

REVISION TEST - VOLUME – I	Register Number	0	1	2		
Time Allowed : 3 Hours	XII – PHYSICS	Maximum Marks : 150				

PART - I

Choose and write the correct answer.

30 × 1 = 30

- A dipole is placed in a uniform electric field with its axis parallel to the field. It experiences
 - only a net force
 - only a torque
 - both a net force and torque
 - neither a net force nor a torque
- The electric field outside the plates of two oppositely charged plane sheets of charge density σ is
 - $\frac{+\sigma}{2\epsilon_0}$
 - $\frac{-\sigma}{2\epsilon_0}$
 - $\frac{\sigma}{\epsilon_0}$
 - zero
- The capacitance of a parallel plate capacitor increases from $5\mu\text{F}$ to $50\mu\text{F}$ when a dielectric is filled between the plates. The permittivity of dielectric is
 - $8.854 \times 10^{-24}\text{C}^2\text{N}^{-1}\text{m}^{-2}$
 - $8.854 \times 10^{-11}\text{C}^2\text{N}^{-1}\text{m}^{-2}$
 - 12
 - 10
- A non-polar molecule is placed in an external electric field \vec{E} . The induced dipole moment acts
 - in the direction of \vec{E}
 - opposite to the direction of \vec{E}
 - perpendicular to the direction of \vec{E}
 - at random
- Van de Graaff generator works on the principle of
 - electromagnetic induction and action of points
 - electrostatic induction and action of points
 - electrostatic induction only
 - action of points only
- On moving a charge of 20 C by 2 cm, 2J of work is done, then the potential difference between the points is
 - 0.5 V
 - 0.1 V
 - 8 V
 - 2 V
- The total flux over a closed surface enclosing a charge 'q' (in Nm^2C^{-1})
 - $8\pi q$
 - $9 \times 10^9 q$
 - $36\pi \times 10^9 q$
 - $8.854 \times 10^{-12} q$
- A hollow metal ball carrying an electric charge produces no electric field at points
 - outside the sphere
 - on its surface
 - inside the sphere
 - at a distance more than twice
- The material through which electric charge cannot flow easily is
 - aluminium
 - mica
 - nichrome
 - copper
- The unit of conductivity is
 - mho
 - ohm
 - ohm-m
 - mho- m^{-1}
- The graph showing variation of thermo emf with temperature is
 - straight line
 - parabola
 - hyperbola
 - circle
- In a tangent galvanometer, for a constant current, the deflection is 30° . The plane of the coil is rotated through 90° . Now, for the same current, the deflection will be
 - 30°
 - 60°
 - 90°
 - 0°
- Phosphor – bronze wire is used for suspension in a moving coil galvanometer, because it has
 - high conductivity
 - high resistivity
 - large couple per unit twist
 - small couple per unit twist
- For a given thermocouple the neutral temperature
 - depends upon the temperature of cold junction
 - depends upon the temperature of the hot junction
 - is a constant
 - depends upon the temperature of cold junction and the temperature of the hot junction
- Electromagnetic induction is not used in
 - transformer
 - room heater
 - AC generator
 - choke coil
- The self-inductance of a straight conductor is
 - zero
 - infinity
 - very large
 - very small
- The input power of a transformer is 50 watt and its output power is 20 watt. Then its efficiency is
 - 30 %
 - 40 %
 - 50 %
 - 100 %
- An inductor ,

- a) allows AC; blocks DC b) allows DC; blocks AC c) blocks DC d) allows both AC and DC
19. In long distance power transmission, which plays a very important role?
 a) resistor b) transformer c) inductor d) capacitor
20. In LCR circuit when $X_L = X_C$, the current
 a) is zero b) is in phase with the voltage
 c) leads the voltage d) lags behind the voltage
21. In an AC circuit average power consumed is 200 W and the apparent power is 300 W. The power factor is
 a) 1.5 b) 0.66 c) 0.33 d) 1
22. A DC of 5A produces the same heating effect of as an AC (alternating current) of
 a) 50 Arms current b) 5 A peak current c) 15 Arms current d) none of these
23. Refractive index of glass is 1.5. Time taken for light to pass through a glass plate of thickness 10cm is
 a) 2×10^{-8} s b) 2×10^{-10} s c) 5×10^{-8} s d) 5×10^{-10} s
24. The path difference between two monochromatic light waves of wavelength 4000 \AA is 2×10^{-7} m. The phase difference between them is
 a) π b) 2π c) $3\frac{\pi}{2}$ d) $\pi/2$
25. The phase difference between successive particles of a wave front is
 a) $\pi/2$ b) π c) 2π d) zero
26. Two coherent sources have wavelengths λ_a and λ_b then
 a) $\lambda_a = \lambda_b$ b) $\lambda_a > \lambda_b$ c) $\lambda_a < \lambda_b$ d) none of these
27. In a grating there are 5000 lines / cm, the grating element is
 a) $0.2 \mu\text{m}$ b) $2 \mu\text{m}$ c) $5 \mu\text{m}$ d) $0.5 \mu\text{m}$
28. Of the following, optically active material is
 a) Sodium chloride b) calcium chloride c) sodium d) chlorine
29. Which of the following gives rise to continuous emission spectrum ?
 a) Electric filament lamp b) sodium vapour lamp
 c) gases in the discharge tube d) calcium salt in Bunsen flame
30. A ray of light is incident on a glass surface such that the reflected ray completely plane polarized. The angle between the reflected ray and the refracted ray is
 a) 57.5° b) 32.5° c) 90° d) 115°

