TEST SERIES CSIR-UGC-NET/JRF Dec. 2016

BOOKLET SERIES B

Paper Code 05

Test Type: TEST SERIES

PHYSICAL SCIENCES

Duration: 02:00 Hours

Date: 26-11-2016

Maximum Marks: 120

Read the following instructions carefully:

1. Attempt all the questions.
2. This booklet contain **60** Objective Type Questions, each Question carry **2 marks** each.
3. For rough work, blank sheet is attached at the end of test booklet.
4. There will be negative marking **@25%** for each wrong answer.
5. Darken the appropriate bubbles with HB pencil/Ball Pen to write your answer.
6. The candidates shall be allowed to carry the Question Paper Booklet after completion of the exam.

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CLASSICAL MECHANICS + SOLID STATE PHYSICS + MATHEMATICAL PHYSICS

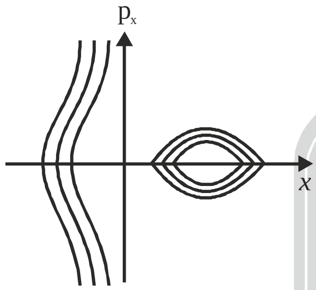
1. What are principal moment of inertia of a square plate of mass m and side a about axes passing through one corner

(a) $\frac{ma^2}{12}, \frac{ma^2}{12}$ (b) $\frac{ma^2}{12}, \frac{ma^2}{4}$ (c) $\frac{ma^2}{12}, \frac{7ma^2}{12}$ (d) $\frac{ma^2}{12}, \frac{ma^2}{3}$

2. A classical non-relativistic particle is moving under a potential

$$V(x) = \begin{cases} \dfrac{2ax}{4-x^2} & -\infty < x < 0 \\ bx^2 & 0 \le x < \infty \end{cases}$$

Phase space trajectory of the particle is

(a)


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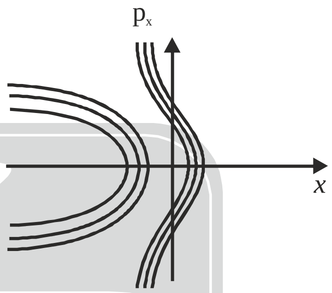

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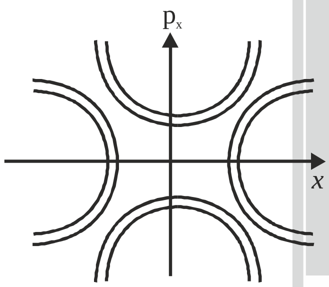

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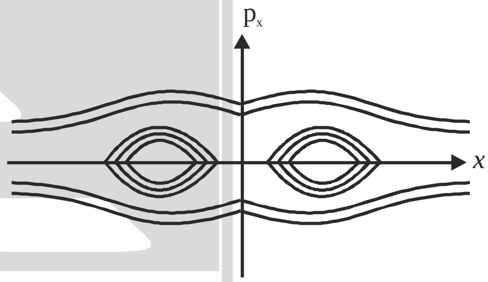


3. A relativistic particle has momentum p_0 when its kinetic energy equal to rest mass energy. What will be its momentum when its kinetic energy becomes twice its rest mass energy.

(a) $4p_0$ (b) $2p_0$ (c) $\frac{2}{\sqrt{3}}p_0$ (d) $\sqrt{\frac{8}{3}}p_0$

4. In Milikan's oil drop experiment, an oil drop of mass m and radius r and charge q is found to fall down with terminal speed v_1. When an electric field E is applied it moves upward with terminal speed v_2. Coefficient of viscocity of medium is

(a) $\frac{mg}{6\pi r(v_1+v_2)}$ (b) $\frac{mg}{6\pi r(v_1-v_2)}$ (c) $\frac{qE}{6\pi r(v_1-v_2)}$ (d) $\frac{qE}{6\pi r(v_1+v_2)}$

