Learn Physics in Right Way

CUET(PG) Physics

Question Paper -2022

Be Part of Disciplined Learning

CUET_PG_2022_Physics Question

Section-A

Q1. From among the four options given, choose the most appropriate sequence of the four phrases given below, to make a meaningful sentence:

(A) turn to the next page (B) once you get to the end

(C) to find the correct answers (D) of the quiz

Choose the correct answer from the options given below:

(1) (A), (C), (B), (D) (2) (D), (B), (C), (A)

(3) (B), (D), (A), (C) (4) (C), (A), (D), (B)

Q2. Choose the correctly spelt word.

(1) Egaliterian (2) Egalitarian (3) Egalitirian (4) Egaletarian

Q3. Choose the correct sentence.

(1) Camera is piece of equipment used to take photographs.

(2) Camera is a piece of equipment used for taking photographs.

(3) Camera is a piece of equipment used to taking photographs.

(4) Camera is the piece of equipment used on taking photographs.

Q4. Match List I with List II.

	List I (word)		List II (antonym)
(A)	Lively	(I)	Comfort
(B)	Release	(II)	Discredit
(C)	Bother	(III)	Check
(D)	Appreciate	(IV)	Dull

Chooser the correct answer from the options given below:

(1) (A)-(IV), (B)-(III), (C)-(I), (D)-(II) (2) (A)-(III), (B)-(IV), (C)-(I), (D)-(II)

(3) (A)-(II), (B)-(IV), (C)-(I), (D)-(III) (4) (A)-(IV), (B)-(II), (C)-(I), (D)-(III)

Q5. From among the four options given, choose the word that is opposite in meaning to 'professional'

(1) Unemployed (2) Student (3) Amateur (4) Executive

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Q6. Identify the correct direct narration for the following sentence.
Moti asked Gangu whether the latter was in his sense.
(1) "Hey Gangu, are you in your senses now?" asked Moti.
(2) "Gangu, have you lost your senses?" asked Moti.
(3) "Gangu, are you in your senses?" asked Moti.
(4) "Are you senseless, Gangu?" asked Moti.

Q7. Which of the following is a one-word substitute for 'a government by the wealthy'?
(1) oligarchy (2) aristocracy (3) plutocracy (4) kelptocracy

Q8. Pick out the synonym of the following word. Optimist
(1) destructive (2) disappointed (3) hopeful (4) funny

Q9. Fill up the blank with the correct form of verb:
Neither of the two plans_____approved.
(1) were (2) was (3) were being (4) had

Q10. Identify the passive voice for the following sentence. Do not insult the poor.
(1) The poor are not insulted. (2) The poor should not be insulted.
(3) Let the poor not be insulted. (4) Let the poor be not insulted.

Q11. Member of Parliament will lost his membership if he is continuously absents from his sessions for:
(1) 30 days (2) 60 days (3) 90 days (4) 120 days

Q12. When value of money exceeds the commodity value of money, it is called
(1) Full bodied Money (2) Credit Money
(3) Fiat Money (4) Fiduciary Money

Q13. Which of the following will become the first multilateral agency to open an office in the Gujarat International Finance Tech City (GIFT)?
(1) Asian Development Bank (2) World Bank
(3) New Development Bank (4) International Monetary Fund

Q14. Name the first Indian firm which has entered the so-called global carbon market through the farm sector

(1) nurture farm (2) nature farm (3) unique farm (4) carbon farm

Q15. A retired judge of a High Court is permitted to practice as a lawyer in

(1) Supreme Court of India

(2) Any Court of India

(3) High Courts other than the one from where he retired

(4) (1) and (2) only

Q16. Invariable Concomittance relations are like:

(A) The relation between Tree and Fruit

(B) The relation between Fire and Coolness

(C) The relation between Smoke and Fire

(D) The relation between Earth and Smell

(E) The relation where absence of one is the negation of other

Choose the most appropriate answer from the options given below:

(1) (A) and (D) only (2) (A), (B) and (C) only

(3) (C) and (E) only (4) (A), (D) and (E) only

Q17. Match List I with List II:

	List I		List II
(A)	Philosopher	(I)	Rational
(B)	Truth	(II)	Taste
(C)	Tongue	(III)	Idea
(D)	Man	(IV)	Eternal

Choose the correct answer from the options given below:

(1) (A)-(IV), (B)-(I), (C)-(II), (D)-(III)

(2) (A)-(II), (B)-(I), (C)-(IV), (D)-(III)

(3) (A)-(III), (B)-(IV), (C)-(II), (D)-(I)

(4) (A)-(III), (B)-(II), (C)-(I), (D)-(IV)

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Q18. Put all the statements in a specific order. Choose the option which indicates a valid argument containing logical statement that is, where the third statement is a conclusion from the preceding two statements:

(A) All Cats are Pens (B) All Dogs are Pens (C) All Dogs are Cats

(D) Some Dogs are Pens (E) Some Pens are Cats (F) No Cat is Hen

Choose:

(1) (C), (D), (E) (2) (A), (C), (D)

(3) (B), (E), (F) (4) (C), (E), (F)

Q19. Match List I with List II:

	List I		List II
(A)	Bees	(I)	Consciousness
(B)	Mind	(II)	Poison
(C)	Snake	(III)	Honey
(D)	Human	(IV)	Thought

Choose the correct answer from the options given below:

(1) (A)-(I), (B)-(III), (C)-(II), (D)-(IV)

(2) (A)-(III), (B)-(IV), (C)-(II), (D)-(I)

(3) (A)-(IV), (B)-(II), (C)-(I), (D)-(III)

(4) (A)-(II), (B)-(IV), (C)-(III), (D)-(I)

Q20. Match List I with List II:

	List I		List II
(A)	Forest	(I)	Bacteria
(B)	Milk	(II)	Taste
(C)	Water	(III)	Trees
(D)	Food	(IV)	Oxygen

Choose the correct answer from the options given below:

(1) (A)-(III), (B)-(I), (C)-(IV), (D)-(II)

(2) (A)-(IV), (B)-(II), (C)-(III), (D)-(I)

(3) (A)-(I), (B)-(III), (C)-(IV), (D)-(II)

(4) (A)-(II), (B)-(IV), (C)-(III), (D)-(I)

Q21. The polynomial $p(x)=ax^3+bx^2+x-6$, when divided by $x+2$ and $x-2$ leaves the remainders 0 and 4 respectively, then

(1) $a=2,b=0$ (2) $a=\frac{-1}{8},b=\frac{5}{4}$

(3) $a=0,b=2$ (4) $a=\frac{5}{4},b=\frac{-1}{8}$

Q22. Given below are two statements: One is labelled as Assertion A and the other is labelled as Reason R.

Assertion (A): If the areas of two circles are in the ratio 16:25 then their circumferences are in the ratio 4:5.

Reason (R): If the areas of two circles are in the ratios $A_1:A_2$ then their circumferences are in the ratio $\sqrt{A_1}:\sqrt{A_2}$.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Both (A) and (R) are correct and (R) is the correct explanation of (A)

(2) Both (A) and (R) are correct but (R) is NOT the correct explanation of (A)

(3) (A) is correct but (R) is not correct

(4) (A) is not correct but (R) is correct

Q23. The diameter of a sphere is 6 cm. It is melted and drawn into a wire of diameter 4 mm. Then the length of wire is

(1) 54 m (2) 36 m (3) 18 m (4) 9 m

Q24. If a and b are the roots of quadratic equation $x^2+ax-b=0$ and $b\neq 0$, then

(1) $a=-1,b=\frac{1}{2}$ (2) $a=\frac{1}{2},b=-1$

(3) $a=-1,b=2$ (4) $a=1,b=\frac{1}{2}$

Q25. A three digit number is chosen at random, the probability that its hundred's digit, ten's digit and unit's digit's are consecutive integers in descending order, is

(1) $\frac{1}{45}$ (2) $\frac{2}{225}$ (3) $\frac{4}{225}$ (4) $\frac{1}{75}$

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Section-B

Q26. Find $\vec{a}\times\left(\vec{b}\times\vec{c}\right)$ where, $\vec{a}=\hat{i}+\hat{j}-\hat{k}$, $\vec{b}=\hat{i}-\hat{j}+\hat{k}$, $\vec{c}=\hat{i}-\hat{j}-\hat{k}$

(1) $\hat{i}-\hat{j}$ (2) $2\hat{i}-2\hat{j}$ (3) $2\hat{j}-2\hat{i}$ (4) $\hat{j}-\hat{i}$

Q27. Given, $A=x^2+y^2+z^2$; $x=r\sin\theta\cos\phi$, $y=r\sin\theta\sin\phi$, $z=r\cos\theta$

Then, $\frac{\partial A}{\partial r}$ value will be

(1) $2r$ (2) r (3) r^2 (4) $2r^2$

Q28. Integrating factor of the differential equation, $\frac{dy}{dx}+Py=Q$ is given by

(1) I.F. $=e^{\int Qdy}$ (2) I.F. $=e^{\int Pdy}$

(3) I.F. $=e^{\int Pdx}$ (4) I.F. $=e^{\int Qdx}$

Q29. Among the following equations, which is a homogeneous equation?

