

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

## PART - I

Choose and write the correct answer.

 $30 \times 1 = 30$ 

- Two point charges  $+q$  and  $-q$  are Placed in air at a distance of 2 m apart. One of the charges is moved towards the other through a distance of 1m. the work done is :
  - $\frac{q_1 q_2}{4\pi\epsilon_0}$
  - $\frac{2q_1 q_2}{4\pi\epsilon_0}$
  - $\frac{q_1 q_2}{8\pi\epsilon_0}$
  - $\frac{q_1 q_2}{16\pi\epsilon_0}$
- The negative gradient of potential is
  - electric force
  - torque
  - electric current
  - electric field intensity
- Which of the following is used to increase the efficiency of power transmission
  - electric dipole
  - lightning conductor
  - capacitor
  - vandegraff generator
- An electric dipole of moment  $\vec{P}$  is placed in a uniform electric field of intensity  $\vec{E}$  at an angle  $\theta$  with respect to the field. The direction of torque is
  - along the direction of  $\vec{P}$
  - opposite to the direction  $\vec{P}$
  - along the direction of  $\vec{E}$
  - perpendicular to the plane containing  $\vec{P}$  and  $\vec{E}$
- When the current flows from east to west, then the electron move from
  - north to south
  - east to west
  - west to south
  - south to north
- For normal frequencies the Q – factor range is
  - 0 – 100
  - 0 – 50
  - 10 – 100
  - 50 – 100
- A proton and an  $\alpha$  Particle are Projected with the same velocity normal to a uniform magnetic field. The ratio of the magnetic Lorentz force experienced by the proton and  $\alpha$  particle is
  - 1 : 1
  - 1 : 2
  - 2 : 1
  - 1 : 0
- The heat developed in half a minute in a resistor of resistance  $5 \Omega$  is 15000 J. The current through resistor is
  - 5 A
  - 40 A
  - 100 A
  - 10 A
- Which of the following can be stepped in a transformer?
  - input current
  - input voltage
  - both a and b
  - neither a nor b
- If the frequency of AC circuit connected with an inductor of inductance 0.03 H only is 50 Hz, then inductive reactance is:
  - 3.14  $\Omega$
  - 9.42  $\Omega$
  - 3  $\Omega$
  - 6.28  $\Omega$
- A Leclanche cell of emf 1.5 V is applied to a capacitor of reactance 3  $\Omega$ , the current passed through is
  - 2 A
  - 0.5 A
  - 0
  - $\infty$
- If  $i$  is the angle of incidence, the angle between the incident wave front and the reflecting surface is
  - $i$
  - $90^\circ - i$
  - $90^\circ + i$
  - $90^\circ$
- What is the angle of incidence for glass if the reflected beam is completely plane polarized
  - $32.5^\circ$
  - $57.5^\circ$
  - $90^\circ$
  - $35.2^\circ$
- In interference pattern, the width of the dark fringe is  $\beta_1$  and width of the bright fringe is  $\beta_2$  then
  - $\beta_1 = \beta_2$
  - $\beta_1 - \beta_2 = 0$
  - $\frac{\beta_1}{\beta_2} = 1$
  - all of these
- When a plane polarised light passes through an analyser and the analyser is rotated through  $90^\circ$ , the intensity of emerging light
  - becomes zero
  - does not vary
  - varies between maximum and minimum
  - varies between maximum and zero
- the ratio of the specific charge of a proton to that of an X – ray is
  - 4 : 1
  - 1 : 2
  - 2 : 1
  - 1 : 1
- In Millikon's oil drop experiment charged oil drop is balanced between the two plates. Now the viscous force
  - acts downwards
  - acts upwards
  - is zero
  - acts either upwards or downwards
- In a system of thermal equilibrium the number of atoms in the ground state is much greater than the number of atoms in an excited state, this is called
  - population inversion
  - Normal population
  - Spontaneous emission
  - none of these
- The wave number of a spectral line of hydrogen atom is equal to Rydberg's constant. The line is
  - first line of Lyman series
  - series limit of Lyman series
  - first line of Pfund series
  - series limit of Pfund series