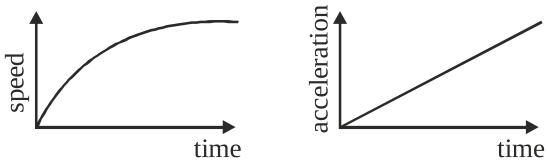
5. A solid cylinder attains speed v_1 when it rolls down an inclined plane and attains speed v_2 when it slides down without friction. The value of $\frac{v_1}{v_2}$ is

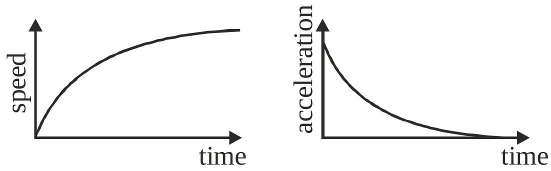
(a) 1 (b) $\sqrt{2}$ (c) $\frac{1}{2}$ (d) $\sqrt{\frac{2}{3}}$

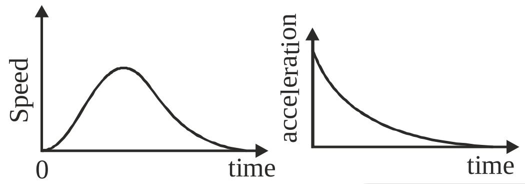
6. A particle of mass m collides elastically with another particle of mass 2m initially at rest. if speed of first particle in center of mass frame after collision is V_0. Then speed of first particle in lab frame before collision is:

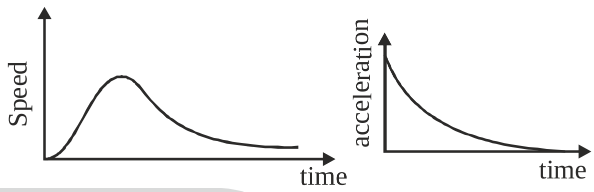
(a) $\frac{3V_0}{2}$ (b) $\frac{V_0}{2}$ (c) $\frac{2V_0}{3}$ (d) $2V_0$

7. A small rain drop of mass m experiences a viscous force $F_d = bv$, proportional to its instaneous speed v. If it starts from rest at a height h then which of the following is correct

(a) 

(b) 

(c) 

(d) 

8. A particle of mass m is moving under a central force $F = \frac{-K}{r^2}$. If E and L be energy and angular momentum of particle and r_1 and r_2 be two turning points. Then for $E = \frac{-3mK^2}{8L^2}$ value of $\frac{r_1}{r_2}(r_1 > r_2)$ is

(a) 3 (b) 3.5 (c) 4.5 (d) 7

9. Consider canonical transformation defined by $Q = p + m\omega q$, $P = \frac{(p - m\omega q)}{2m\omega}$. The generating function for this transformation is

(a) $qQ - \frac{1}{2}m\omega q^2 - \frac{Q^2}{4m\omega}$ (b) $qQ + \frac{1}{2}m\omega q^2 + \frac{Q^2}{4m\omega}$

(c) $\frac{1}{2}m\omega q^2 + \frac{Q^2}{4m\omega}$ (d) $qQ + \frac{1}{2}m\omega q^2$

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10. A particle of mass m collides elastically with another particle of mass $\sqrt{3}$m which is at rest. If in lab frame first particle scatters at angle 60º to initial direction of motion. Then in center of mass frame angle of scattering will be

(a) 60º (b) 15º (c) 90º (d) 45º

11. Two qual point masses are fixed 2d distance a part. On perpendicular bisector line a third mass is placed. For what value of distance of third mass from mid point with net force on it will be maximum.

(a) d (b) $\frac{d}{\sqrt{2}}$ (c) $\sqrt{2}d$ (d) $2d$

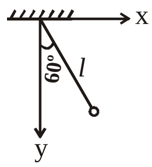
12. A particle is moving under time dependent potential $V(x,y,t) = \frac{A}{2}(x^2 + y^2) + B\sin\omega t$. Which of the following statements is/are correct?