(1) $\frac{dy}{dx}=\frac{x^2+2y^2}{2x^2+3y^3}$ (2) $\frac{dy}{dx}=\frac{2x^3+y^3}{3x^2+2y^2}$

(3) $\frac{dy}{dx}=\frac{x^2+y^2}{3x^2+2y}$ (4) $\frac{dy}{dx}=\frac{x^2+2y^2}{2x^2+4y^2}$

Q30. If $x+y+z=a$, $y+z=ab$, $z=abc$. The value of $\frac{\partial(x,y,z)}{\partial(a,b,c)}$ is

(1) $-a^2b$ (2) a^2b (3) ab^2 (4) $-ab^2$

Q31. Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R.

Assertion A: Modulus of the complex number $\frac{1+2i}{1-(1-i)^2}$ is 1.

Reason R: Multiplication of $3+4i$ with $7-3i$ gives result as $33+19i$.

In the light of the above statement, choose the correct answer from the options given below:

(1) Both A and R are true and R is the correct explanation of A

(2) Both A are R are true but R is not the correct explanation of A

(3) A is true but R is false

(4) A is false but R is true

Q32. Given below are two statements:

Statement I:

The order of a differential equation is the order of the highest differential coefficient present in the equation.

Statement II:

The degree of a differential equation is the degree of the lowest derivative after removing radical sign and fraction.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Both statement I and statement II are correct

(2) Both statement I and statement II are incorrect

(3) Statement I is correct but statement II is incorrect

(4) Statement I is incorrect but statement II is correct

Q33. A fluid motion given by $\vec{v}=(t+z)\hat{i}+(z+x)\hat{j}+(x+y)\hat{k}$ is

(1) Solenoidal (2) Rotational

(3) Both solenoidal rotational (4) Irrational

Q34. Which of the statements given below are correct?

A. If the dot product of two vectors is zero, then vectors are perpendicular to each other.

B. Work done is a dot product of force and displacement.

C. Vector product is commutative.

D. Vector product is associative with respect to a scalar.

E. The scalar product of two non-zero vectors is always positive.

Choose the correct answer from the options given below:

(1) A and C (2) B and C (3) A, B and D (4) C and E

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Q35. Match List I with List II:

	List I		List II
A.	Transverse vibration of a string	I.	$\frac{\partial^2 y}{\partial t^2} = c^2 \frac{\partial^2 y}{\partial x^2}$
B.	Two-dimensional heat flow	II.	$\frac{\partial^2 u}{\partial r^2} + \frac{1}{r}\frac{\partial u}{\partial r} + \frac{1}{r^2}\frac{\partial^2 u}{\partial \theta^2} = 0$
C.	One-dimensional heat flow	III.	$\frac{\partial u}{\partial t} = c^2 \frac{\partial^2 u}{\partial x^2}$
D.	Two-dimensional heat flow in polar form	IV.	$\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$

Choose the correct answer from the options given below:

(1) A-IV, B-I, C-II, D-III
(2) A-II, B-III, C-I, D-IV
(3) A-I, B-IV, C-III, D-II
(4) A-III, B-II, C-IV, D-I

Q36. Given below are two statements:

Statement I:

The general displacement of a rigid body with one point fixed is a rotation about same axis.

Statement II:

The most general displacement of a rigid body is a translation plus a rotation.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Both statement I and statement II are correct
(2) Both statement I and statement II are incorrect
(3) Statement I is correct but statement II is incorrect
(4) Statement I is incorrect but statement II is correct

Q37. The correct relationship between Cartesian coordinates (x, y, z) and the spherical polar coordinates (r, θ, ϕ) is

(1) $x = r\sin\theta\sin\phi;\ y = r\sin\theta\cos\phi;\ r = r\cos\theta$
(2) $x = r\sin\theta\cos\phi;\ y = r\sin\theta\sin\phi;\ z = r\cos\theta$
(3) $x = r;\ y = r\sin\theta;\ z = r\cos\phi$
(4) $x = r\cos\theta;\ y = r\sin\theta\cos\phi;\ z = r\cos\theta\cos\phi$

Q38. Consider a planet moving in an elliptical orbit around the Sun. Which of the following quantities will remain constant in a planetary motion as seen from the Sun?

(1) Speed (2) Angular Velocity

(3) Kinetic Energy (4) Areal Velocity

Q39. Given below are two statements:

Statement I:

The product of the area of cross-section and the speed remains the same at all points of a tube in laminar flow.

Statement II:

If the pressure in a liquid is changed at a particular point, the change would be transmitted in the entire liquid, with diminished magnitude

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Both statement I and statement II are correct

(2) Both statement I and statement II are incorrect

(3) Statement I is correct but statement II is incorrect

(4) Statement I is incorrect but statement II is correct

Q40. Which of the statements given below are correct?