PART - II

Answer any 15 questions

 $15 \times 3 = 45$

31. Define: Coulomb on the basis of Coulomb's law.
32. Give the principle of working of a microwave oven.
33. State Gauss's law.
34. Write the applications of a capacitor.
35. State Ohm's law.
36. Define critical temperature or transition temperature.
37. State Kirchoff's voltage law in electricity.
38. The resistance of nichrome wire at 0°C is 10Ω . If the temperature coefficient of resistance is $0.004/^\circ\text{C}$, find its resistance at boiling point of water. Comment on the result.
39. Distinguish between electric power and electric energy.
40. Compare the emf and the potential difference.
41. Why nichrome is used as heating element ?
42. What are the limitations of a cyclotron?
43. State Fleming's right hand rule.
44. What are the methods of inducing emf in a circuit?
45. Give the differences between AF choke and RF choke.
46. A train runs at a speed of 180 km/hr on a railway track with the two rails insulated from each other and the ground and connected to a millivoltmeter. If the vertical component of earth's magnetic field is $0.2 \times 10^{-4} \text{ Wb/m}^2$ and the distance of separation between the rails is 1m . what would be the reading in the voltmeter?
47. What is band emission spectrum? Give an example.
48. Why does the sky appear blue in colour ?

49. Define: specific rotation?
 50. In Young's experiment, the width of the fringes obtained with light of wavelength 6000 \AA is 2 mm. Calculate the fringe width if the entire apparatus is immersed in a liquid of refractive index

PART – III

Answer question No. 57 compulsory and answer any six of the remaining 11 questions. $7 \times 5 = 35$

51. Write the properties of electric lines of forces.
 52. Three capacitors each of capacitance 9 pF are connected in series i) What is the total capacitance of the combination? ii) What is the potential difference across each capacitor if the combination is connected to 120 V supply?
 53. Explain the working of Leclanche cell.
 54. An iron box of 400 W power is used daily for 30 minutes. If the cost per unit is 75 paise, find the weekly expense on using the iron box.
 55. State and verify Faraday's second law of electrolysis
 56. How will you compare the emfs of the two given cells using the Potentiometer.
 57. In a tangent galvanometer, a current of 1 A produces a deflection of 30° . Find the current required to produce a deflection 60°

[OR]

A circular coil of radius 20 cm has 100 turns of wire and it carries a current of 5A. Find the magnetic induction at a point along its axis at a distance of 20 cm from the Centre of the coil.

58. What are the special features of magnetic Lorentz force?
 59. Explain how an emf can be produced by changing the area enclosed by a coil.
 60. Explain the energy losses in a transformer? How are they minimized?
 61. A parallel beam of monochromatic light is allowed to incident normally on a plane transmission grating having 5000 lines per centimetre. A second order spectral line is found to be diffracted at an angle 30° . Find the wavelength of the light.
 62. Write a note on Nicol prism.

PART – IV

Answer any 4 questions in detail

$4 \times 10 = 40$

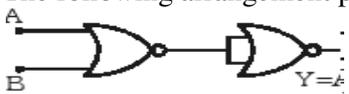
63. Explain Principle, construction and working of Van de Graaff generator. What is its use?
 64. Derive an expression for electric potential due at a point to an electric dipole. Discuss the special cases.
 65. Deduce an expression for the magnetic induction, at a point along the axis of a circular coil carrying current.
 66. Deduce expression for the force on a current carrying conductor placed in a magnetic field. Find the magnitude of the force.
 67. Discuss with theory the method of inducing e.m.f in a coil by changing its orientation with respect to the direction of the magnetic field.
 68. Describe principle, construction, and working of a single phase A C generator.
 69. What is Raman scattering? Explain Raman scattering with the help of energy level diagram.
 70. What is known as interference? Derive an expression for band width of interference fringes in Young's double slit experiment.