(a) P_y = constant (b) L_z = constant (c) energy = constant (d) P_x = constant

13. A particle is dropped from some height (much less compared to radius of earth). Its momentum versus displacement graph will be

(a) straight line (b) parabola (c) circle (d) ellipse

14. In figure shown, bob is released from point (ℓ, o), x-component of its acceleration at the moment shown in the figure is



(a) $\frac{g}{2}$ (b) $\frac{\sqrt{3}g}{2}$ (c) $\frac{3\sqrt{3}g}{4}$ (d) $\frac{\sqrt{3}g}{4}$

15. Hamiltonian of system is $H = \frac{p^2}{2m} + V(x, y, z)$ and angular momentum is $\vec{L}$. The value of Poission Bracket $[\vec{L}, H]$ is

(a) $-\vec{r} \times \vec{\nabla} V$ (b) $\vec{r} \times \vec{\nabla} V$ (c) 0 (d) $\vec{r} \times \vec{L}$

16. A particle of rest mass m_0 initially at rest is acted upon by a constant force F. What is kinetic energy of the particle if force acts for a time t.

(a) $\sqrt{F^2 t^2 c^2 + m_0^2 c^4}$ (b) $m_0 c^2 \left[\sqrt{1 + \frac{F^2 t^2}{m_0^2 c^2}} - \frac{Ft}{m_0 c}\right]$

(c) $m_0 c^2 \left[\sqrt{1 + \frac{F^2 t^2}{m_0^2 c^2}} - 1\right]$ (d) Ftc

17. A double star consits of two stars of masses m_1 and m_2 separated by a distance r and revolving about their common centre of mass due to their mutual gravitational attraction. Kinetic energy of the system is

(a) $\frac{Gm_1 m_2}{r}$ (b) $\frac{Gm_1 m_2}{2r}$ (c) $\frac{Gm_1 m_2}{4r}$ (d) $\frac{2Gm_1 m_2}{r}$

18. Generalised potential for a system is $u(q, \dot{q}) = \frac{(q + \dot{q})^2}{2}$, corresponding generalised force is

(a) $\dot{q} + \ddot{q}$ (b) $\ddot{q} - \dot{q}$ (c) $\ddot{q} - \dot{q}$ (d) $\ddot{q} - q$

19. A particle of mass m and energy E moves in one dimensional potential $V(x) = \frac{1}{4} kx^4$. Motion of the particle is

(a) simple harmonic

(b) periodic with time period proportional to $E^{1/2}$

(c) periodic with time period proportional to $E^{-1/4}$

(d) periodic with time period independent of E.

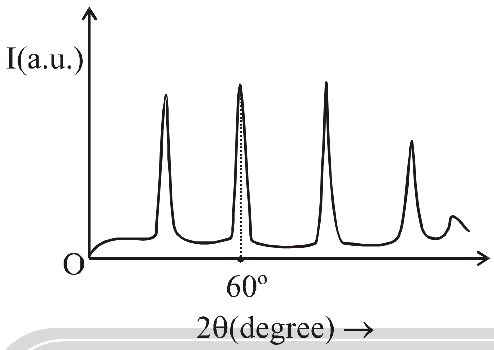
20. Consider canonical transformation $(q_i, p_i) \to (Q_i, P_i)$ such that

$Q_1 = q_1, P_1 = p_1$ and $Q_2 = -q_2, P_2 = -p_2$

Generating function for this transformation is

(a) $Q_1 p_1 - q_2 P_2$ (b) $-Q_1 p_1 + q_2 P_2$ (c) $Q_1 p_1 + q_2 P_2$ (d) $-Q_1 p_1 - q_2 P_2$

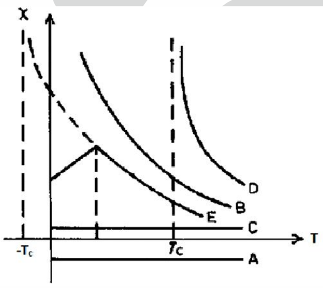
21. A beam of X-rays with wavelength of 2.5Å is reflected from sodium (Na) metal having bcc structure. A plot between intensity (I) versus diffraction angle (2θ), for this metal, is shown in the figure below.