A. The linear momentum of a particle is independent of the frame of reference.

B. The kinetic energy of a particle depends upon the frame of reference.

C. In an elastic collision, the initial kinetic energy is equal to the final kinetic energy.

D. In an inelastic collision, the kinetic energy first increases then decreases.

E. In an elastic collision, the linear momentum is not conserved.

Choose the most appropriate answer from the options given below:

(1) A, B (2) B, D, E (3) B, C (4) C, D, E

Q41. A satellite is revolving round the Earth at a height of 3600 km. Then, the time period of the satellite is

[Assume, Radius of Earth = 6400 km, Mass of Earth $= 6\times10^{24}$ kg]

(1) 2.77 hours (2) 1.77 hours (3) 1.61 hours (4) 16.1 hours

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Q42. A reference frame attached to the Earth

(1) is an inertial frame by definition.

(2) is an inertial frame because Newton's laws are applicable in this frame.

(3) cannot be an inertial frame because the Earth is revolving around the Sun.

(4) cannot be an inertial frame of reference because Newton's laws are not applicable.

Q43. Match List I with List II:

	List I		List II
A.	Biquartz Polarimeter	I.	Optical refractive index
B.	Michelson's Interferometer	II.	Diffracting screen
C.	Zone Plate	III.	Mountings
D.	Concave Grating	IV.	Optical Rotation

Choose the correct answer from the options given below:

(1) A-II, B-III, C-IV, D-I (2) A-IV, B-I, C-II, D-III

(3) A-III, B-IV, C-I, D-II (4) A-IV, B-II, C-I, D-III

Q44. Given below are two statements:

Statement I:

A Line spectra contains information about atoms.

Statement II:

A Band spectra contains information about molecules and atomic clusters.

In the light of the above statements, choose the correct answer from the options given below:

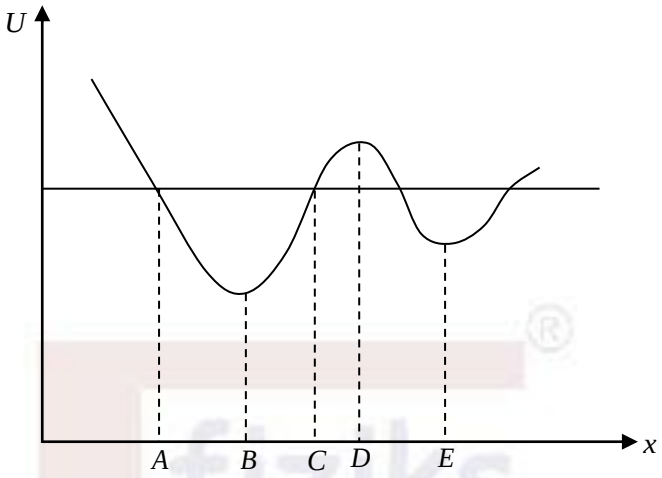
(1) Both statement I and statement II are true

(2) Both statement I and statement II are false

(3) Statement I is true but statement II is false

(4) Statement I is false but statement II is true

Q45. Motion of a particle is shown in the figure. At which point does the particle have unstable equilibrium? (where U is the potential energy)



(1) A (2) B (3) D (4) E

Q46. The relation between quality factor Q and relaxation time t of an oscillator is [ω being angular speed]

(1) $Q=\frac{\omega}{t}$ (2) $Q=\frac{t}{\omega}$ (3) $Q=\omega t$ (4) $Q=\frac{1}{\omega t}$

Q47. What is the Lissajous figure of two rectangular S.H.M.s (Simple Harmonic Motion) of equal frequencies and phase difference of $\frac{\pi}{2}$?

(1) Ellipse (2) Circle (3) Straight line (4) Parabola

Q48. When a body is set into oscillation by an external periodic force of the same frequency as the natural frequency of the body, the phenomenon is known as

(1) Stiffening (2) Resonance (3) Damping (4) Reverberation

Q49. The equation for a wave travelling in x-direction on a string is

$y=(3.0\,cm)\sin\left[\left(3.14\,cm^{-1}\right)x-\left(314\,s^{-1}\right)t\right]$

What is the maximum velocity of a particle of the string?

(1) 9.4 m/sec (2) 9.2 m/sec (3) 9.4 cm/sec (4) 9.0 cm/sec

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Q50. Which is the correct option?

(1) The energy of any small part of a string remains constant in a travelling wave.

(2) The energy of any small part of a string remains constant in a standing wave.

(3) The energies of all small parts of equal length are equal in a travelling wave.

(4) The energies of all the small parts of unequal length are equal in a standing wave.

Q51. The engine of a moving train sounds a whistle at frequency ν. Then the frequency heard by the passenger in the train is

(1) $>\nu$ (2) $<\nu$ (3) $=\frac{1}{\nu}$ (4) $=\nu$

Q52. A plano convex lens of radius 350 cm is placed on a flat plate and illuminated by monochromatic light gives the 6th bright ring of diameter 0.68 cm. What is the wavelength of the light source used?