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REVISION TEST - VOLUME – II	Register Number	0	1	2			
Time Allowed : 3 Hours	XII – PHYSICS	Maximum Marks : 150					

PART - I**Choose and write the correct answer.****30 × 1 = 30**

- According to Bohr's postulates, which of the following quantities take discrete values?
 - kinetic energy
 - potential energy
 - angular momentum
 - momentum
- According to Rutherford atom model, the spectral lines emitted by an atom is,
 - line spectrum
 - continuous spectrum
 - continuous absorption spectrum
 - band spectrum
- In hydrogen atom, which of the following transitions produce a spectral line of maximum frequency
 - 2 → 1
 - 6 → 2
 - 4 → 3
 - 5 → 2
- if the wave length of a radiation is 2500 \AA , then its wave number is
 - 4000 m^{-1}
 - $400 \times 10^{-2} \text{ m}^{-1}$
 - $4 \times 10^5 \text{ m}^{-1}$
 - $4 \times 10^6 \text{ m}^{-1}$
- If the minimum wavelength of X-rays produced in a Coolidge tube is 0.62 \AA , the operating potential is
 - 20 kV
 - 0.2 kV
 - 2 kV
 - 10 kV
- The energy of the electron in the first orbit of hydrogen atom is -13.6 eV , its potential energy is
 - -13.6 eV
 - 13.6 eV
 - -27.2 eV
 - 27.2 eV
- In holography, which of the following is (are) recorded on the photographic film?
 - Frequency and amplitude
 - Phase and frequency
 - Phase and amplitude
 - Frequency only
- The ratio of areas enclosed by first three orbits of hydrogen atom is
 - 1:2:3
 - 1:8:27
 - 1:4:9
 - 1:16:81
- The stopping potential of a metal surface is independent of
 - frequency of incident radiation
 - intensity of incident radiation
 - the nature of the metal surface
 - velocity of the electrons emitted.
- According to relativity, the length of a rod in motion
 - is same as its rest length
 - is more than its rest length
 - is less than its rest length
 - may be more or less than or equal to rest length depending on the speed of the rod
- The number of frame of reference in this universe is
 - 3
 - 2
 - zero
 - infinite
- In photoelectric effect, a graph is drawn taking the frequency of incident radiation along X - axis and the corresponding stopping potential along the y -axis. The nature of the graph is:
 - a straight line passing through origin
 - a straight line having positive y – intercept
 - a straight line having negative y – intercept
 - a parabola
- If radium emits two β -particles at 32°C , the number of β -particles emitted at 160°C
 - increases by 5 times
 - decreases
 - remains unchanged
 - increases
- The explosion of atom bomb is based on the principle of
 - uncontrolled fission reaction
 - controlled fission reaction
 - fusion reaction
 - thermonuclear reaction
- The half life period of N^{13} is 10.1 minute. Its life time is
 - 5.05 minutes
 - 20.2 minutes
 - $\frac{10.1}{0.6931}$ minutes
 - infinity
- If nuclear charge is $20.8 \times 10^{-19} \text{ C}$ and nuclear radius is 3.9 F , then the number of neutrons is
 - 13
 - 27
 - 14
 - 39
- The moderator used in nuclear reactor is
 - Cadmium
 - Boron carbide
 - Heavy water
 - Uranium (${}_{92}\text{U}^{235}$)

18. The particle which has zero mass but has energy, is
 a) electron b) photon c) proton d) neutron
19. Which of the following is used to detect the presence of blocks in blood vessels?
 a) $_{15}\text{P}^{31}$ b) $_{15}\text{P}^{32}$ c) $_{26}\text{Fe}^{59}$ d) $_{11}\text{Na}^{24}$
20. The nuclear force between a proton and another proton inside the nucleus is
 a) zero b) short range c) repulsive d) long range
21. Three amplifiers have gains A_1, A_2 and A_3 respectively. When they are connected in cascade, the overall gain is
 a) $A_1 + A_2 + A_3$ b) $A_1 - A_2 - A_3$ c) $A_1 A_2 A_3$ d) $A_1 / A_2 + A_3$
22. The emitter base junction of a given transistor is forward biased and its collector - base junction is reverse biased. If the base current is increased, then its
 a) V_{CE} will increase b) I_C will decrease c) I_C will increase d) V_{CC} will increase.
23. Since the input impedance of an ideal operational amplifier is infinite,
 a) its input current is zero
 b) its output resistance is high
 c) its output voltage becomes independent of load resistance
 d) it becomes a current controlled device
24. Condition for oscillator is
 a) $A\beta = 0$ b) $A = 1/\beta$ c) $A\beta = \infty$ d) $A + \beta = 0$
25. The forbidden energy gap for semiconductor Ge and Si are respectively
 a) 1.1 eV and 0.7 eV b) 0.7 eV and 1.1 eV c) 4 eV and 0.7 eV d) 1.1 eV and 7 eV
26. The following arrangement performs the logic function of