The lattice constant 'a' of Na is:

(a) 5Å (b) 3.5Å (c) 2.5Å (d) 4.3Å

22. Susceptibility (χ) Vs Temperature (T) graph given below is for five solids A, B, C, D and E.



Choose correct answer:

(a) A is Diamagnetic, B is Ferromagnetic and C is Anti-Ferromagnetic.

(b) A is Diamagnetic, D is Ferromagnetic and C is Pauli-Paramagnetic.

(c) C is Diamagnetic, D is Ferromagnetic and B is Pauli-Paramagnetic.

(d) E is Anti-Ferromagnetic, D is Ferri-Magnetic and C is Pauli-Paramagnetic.

23. In an experiment, the resistance of a rectangular slab of a semiconductor is measured as a function of temperature. The semiconductor shows a resistance of 300Ω at 200 K and $2\ \Omega$ at 250 K. Its energy band gap is [Given: ln(15) = 2.708, ln(10) = 2.303]

(a) 0.138 eV (b) 0.431 eV (c) 0.690 eV (d) 0.862 eV

24. Nickel is ferromagnetic, with a saturation magnetization per atom of 0.6 μ_B, where μ_B is the Bohr magneton, equal to 9.27×10^{-24} J/T. Given that the atomic weigth of nickel is 58.71 and that the density of nickel is 8.9 g/cm^3, the molar saturation magnetization of nickel is:

(a) $1.5\times10^5\ A-m^{-1}$ (b) $5.1\times10^5\ A-m^{-1}$

(c) $3.6\times10^3\ A-m^{-1}$ (d) $3.6\times10^{-3}\ A-m^{-1}$

25. The tight binding energy dispersion (E–k) relation for electrons in a one-dimensional array of atoms having lattice constant a and total length L is:

$$E = 2E_0\left[\sin^2\left(\frac{ka}{2}\right) - \frac{1}{6}\sin^2(ka)\right]$$

Where E_0 is constant and k is the wave-vector. The effective mass (m*) of electron at $k = \frac{\pi}{2a}$ is

(a) $-\frac{\hbar^2}{E_0 a^2}$ (b) $\frac{\hbar^2}{E_0 a^2}$ (c) $\frac{3\hbar^2}{2E_0 a^2}$ (d) $-\frac{3\hbar^2}{2E_0 a^2}$

26. The lattice parameter of a fcc solid is given as a = 2Å. If energy (E_V) of vacancy formation is 1 eV. The number of vacancies/m^3 at 300K are: (Given : $\exp(-40) = 4.2\times10^{-18}$)

(a) 2.1×10^{12} (b) 1.70×10^{12} (c) 4×10^{19} (d) 1.70×10^{20}

27. X-rays are diffracted from a set of planes with miller indices (110) in NaCl crystal at Bragg angle of 30º. If the lattice parameter (a) of the crystal is 4.2Å, the wavelength λ of the X-rays is:

(a) 2.96Å (b) 5.94Å (c) 1.48Å (d) 4.2Å

28. The excitations of a three –dimensional solid are bosonic in nature with their frequency ω and wave-number are related by $\omega \propto k$. If the chemical potential is zero, the behavior of the specific heat of the solid at low temperature is proportional to

(a) $T^{1/2}$ (b) $T^{3/2}$ (c) T^3 (d) T

29. An intrinsic sample of silicon is doped with P and Al with doping densities of $1.5\times10^{16}/cm^3$ and $2.5\times10^{16}/cm^3$ respectively. If intrinsic carrier concentration of Si is $1.5\times10^{10}/cm^3$. The electron and hole densities per cm^3 are, respectively.