(1) 5000Å (2) 6000Å (3) 5500Å (4) 6500Å

Q53. For a zone plate the focal length of red colour is given by:

[f_R, f_Y, f_V are respective focal lengths for red, yellow and violet colours]

(1) $f_R < f_V$ (2) $f_R = f_V$ (3) $f_R > f_V$ (4) $f_R = f_Y$

Q54. The electron microscope offers better resolution capability as compared to the optical microscope primarily because

(1) Electron microscope uses the shorter wavelength of radiation.

(2) Electron microscope uses better electronic circuits.

(3) Electron microscope uses complicated accessories.

(4) Electron microscope uses larger objective lenses.

Q55. A tube of sugar solution 20 cm long is placed between crossed Nicols and illuminated with light of wavelength $6\times10^{-5}cm$. If the optical rotation produced is 13° and specific rotation is $65°/dm/g/cm^3$, then what will be the strength of the solution used?

(1) 100% (2) 10% (3) 50% (4) 20%

Q56. Given below are two statements:

Statement I:

The magnitude of the emf ε induced in a conducting loop is equal to the rate at which the magnetic field changes with time.

Statement II:

If a conducting plate moves out of a magnetic field, the relative motion of the field and conductor induced a current in the plate.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Both statement I and statement II are correct

(2) Both statement I and statement II are incorrect

(3) Statement I is correct but statement II is incorrect

(4) Statement I is incorrect but statement II is correct

Q57. Which of the statements given below are correct?

A. An electric dipole has its least potential energy when it's moment is lined up with the field $\vec{E}$.

B. In a uniform electric field, the net force on an electric dipole is zero.

C. The electric dipole's potential energy is defined to be maximum when dipole moment is parallel to applied electric field.

D. The density of field lines in any region is inversely proportional to the magnitude of the electric field in that region.

Choose the most appropriate answer from the options given below:

(1) B, C (2) B, D (3) C, D (4) A, B

Q58. Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R.

Statement A:

The electric potential inside a conductor is constant.

Reason R:

The net charge density inside a conductor is zero.

In the light of the above statements, choose the correct answer from the options given below:

(1) Both A and R are true and R is the correct explanation of A

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(2) Both A and R are true but R is not the correct explanation of A

(3) A is true but R is false

(4) A is false but R is true

Q59. Match List I with List II:

	List I		List II
A.	Inductance	I.	TmA^{-1}
B.	Magnetic field	II.	Tm^2A^{-1}
C.	Permeability	III.	Tm^2A
D.	Magnetic energy	IV.	$NA^{-1}m^{-1}$

Choose the correct answer from the options given below:

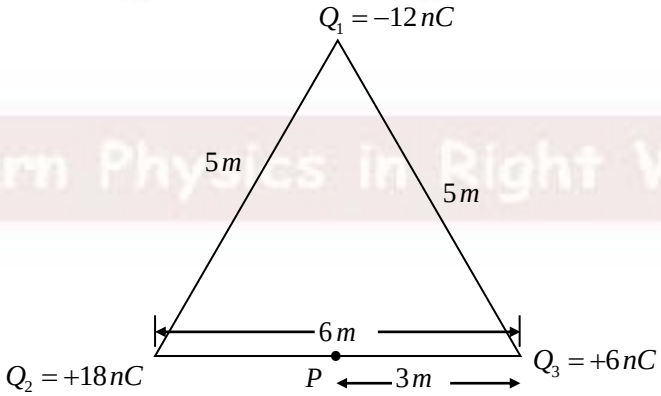
(1) A-II, B-III, C-I, D-IV (2) A-III, B-IV, C-II, D-I

(3) A-IV, B-III, C-I, D-II (4) A-II, B-IV, C-I, D-III

Q60. The concept of displacement current is introduced in which of Maxwell's law of electromagnetic?

(1) First law (2) Second law (3) Third law (4) Fourth law

Q61. The electric potential at Point P is



(1) 98.89 V (2) 62.93 V (3) 44.95 V (4) 8.99 V

Q62. The magnetic field at a distance R from the centre of a long wire of radius $a(a > R)$ varies

(1) inversely with R^2 (2) inversely with a

(3) directly with R (4) directly with a

Q63. A circular loop of wire, 20 mm in radius carries a current of 8A. The value of energy density at the centre of loop is

(1) $1.28\times10^{-5}\ J/m^3$ (2) $1.28\pi\times10^{-5}\ J/m^3$

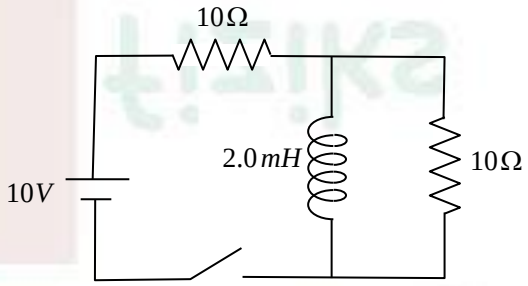
(3) $1.28\times10^{-7}\ J/m^3$ (4) $1.28\pi\times10^{-7}\ J/m^3$