 a) NOT b) EXOR c) OR d) AND
27. Printed documents to be transmitted by fax are converted into electrical signals by the process of
 a) reflection b) scanning c) modulation d) light variation
28. In phase modulation
 a) only the phase of the carrier wave varies
 b) only the frequency of the carrier wave varies.
 c) both the phase and the frequency of the carrier wave varies.
 d) there is no change in the frequency and phase of the carrier wave
29. The first man - made satellite is
 a) Aryabhata b) Sputnik c) Venera d) Rohini
30. The principle used for transmission of light signals through optical fibre is
 a) refraction b) diffraction c) polarization d) total internal reflection

PART - II

Answer any 15 questions

15 × 3 = 45

31. State Moseley's law.
 32. What are the characteristics of laser beam?
 33. What are the conditions to achieve the laser action?
 34. Write any three medical applications of laser.
 35. State the fundamental postulates of special theory of relativity?
 36. What are the limitations of electron microscope?
 37. Calculate the number of atoms in one gram of ${}^6_3\text{Li}$? (Avagadro number = 6.023×10^{23})
 38. What are leptons? Give examples.
 39. Write any three findings of binding energy curve.
 40. State any three properties of the neutrons.
 41. What is intrinsic and extrinsic semiconductor?
 42. What is Zener breakdown?
 43. Define output impedance of a transistor.
 44. What are advantages of negative feedback?

45. What are the Barkhausen conditions for oscillations?
46. Distinguish between analog signal and digital signal
47. Draw the circuit diagram for NPN transistor in common base (CB) mode.
48. A transistor is connected in CE configuration. The voltage drop across the load resistance (R_C) $3\text{ k}\Omega$ is 6 V . Find the base current. The current gain α of the transistor is 0.97
49. What is meant by skip distance?
50. Define: modulation factor in amplitude modulation.

PART – III

Answer question No. 57 compulsory and answer any six of the remaining 11 questions. $7 \times 5 = 35$

51. Give any five properties of canal rays.
52. Wavelength of Balmer second line is 4861 \AA . Calculate the wavelength of first line.
53. Write any five applications of photoelectric cells.
54. Derive an expression for de Broglie wavelength of matter waves.
55. Explain length contraction (or) Lorentz – Fitzgerald contraction with an example.
56. Obtain Einstein's photoelectric equation.
57. Calculate the energy released when 1 kg of ${}_{92}\text{U}^{235}$ undergoes nuclear fission. Assume, energy per fission is 200 MeV . Avagadro number = 6.023×10^{23} . Express your answer in kilowatt hour also.

[OR]

A reactor is developing energy at the rate of 32 MW . Calculate the required number of fissions per second of ${}_{92}\text{U}^{235}$. Assume that energy per fission is 200 MeV .

58. Explain how carbon – nitrogen cycle can account for the production of stellar energy.
59. State and prove De Morgan's theorems.
60. Explain the function of a transistor as a switch.
61. Explain with a block diagram of FM radio transmitter.
62. Mention the principle of radar and write its applications.

PART – IV

Answer any 4 questions in detail

$4 \times 10 = 40$

63. Describe the J.J Thomson method for determine the specific charge of an electron.
64. Draw a neat sketch of ruby laser. Explain its working with the help of energy level diagram.
65. Describe the principle and action of a Bainbridge Mass spectrometer in determining the isotopic masses.
66. What are cosmic rays? Explain the latitude effect and altitude effect of cosmic rays.
67. What is rectification? Explain the working of a Bridge rectifier. Draw the input and output signals.
68. Explain with neat circuit diagram, the working of single stage CE amplifier. Draw the frequency response curve and discuss the result.
69. Make the analysis of amplitude modulated wave. Plot the frequency spectrum and band width.
70. With the help of a functional block diagram, explain the function of a monochrome TV receiver.

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