(a) $2.25\times10^4, 1\times10^{16}$ (b) $1.5\times10^4, 2.5\times10^{16}$

(c) $1\times10^{16}, 2.25\times10^4$ (d) $1.5\times10^{16}, 1\times10^4$

30. Total energy of fcc solid is given by

$$U = -\frac{\alpha e^2}{4\pi\varepsilon_0 r} + \frac{B}{r^9}\text{ ; } \alpha \text{ is madelung constant and B is constant .}$$

If r_0 is bond length then lattice parameter 'a' of solid will be

(a) $\left(\frac{36\pi \in_0 B}{\alpha e^2}\right)^{1/8}$ (b) $\frac{2}{\sqrt{3}}\left(\frac{36\pi \in_0 B}{\alpha e^2}\right)^{1/8}$ (c) $\sqrt{2}\left(\frac{36\pi \in_0 B}{\alpha e^2}\right)^{1/8}$ (d) $2\sqrt{2}\left(\frac{36\pi \in_0 B}{\alpha e^2}\right)^{1/8}$

31. A set of primitive vectors for the unit cell of aluminium in a face-centred is given to be $\vec{a} = d(\hat{j}+\hat{k})$, $\vec{b} = d(\hat{i}+\hat{k})$ and $\vec{c} = d(\hat{i}+\hat{j})$. The density and mass number of aluminium are 2.7 g/cm^3 and 27 respectively. The value of 'd' is (approximately).

(a) 2Å (b) 4Å (c) 6Å (d) 1Å

32. Choose correct answer:

(a) X-ray diffraction used in magnetic studies of crystal.
(b) Electron diffraction used to study crystal lattice structure.
(c) Neutron diffraction used to study surface crystallography of the crystal.
(d) X-ray diffraction used to study crystal lattice structure.

33. Two dimensional lattice has primitive translation vector $\vec{a} = 2\hat{i}$ and $\vec{b} = \hat{i} + 2\hat{j}$, Corresponding reciprocal lattice vectors are

(a) $2\hat{i}, \hat{i} + 2\hat{j}$ (b) $\pi\hat{i}, \frac{\pi}{2}\left(-\hat{i} + 2\hat{j}\right)$ (c) $\frac{\pi}{2}\left(2\hat{i} - \hat{j}\right), \pi\hat{j}$ (d) $\pi\left(\hat{i} - \hat{j}\right), \pi\hat{i}$

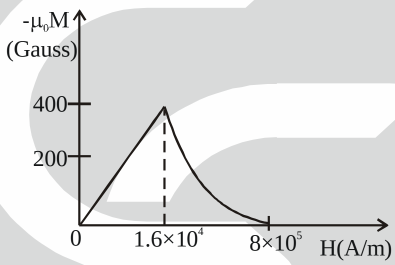
34. A current 'I' is measured in a copper rod of resistivity 'ρ', length ℓ and radius 'r' by applying the voltage 'V'. If the uncertainties in the measurement of length (ℓ), radius (r) and voltage (v) are 3%, 2% and 5% respectively and no uncertainty in ρ. The uncertainties in the length and radius are random and independent of each other. The uncertainty in the value of resistance 'R' is:

(a) 5% (b) 9% (c) 7% (d) 6%

35. A two-dimensional system consists of a monovalent atom in a rectangular primitive cell with a = 2Å and b = 4Å. By assuming free electron model, the ratio of the electron energy at corner to side centre position (along k_x-direction) in I[st] BZ is:

(a) $\frac{5}{4}$ (b) $\frac{4}{5}$ (c) 5 (d) $\frac{1}{5}$

36. For a super conductor M vs H graph is shown in the figure. The penetration depth (λ) for the super conductor is?



(a) 4Å (b) 2Å (c) 6Å (d) 8Å

37. A GaAsP photodetector has a cross-sectional area of 2×2 mm^2. A light of wavelength 500 nm and intensity 0.1 mw/cm^2 incident on the photodetector of unity quantum efficiency. Band gap of GaAsP semiconductor is 2.20 eV. Photocurrent (I_{ph}) generated in the detector is?