Q64. A plane wave $\tilde{E}_I(x,t)=\tilde{E}_{OI}e^{I(k_1x-\omega t)}\hat{j}$ approaches an interface (yz plane) between two linear media velocity v_1. The value of $B_R(x,t)$ in the reflected wave is

(1) $\frac{\tilde{E}_{OI}}{V_1}e^{I(k_1x-\omega t)}\hat{k}$ (2) $-\frac{E_{OI}}{V_1}e^{I(-k_1x-\omega t)}\hat{k}$

(3) $-\frac{E_{OI}}{V_1}e^{I(k_1x-\omega t)}\hat{k}$ (4) $-\frac{E_{OI}}{V_1}e^{I(-k_1x-\omega t)}\hat{k}$

Q65. In the circuit shown below, the value of current i through the battery just after the switch is closed is



(1) 0.5 A (2) 1.0 A (3) 2.0 A (4) 0 A

Q66. The internal energy of a Boson gas becomes zero at

(1) $T<T_C$ (2) $T>T_C$ (3) $T=T_C$ (4) $T=0$

Q67. A Carnot engine is made to work between -23°C and -223°C. Its efficiency is

(1) 89% (2) 80% (3) 10% (4) 20%

Q68. Mean free path varies

(1) linearly with number of molecules

(2) linearly with the diameter of the molecules

(3) inversely with the density of molecules

(4) linearly with the square of the diameter of molecules

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Q69. When the temperature of a substance is raised from T_1K to T_2K, then change in entropy is

(1) $1-\frac{T_2}{T_1}$

(2) $mc\log_e\left(\frac{T_2}{T_1}\right)$

(3) $mc\log_e\left(\frac{T_1-T_2}{T_1}\right)$

(4) $mc\log_e\left(\frac{T_2}{T_1-T_2}\right)$

Q70. The work done in an adiabatic change in a particular gas depends upon only

(1) change in pressure
(2) change in volume
(3) change in temperature
(4) change in heat

Q71. A piece of ice of mass 10 kg is pushed with a velocity of 10 m/s along a horizontal surface. The piece stops after travelling 30 meters due to friction between the piece and the surface. If the latent heat of ice is 80 cal/g, then the mass of melted ice is about

(1) 1.0 g (2) 1.5 g (3) 2.0 g (4) 0

Q72. Match List I with List II:

List I		List II	
A.	$\left(\frac{\partial U}{\partial S}\right)_V$	I.	P
B.	$-\left(\frac{\partial F}{\partial V}\right)_T$	II.	T
C.	$\left(\frac{\partial G}{\partial P}\right)_T$	III.	S
D.	$-\left(\frac{\partial G}{\partial T}\right)_P$	IV.	V

Choose the correct answer from the options given below:

(1) A-I, B-II, C-III, D-IV
(2) A-III, B-IV, C-I, D-II
(3) A-IV, B-III, C-II, D-I
(4) A-II, B-I, C-IV, D-III

Q73. Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R.

Assertion A:

Every thermodynamic system in an equilibrium state possesses internal energy which is a function of state only.

Reason R:

In thermodynamic system, energy is conserved.

In the light of the above statements, choose the correct answer from the options given below:

(1) Both A and R are true and R is the correct explanation of A

(2) Both A and R are true but R is not the correct explanation of A

(3) A is true but R is false

(4) A is false but R is true

Q74. Given below are two statements:

Statement I:

The change in enthalpy during an isobaric process is equal to the heat transferred.

Statement II:

The internal energy of a system is the energy which is available for work in reversible isothermal change.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Both statement I and statement II are correct

(2) Both statement I and statement II are incorrect

(3) Statement I is correct but statement II is incorrect

(4) Statement I is incorrect but statement II is correct

Q75. Which of the statements given below are correct?

A. For a closed system undergoing a cycle of processes, the cyclic integral of heat is equal to the cyclic integral of work.

