	C	slighter and less serious pursuits
	D	the kingdom of heaven
	E	None of the above
	Correct Answer	B
	Marks	1

53	Comprehension	Read the following passage and answer the questions below:
		Americans, I am aware, believe that they will produce Literature and Art, as they produce coal and steel and oil, by the judicious application of intelligence and capital; but here they do themselves injustice. The qualities that are making them masters of the world, unfit them for slighter and less serious pursuits. The future is for them the kingdom of elevators, of telephones, of motor-cars, of flying machines. Let them not idly hark back, misled by the effete traditions, to the old European dream of the kingdom of heaven …let them say, "for Europe, Letters and Art", let America rule the world by syndicates and trusts!" For such is her true destiny, and that she conceives it to be such, is evidenced by the determination with which she has suppressed all irrelevant activities. Every kind of disinterested intellectual operation she has severely repudiated.
	Question Description	The following is not a synonym for "effete"
	A	affected
	B	effective
	C	enfeebled
	D	effeminate
	E	None of the above
	Correct Answer	B
	Marks	1

| 54 | Comprehension | Read the following passage and answer the questions below:

Americans, I am aware, believe that they will produce Literature and Art, as they produce coal and steel and oil, by the judicious application of intelligence and capital; but here they do themselves injustice. The qualities that are making them masters of the world, unfit them for slighter and less serious pursuits. The future is for them the kingdom of elevators, of telephones, of motor-cars, of flying machines. Let them not idly hark back, misled by the effete traditions, to the old European dream of the kingdom of heaven …let them say, "for Europe, Letters and Art", let America rule the world by syndicates and trusts!" For such is her true destiny, and that she conceives it to be such, is evidenced by the determination with which she has suppressed all irrelevant activities. Every kind of disinterested intellectual operation she has severely repudiated. |
|---|---|---|
| | Question Description | The statement about "producing Literature and Art as coal, steel and oil" implies |
| | A | a materialistic approach to creative work |
| | B | a realistic view of literature and art |
| | C | a prudent view of cultural activity |
| | D | a keen interest in refinement of spirit |
| | E | None of the above |
| | Correct Answer | A |
| | Marks | 1 |

55	Comprehension	Read the following passage and answer the questions below:
		Americans, I am aware, believe that they will produce Literature and Art, as they produce coal and steel and oil, by the judicious application of intelligence and capital; but here they do themselves injustice. The qualities that are making them masters of the world, unfit them for slighter and less serious pursuits. The future is for them the kingdom of elevators, of telephones, of motor-cars, of flying machines. Let them not idly hark back, misled by the effete traditions, to the old European dream of the kingdom of heaven …let them say, "for Europe, Letters and Art", let America rule the world by syndicates and trusts!" For such is her true destiny, and that she conceives it to be such, is evidenced by the determination with which she has suppressed all irrelevant activities. Every kind of disinterested intellectual operation she has severely repudiated.
	Question Description	Select the option closest in meaning to the phrase "severely repudiated" in the passage
	A	refused to fulfil
	B	refused to discharge
	C	rejected outright
	D	refused to accept
	E	None of the above
	Correct Answer	C
	Marks	1

56	Question Description	Which case has the Supreme Court referred to a five-judge Constitution Bench recently?
	A	Aadhaar case
	B	Electoral bond case
	C	Pegasus case
	D	Farm laws case
	E	None of the above
	Correct Answer	B
	Marks	1

57	Question Description	How many member countries are there in NATO in 2023?
	A	31
	B	30
	C	29
	D	35
	E	None of the above
	Correct Answer	A
	Marks	1

58	Question Description	Where was the first edition of the Indian Military Heritage Festival inaugurated?
	A	Mumbai
	B	Bangalore
	C	Chennai
	D	New Delhi
	E	None of the above
	Correct Answer	D
	Marks	1

59	Question Description	What is the name of the recent potential cyclonic storm formed in the Arabian Sea?
	A	Cyclone Nisarga
	B	Cyclone Tej
	C	Cyclone Biparjoy
	D	Cyclone Asani
	E	None of the above
	Correct Answer	B
	Marks	1