(a) 3μA (b) 1.60 μA (c) 2.30 μA (d) 1.50 μA

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38. Electrons moves with relativistic speeds on graphene sheet and assumed to follow the dispersion relation $\varepsilon(k) = vk$ (where *v* is constant) over the entire *k*-space, then the dependence of Fermi wave vector (K_F) on electron density (*n*) is

(a) $K_F \propto n^{1/2}$ (b) $K_F \propto n$ (c) $K_F \propto n^{2/3}$ (d) $K_F \propto n^{1/3}$

39. The dispersion relation for electrons in an f.c.c. crystal is given, in the tight binding approximation by

$$\varepsilon(k) = -4\varepsilon_0\left[\cos\frac{k_x a}{2}\cos\frac{k_y a}{2} + \cos\frac{k_y a}{2}\cos\frac{k_z a}{2} + \cos\frac{k_z a}{2}\cos\frac{k_x a}{2}\right]$$

where '*a*' is the lattice constant and ε_0 is a constant with the dimension of energy. The effective mass (m^*) of electron at I[st] BZ boundary is

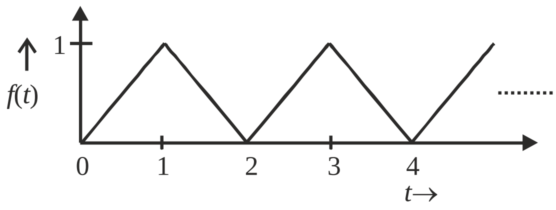
(a) $-\frac{\hbar^2}{\varepsilon_0 a^2}$ (b) $-\frac{\hbar^2}{2\varepsilon_0 a^2}$ (c) $\frac{\hbar^2}{2\varepsilon_0 a^2}$ (d) ∞

40. The energy of an electron in a band as a function of its wave vector **k** is given by

$E(k) = E_0 - B(\cos k_x a + \cos k_y a + \cos k_z a)$, where E_0, B and a are constants. The group velocity (v_g) of electron at $\left(\frac{\pi}{a}, 0, 0\right)$ is

(a) 0 (b) $\frac{Ba}{\hbar}$ (c) $-\frac{Ba}{\hbar}$ (d) $\frac{3Ba}{\hbar}$

41. Consider the following graph of the function $f(t)$:



The Laplace transform of $f(t)$ is

(a) $\frac{1}{s^2}\left(1+e^{-s}\right)$ (b) $\frac{1}{s^2}\left(1-e^{-s}\right)$ (c) $\frac{1}{s^2}\tanh\left(\frac{s}{2}\right)$ (d) $\frac{1}{s^2}\coth\left(\frac{s}{2}\right)$

42. The fourier transform of a function $f(t)$ can be defined as

$$X(\omega) = \int_{-\infty}^{\infty} f(t) e^{-i\omega t} dt$$

If $f(t) = e^{-t/2} u_0(t)$, where $u_0(t)$ is an unit step function defined as

$$u_0(t) = 1 \quad \text{for } t \geq 0$$
$$= 0 \quad \text{for } t < 0$$

Then the variation of $\text{Im}\left[X(\omega)\right]$ will be

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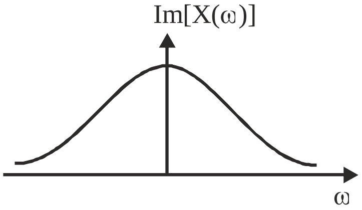
(a)



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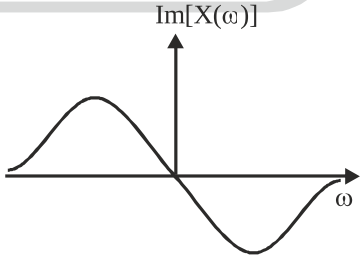

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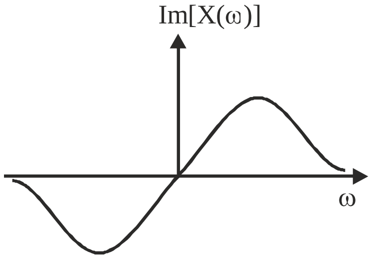

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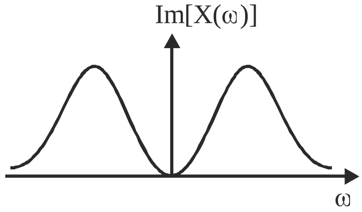