B. The mean free path of the molecules of a gas is independent of the absolute temperature of the gas.

C. The work done by the system is zero in an isochoric process.

D. The internal energy of the system does not change in an adiabatic process.

E. In an adiabatic process, temperature remains constant.

(1) A, C (2) B, C, E (3) B, D, E (4) A, D

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Q76. In a scattering by elementary particle experiment, the scattering cross-section depends upon the energy (E) of the incident particle, Planck's Constant (h) and Velocity of Light (c). On the basis of dimension, scattering cross-section would be proportional to

(1) $\left(\frac{hc}{E}\right)^2$ (2) $\left(\frac{hc}{E^2}\right)^2$ (3) $\left(\frac{h}{E\cdot c}\right)^2$ (4) $\frac{h^2}{E^2c}$

Q77. Match List I with List II:

	List I		List II
A.	Frank-Hertz Experiment	I.	Wave nature of particle
B.	Zeeman Effect	II.	Quantization of energy level of electron in atom
C.	Davisson-Germer Experiment	III.	Existence of spin
D.	Stern-Gerlach Experiment	IV.	Space quantization of angular moment

Choose the correct answer from the options given below:

(1) A-IV, B-II, C-I, D-III (2) A-I, B-II, C-III, D-IV

(3) A-II, B-IV, C-I, D-III (4) A-II, B-IV, C-III, D-I

Q78. The expectation value $\langle X \rangle$ of the position of an electron trapped in a box of width L is

(1) L (2) $\frac{L}{4}$ (3) $\frac{L}{2}$ (4) 0

Q79. In black body radiation in a cavity, photons are created and annihilated as a result of emission and absorption by the walls of the cavity because

(1) Photon has one spin

(2) Entropy of the photons is very high

(3) Chemical potential of the photon is zero

(4) Photon obeys Pauli's exclusion principle

Q80. The de-Broglie wavelength of an electron in a metal at 27°C is

[Boltzmann Constant $k = 1.38\times10^{-23}\, J\, mol^{-1}K^{-1}$ Planck's Constant $h = 6.62\times10^{-34}\, Js$] is

(1) 6.2 nm (2) 3.1 nm (3) 3.1 pm (4) 6.2 pm

Q81. An electron is known to have a speed of 200 m/sec to an accuracy of 1%. What is the minimum uncertainty with which its position can be estimated?

(1) 14.46 μm (2) 28.93 μm (3) 0.2846 μm (4) 0.1446 μm

Q82. Two isotopes of Chlorine $^{35}_{17}Cl$ and $^{37}_{17}Cl$ do not have same

(1) Colour (Yellow)

(2) Suffocating odour

(3) Efficiency (as poisons and bleaching agents)

(4) Boiling and freezing points

Q83. An electron $\left(m_0 = 0.511 MeV/c^2\right)$ has an estimated momenta of $2.000 MeV/c$, then its total energy will be

(1) 2.000 MeV (2) 2.064 MeV (3) 0 (4) 2.511 MeV

Q84. According to Moseley's law, the frequency of the characteristic X-rays is proportional to the square of

(1) Atomic number of the element

(2) Atomic weight of the element

(3) Mass number of the element

(4) Density of the element

Q85. When an X-ray's photon of wavelength 0.1 nm collides with an electron and is scattered through 90°. What is the new wavelength of the X-ray's photon?

(1) 0.2048 nm (2) 0.1048 nm (3) 0.1248 nm (4) 0.1024 nm

Q86. What is the energy of emitted photo-electron if light of frequency 1×10^{15} Hz is incident on a sodium target?

[Work function of Sodium = 2.5 eV Planck's constant, $h = 6.63\times10^{-34} Js$]

(1) $2.01\times10^{-20} J$ (2) $2.01\times10^{-19} J$ (3) $2.63\times10^{-20} J$ (4) $2.63\times10^{-19} J$

Q87. Rutherford scattering formula for scattering of Alpha particle by a thin foil depends upon the Kinetic energy (E) of the Alpha particle as

(1) E^2 (2) E (3) $\frac{1}{E^2}$ (4) $\frac{1}{E}$

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Q88. The radius of the innermost orbit is customarily called the Bohr radius of the hydrogen atom. Its value is

(1) 0.5292 picometer (2) 52.92 picometer

(3) 5.292 picometer (4) 529.2 picometer

Q89. In a CE configuration of npn transistor the base curve looks like that of

(1) Zener diode (2) LED

(3) Ordinary diode (4) Photodiode

Q90. Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R.

Assertion A:

Number of atoms present in the unit cell of hcp structure is 6.

Reason R:

Packing factor in hcp structure is 68%.

In the light of the above statements, choose the correct answer from the options given below:

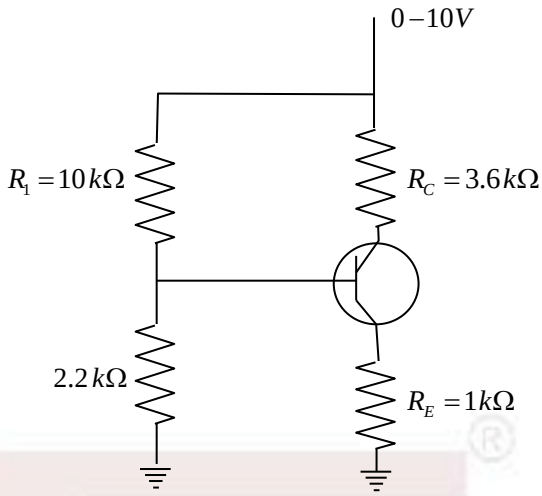
(1) Both A and R are true and R is the correct explanation of A

(2) Both A and R are true but R is not the correct explanation of A

(3) A is true but R is false

(4) A is false but R is true

Q91. The emitter current for the pnp transistor is



(1) 10 mA (2) 1 mA (3) 1.8 mA (4) 11 mA

Q92. Given below are two statements:

Statement I:

Mobility of electron is negative and hole is positive.