20. The resolving power of an electron microscope is  
 a) Directly proportional to the wave length of an electron beam  
 b) inversely proportional to the wave length of an electron beam  
 c) Directly proportional to the charge of an electron  
 d) inversely proportional to the frequency of an electron beam
21. In the photoelectric phenomenon if the ratio of intensity of incident radiation incident on the photosensitive surface is 1:2:3, the ratio of photo electric current is  
 a) 1 : 1/2 : 1/3                      b) 1 : 2 : 3                      c) 1 : 4 : 9                      d) 1 : 1 : 1
22. In which pair nuclear force is more  
 a) (n – n)                      b) (p – p)                      c) (n – p)                      d) all of these
23. From the law of radioactive disintegration, the value of  $\lambda T_{1/2}$  is  
 a)  $\log_{10} 2$                       b)  $\log_2 e$                       c)  $\log_e 2 \times 2.3026$                       d)  $\log_{10} 2 \times 2.3026$
24. The half life period of  $N^{13}$  is 10.1 minute. Its life time is  
 a) 5.05 minutes                      b) 20.2 minutes                      c)  $\frac{10.1}{0.6931}$  minutes                      d) infinity
25. In proton – proton cycle four protons fuse together to give  
 a) an  $\alpha$  particle, two electrons, two neutrinos and energy of 26.7 MeV  
 b) an  $\alpha$  particle, two positrons, two neutrinos and energy of 26.7 MeV  
 c) a helium atom, two positrons, two neutrinos and energy of 26.7 MeV  
 d) an  $\alpha$  particle, two positrons, two anti - neutrinos and energy of 26.7 MeV
26. When the number of amplifier is connected in cascade, the overall voltage gain is equal to \_\_\_\_\_ of individual stages  
 a) sum of voltage gain                      b) product of voltage gain  
 c) difference of voltage gain                      d) mean voltage gain
27. An oscillator is  
 a) an amplifier with feedback                      b) a convertor of ac to dc energy  
 c) nothing but an amplifier                      d) an amplifier without feedback
28. For a transistor connected in common emitter mode (CE) the slope of the input characteristics curve gives  
 a) input impedance                      b) current gain  
 c) reciprocal of input impedance                      d) voltage gain
29. If 900 KHz station is tuned, then the local oscillator will have to produce a frequency of  
 a) 445 KHz                      b) 455 KHz                      c) 10.7 KHz                      d) 1355 KHz
30. In amplitude modulation, the band width is  
 a) equal to the signal frequency                      b) twice the signal frequency  
 c) thrice the signal frequency                      d) four times the signal frequency

## PART – II

Answer any 15 questions

15 × 3 = 45

31. Define: Coulomb on the basis of Coulomb's law.
32. State Gauss's law.
33. Define critical temperature or transition temperature.
34. The resistance of nichrome wire at  $0^\circ\text{C}$  is  $10\Omega$ . If the temperature coefficient of resistance is  $0.004/^\circ\text{C}$ , find its resistance at boiling point of water. Comment on the result.
35. Compare the emf and the potential difference.
36. Why nichrome is used as heating element ?
37. State Fleming's right hand rule.
38. 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?
39. What is band emission spectrum? Give an example.
40. In Young's experiment, the width of the fringes obtained with light of wavelength  $6000 \text{ \AA}$  is 2 mm. Calculate the fringe width if the entire apparatus is immersed in a liquid of refractive index
41. State Moseley's law.

42. What are the conditions to achieve the laser action?
43. State the fundamental postulates of special theory of relativity?
44. Write any three findings of binding energy curve.
45. State any three properties of the neutrons.
46. What is Zener breakdown?
47. Distinguish between analog signal and digital signal
48. Draw the circuit diagram for NPN transistor in common base (CB) mode.
49. A transistor is connected in CE configuration. The voltage drop across the load resistance ( $R_C$ )  $3\text{ k}\Omega$  is  $6\text{V}$ . Find the base current. The current gain  $\alpha$  of the transistor is  $0.97$
50. What is meant by skip distance?

### PART – III

Answer question No. 54 compulsory and answer any six of the remaining 11 questions.  $7 \times 5 = 35$

51. Three capacitors each of capacitance  $9\text{ pF}$  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  $120\text{ V}$  supply?
52. Explain the working of Leclanche cell.
53. How will you compare the emfs of the two given cells using the Potentiometer.
54. In a tangent galvanometer, a current of  $1\text{ A}$  produces a deflection of  $30^\circ$ . Find the current required to produce a deflection  $60^\circ$   
[OR]  
A circular coil of radius  $20\text{ cm}$  has  $100$  turns of wire and it carries a current of  $5\text{A}$ . Find the magnetic induction at a point along its axis at a distance of  $20\text{ cm}$  from the Centre of the coil.
55. Explain how an emf can be produced by changing the area enclosed by a coil.
56. Write a note on Nicol prism.
57. Describe Laue experiment. What are the facts established by it?
58. Explain the construction and working of photo – emissive cell with diagram.
59. Derive Einstein's mass energy equivalence.
60. Calculate the mass of coal required to produce the same energy as that produced by the fission of  $1\text{ kg}$  of  $U^{235}$ . Given ; heat of combustion of coal =  $33.6 \times 10^6\text{ J/kg}$ ,  
 $1\text{ ton} = 1000\text{ kg}$ . Energy per fission of  $U^{235} = 200\text{ MeV}$ .  $1\text{eV} = 1.6 \times 10^{-19}\text{ J}$ .  
Avagadro number  $N = 6.023 \times 10^{23}$
61. Explain how multimeter is used as ohm meter.
62. Explain with a block diagram of FM radio transmitter.

### 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. Deduce expression for the force on a current carrying conductor placed in a magnetic field. Find the magnitude of the force.
65. Describe principle, construction, and working of a single phase A C generator.
66. What is known as interference? Derive an expression for band width of interference fringes in Young's double slit experiment.
67. Explain the working of He-Ne laser with the help of energy level diagram.
68. What is a nuclear reactor? Explain the function of (i) moderator (ii) control rod and (iii) neutron reflector. Mention the uses of nuclear reactor. (diagram not necessary)
69. Explain with neat circuit diagram, the working of single stage CE amplifier. Draw the frequency response curve and discuss the result.
70. Explain the construction and working of a vidicon camera tube with neat diagram.

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