43. The fourier transform of $f(x)$ is $\tilde{f}(k)=\int_{-\infty}^{\infty} f(x)e^{-ikx}dx$. If $f(x)=\delta(x)+\sum_{n=1}^{\infty}\frac{1}{n!}\frac{d^n}{dx^n}[\delta(x)]$. Then $\tilde{f}(k)$ will be

(a) e^{ik} (b) e^{-ik} (c) $\frac{1}{1-ik}$ (d) $\frac{1}{1+ik}$

44. Consider a square wave of frequency 2 kHz. In the fourier series expansion of the square wave. The frequency of the second overtone, will be

(a) 1 kHz (b) 2 kHz (c) 4 kHz (d) 6 kHz

45. If the random variable X has a mean 3 and variance 4, then the expectation value of x^2+3x+2 will be

(a) 15 (b) 24 (c) 32 (d) 42

46. Let x_1 and x_2 be two independent random variables, each of which follow a Gaussian distribution with standard deviation σ_1, σ_2 and mean μ_1, μ_2 respectively. Then the sum $3x_1+4x_2$ follows a

(a) distribution with two peaks at μ_1, μ_2 and standard deviation $3\sigma_1+4\sigma_2$

(b) distribution with one peak at $(3\mu_1+4\mu_2)$ and standard deviation $3\sigma_1+4\sigma_2$

(c) distribution with one peak at $(3\mu_1+4\mu_2)$ and standard deviation $\sqrt{9\sigma_1^2+16\sigma_2^2}$

(d) distribution with one peak at $(\mu_1+\mu_2)/2$ and standard deviation $\sqrt{9\sigma_1^2+16\sigma_2^2}$

47. Consider a dice with the property that the probability of a face with n dots showing up is proportional to n. If the dice is thrown twice, then the probability that the sum of the numbers that turn up is odd, is

(a) $\frac{108}{441}$ (b) $\frac{144}{441}$ (c) $\frac{225}{441}$ (d) $\frac{216}{441}$

48. Consider the following differential equation:

$$\frac{d^2y}{dt^2}+y=0$$

with initial conditions, $y(0)=1, \left.\frac{dy}{dt}\right|_{t=0}=1$ for $t\geq 0$. The solution attains a maximum for

(a) $t=\frac{\pi}{4}$ (b) $t=\frac{\pi}{2}$ (c) $t=\pi$ (d) $t=0$

49. Given the recurrance relation for Legendre Polynomial

$$(2n+1)P_n(x)=P'_{n+1}(x)-P'_{n-1}(x)$$

Then the value of the following series

$$P_0+3P_1+5P_2..........+(2n+1)P_n \text{ will be}$$

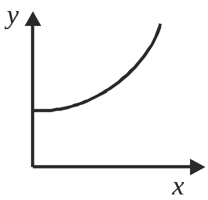
(a) $P'_{n+1}(x)-P'_n(x)$ (b) $P'_{n+1}(x)+P'_n(x)$

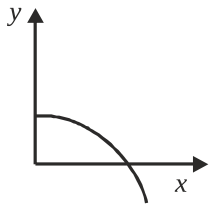
(c) $P'_n(x)-P'_{n+1}(x)$ (d) none of these

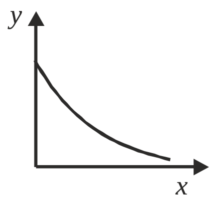
50. The solution of the differential equation

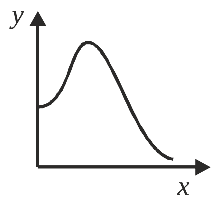
$$\frac{dy}{dx}=-\frac{(xe^x+e^x+y)}{x}$$

under the condition $y(0)=1$, will have graphical form

(a) 

(b) 

(c) 

(d) 

51. In the Laurrent series expansion of the function $f(z)=\frac{1}{(z-1)(z-2)}$ in the anular region between $z=1$ and $z=2$, the ratio of the coefficient of z^n and $\frac{1}{z^n}$ will be

(a) $\frac{1}{2}$ (b) $\frac{1}{2^n}$ (c) $\frac{1}{2^{n+1}}$ (d) $-\frac{1}{2^n}$