Statement II:

Mobility of electrons and holes are both positive.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Both statement I and statement II are correct

(2) Both statement I and statement II are incorrect

(3) Statement I is correct but statement II is incorrect

(4) Statement I is incorrect but statement II is correct

Q93. Among following applications, which is the correct application of transistor?

(1) Clamper (2) Rectifier

(3) Clipper (4) Switch

Q94. Closed loop voltage gain of an inverting amplifier is given by

(1) The ratio of input resistance to feedback resistance

(2) Feedback resistance divided by input resistance

(3) Input resistance multiplied by feedback resistance

(4) Difference of input resistance and feedback resistance

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Q95. When binary 110.001 is converted to a decimal number the answer is

(1) 7.125 (2) 6.125 (3) 7.75 (4) 6.75

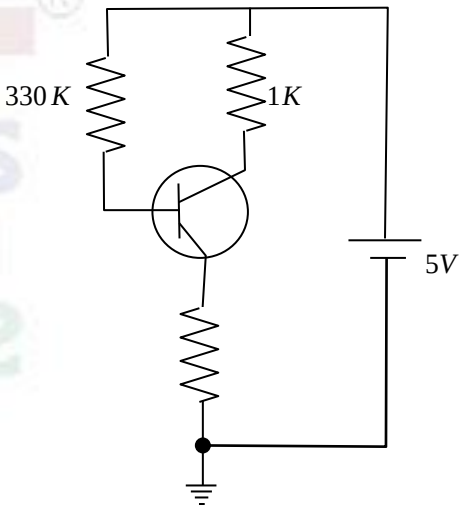
Q96. Packing fraction of bcc, fcc and sc can be represented as

[Where, fcc-face centered cubic, sc-simple cubic, bcc-body-centered cubic systems]

(1) fcc > sc > bcc (2) sc > bcc > fcc

(3) sc < bcc < fcc (4) bcc < fcc < sc

Q97. In the following transistor circuit, $\beta = 100$ and I_{CO} is negligible. The transistor currents are [Given, $V_{BE} = 0.7V$]



(1) $I_C = 1mA, I_B = 1mA$

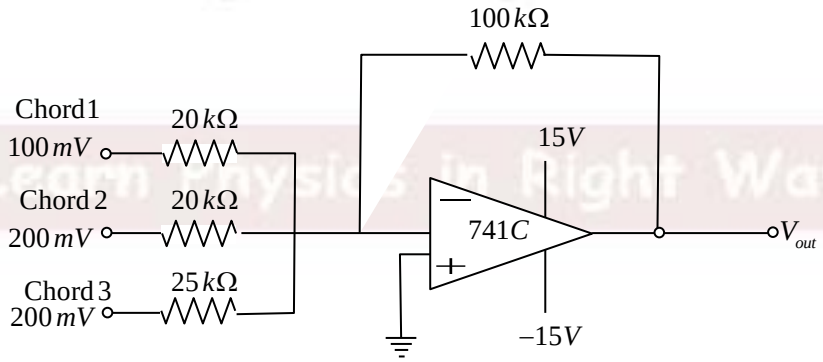
(2) $I_C = 0.01mA, I_B = 1mA$

(3) $I_C = 1mA, I_B = 0.01mA$

(4) $I_C = 0.1mA, I_B = 0.01mA$

(1) 1 (2) 2 (3) 3 (4) 4

Q98. Three audio signals are given in the summing amplifier as shown in the figure. What is the ac output voltage among the following options?



(1) - 2.7 V (2) - 3.1 V (3) 3.1 V (4) 2.7 V

Q99. Given are the following equations

A. $\overline{A+B}=\overline{A}\cdot\overline{B}$

B. $A+\overline{A}=A$

C. $A+B\cdot C=(A+B)C$

D. $A+A\cdot B=A$

Choose the correct answer from the options given below:

(1) B and D (2) A and C (3) C and D (4) A and D

Q100. In binary arithmetic circuits

A. 1-1 = 0

B. 0+1 = 0

C. 1+1 = 10

D. 10+1 = 111

Choose the correct answer from the options given below:

(1) A and B (2) B and C (3) A and C (4) C and D

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