60		
Question Description		Which country won the gold medal in the men's hockey event at the 2023 Asian Games?
A		Japan
B		South Korea
C		Pakistan
D		India
E		None of the above
Correct Answer		D
Marks		1

61		
Question Description		Which city in India is aiming to become the first wetland city?
A		Udaipur
B		Jaipur
C		Jodhpur
D		Kota
E		None of the above
Correct Answer		A
Marks		1

62	Question Description	Which city is known as the "Tea City of India"?
	A	Kolkata
	B	Guwahati
	C	Darjeeling
	D	Dibrugarh
	E	None of the above
	Correct Answer	D
	Marks	1

63	Question Description	What is the name of India's first semi-high-speed regional rail service?
	A	Namo Bharat
	B	Rapid B
	C	Vande Bharat
	D	Speed X
	E	None of the above
	Correct Answer	A
	Marks	1

64	Question Description	Who won the gold medal in the men's T63 high jump event at the Asian Para Games 2023?
	A	Pranav Soorma
	B	Shailesh Kumar
	C	Mariyappan Thangavelu
	D	Padhiyar Govindbhai
	E	None of the above
	Correct Answer	B
	Marks	1

65	Question Description	Which Indian aerospace organization unveiled its Vikram-1 orbital rocket in October 2023?
	A	Skyroot Aerospace
	B	Indian Space Research Organisation
	C	Bharat Heavy Electricals Limited
	D	Bharat Dynamics Limited
	E	None of the above
	Correct Answer	A
	Marks	1

66	Question Description	Find the missing alphabet in the following series? O, T, T, F, F, S, S, E, ?
	A	E
	B	N
	C	G
	D	H
	E	None of the above
	Correct Answer	C
	Marks	1

67	Question Description	If BEAUTY is coded as DHEZZF, how will FLOWER be written in that code?
	A	HSOBYK
	B	HBOSKY
	C	SBKYOH
	D	HOSBKY
	E	None of the above
	Correct Answer	D
	Marks	1

68	Question Description	Select the pair of words that are related to each other in the same way as the two capitalized words PAPER:WOOD
	A	ink: colour
	B	brush: paint
	C	brick: clay
	D	cloth: dresses
	E	None of the above
	Correct Answer	C
	Marks	1

69 Question Description	Assuming the given statements to be true, decide which of the conclusion is true, disregarding the commonly known facts
	
	Statements
	   I. All locks are keys
	   II. All chains are locks
	
	Conclusions

A	all keys are locks
B	all chains are keys
C	all locks are chains
D	some chains are not keys
E	None of the above
Correct Answer	B
Marks	1

Question Description	In an interview panel, seven members are sitting in a row. A is in between D & F, C is in between F & G. G is between C & E and D is in between B & A. Find the person sitting in the middle.
A	D
B	F
C	B
D	A
E	None of the above
Correct Answer	B
Marks	1

70

71	Question Description	If SIZZLING is coded as 5 and ABSENTEE as 6, then what is the code for LETTERS?
	A	5
	B	6
	C	7
	D	8
	E	None of the above
	Correct Answer	A
	Marks	1

72	Question Description	Raju's age is three years more than four times Balu's age. After five years, Raju's age will be one year more than thrice Balu's age. What is Raju's present age in years?
	A	8
	B	13
	C	32
	D	35
	E	None of the above
	Correct Answer	D
	Marks	1

73	**Question Description**	IMT's hostel mess requires 60 kgs of rice every day except every 7th day on which only 50 kgs of rice is required. If this continues, how many kgs of rice is required for 150 days starting from the first day?
	A	9000 kgs
	B	8790 kgs
	C	8970 kgs
	D	9890 kgs
	E	None of the above
	Correct Answer	B
	Marks	1

74

Question Description	Understand the pattern in the given figure and find the missing number	

	4	9	
6	20	?	6
5	39	51	10
	8	7	

A	45
B	32
C	54
D	28
E	None of the above
Correct Answer	A
Marks	1

75	Question Description	Owner of a branded shoe showroom earns 25% profit after giving 25% discount. Now, if he wants to give 10% discount, what would be his profit percentage?
	A	30%
	B	40%
	C	50%
	D	60%
	E	None of the above
	Correct Answer	C
	Marks	1