52. The value of the integral

$$\oint_C \operatorname{cosec}(\pi z)\cdot\frac{z+1}{z-1}dz$$

where C is closed contour defind by the equation $2|z-1|-1=0$, traversed in the anti-clockwise direction, is

(a) $-2i$ (b) $2i$ (c) 0 (d) ∞

53. The value of the real improper integral

$$\int_{-\infty}^{\infty}\frac{x}{x^3-1}dx$$

will be

(a) $\frac{\pi}{3\sqrt{3}}$ (b) $\frac{2\pi}{3\sqrt{3}}$ (c) $\frac{\pi}{\sqrt{3}}$ (d) $\frac{2\pi}{\sqrt{3}}$

54. Consider the matrix

$$A=\begin{bmatrix}-3 & 2\\ -1 & 0\end{bmatrix}$$

Then A^9 will be

(a) 511A + 510I (b) 309A + 104I (c) 154A + 155I (d) exp (9A)

55. Consider the following vector field:

$$\vec{F}(x,y,z)=2px\hat{i}+qy\hat{j}-3rz\hat{k}\quad(\text{where } p,q,r \text{ are positive real constants})$$

If the net flux of the vector field passing through the surface $S:(x-3)^2+(y+2)^2+\left(z-\sqrt{3}\right)^2=1$, is zero, then which of the following relations is true?

(a) $p+\frac{q}{6}-r=0$ (b) $\frac{p}{3}+\frac{q}{6}-\frac{r}{2}=0$ (c) $\frac{p}{2}-q+\frac{r}{3}=0$ (d) $\frac{2}{p}+\frac{1}{q}-\frac{3}{r}=0$

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56. Consider a $n \times n$ matrix having elements $a_{ij} = ij$ [for all i and j]. Which of the following statement is/are **NOT CORRECT**?
(a) The matrix will not be invertible in nature.
(b) The rank of the matrix will be always 1, does not depend on the its order.
(c) The matrix will have one degenerate eigenvalue wth degeneracy (n -*1*)
(d) The characteristic equation of the matrix A will be $\lambda^n - \left(\sum_{i=1}^{n-1} a_{ii}\right)\lambda^{n-1} = 0$

57. The infinite series

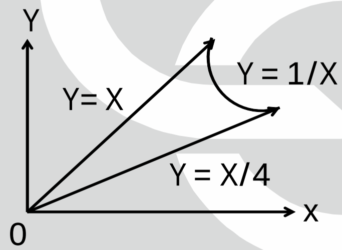
$$\frac{1}{2}x^2 + \frac{1}{4}x^4 + \frac{1}{6}x^6 + ...$$

where $-1 < x < 1$, can be summed to the value

(a) $\frac{1}{2}\ell n\left[\frac{(1+x)}{(1-x)}\right]$ (b) $-\frac{1}{2}\ell n\left(1-x^2\right)$ (c) $\tanh x$ (d) $\frac{1}{2}\ell n\left(1-x^2\right)$

58. The integral $\int_1^3 x^2 dx$ is to evaluated upto 2 decimal places using Simpson's $\frac{1}{3}$ rule. If the interval [1, 3] is divided into 4 equal parts, then the value of the integral is
(a) 7.67 (b) 7.33 (c) 8.33 (d) 8.67

59. The area of the region in the first quadrant bounded by the curves (shown below) will be (in sq. m. units)



(a) $\frac{1}{2}\ln 2$ (b) $\ln 2$ (c) $2\ln 2$ (d) none of these

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60. If a group G is defined as $a * b = 2a + b - 2$, then the inverse of the element 'a' of the group will be
(a) $2-a$ (b) $2+a$ (c) $4+3a$ (d) $4-3a$

Space for rough work

CAREER ENDEAVOUR

PHYSICAL SCIENCES
TEST SERIES-II

Date : 26-11-2016

CLASSICAL MECHANICS + SOLID STATE PHYSICS + MATHEMATICAL PHYSICS

ANSWER KEY

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

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