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PREBOARD EXAM - 2020 – 2021

PHYSICS

CLASS-12

M.M -70

NOTE-Section A contains ten questions and four assertion reasoning mcq of 1 marks each. Section B has two case based questions of 4 marks each Section C contains nine questions 2 marks each, Section D contains 5 questions 3 marks each and Section E contains three long answer questions of 5 marks each.

SECTION –A

Q1-Name the physical quantity having unit NEWTON METER.

Q2-Two lenses are in contact having powers 5D and -3D. Find focal length of combination.

Q3-Emf of a primary cell is 2.4V .when cell is short circuited, then current becomes 4A. What is internal resistance of cell.

Q4- A wire has resistance of 10ohm at 0°C and 20 ohm at 273°C. find temperature coefficient of resistance of wire.

Q5-What is electrostatic potential at the surface of silver nucleus of diameter 12.4 fermi. Atomic no. of silver is 47.

Q6-When yellow light is incident over a metal surface ,no electrons are emitted while green light can emit electrons .what will happen ,if red light is incident over the surface.

Q7-When a ray is refracted from one medium to another, the wave length changes from 6000Å to 4000Å. Find the critical angle for interface.

Q8-Name any one method by which eddy currents can be minimized in the metal core of transformer. on which coils are wound .

Q9-For what distance is ray optics a good approximation. when the aperture is 4mm wide and the wave length is 500nm.

Q10-The de Broglie wavelength associated with an electron accelerated through a potential difference  $V$  is  $\lambda$ . What will be its wavelength when the accelerating potential is increased to  $4V$ .

For question nos 11,12,13, and 14 two statements are given –one labelled Assertion (A) and the other labelled REASON (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below

a-both A and R are true and R is correct explanation of A

b-both A and R true but R is not the correct explanation of A

c-A is true R is false

d-A is false R is also false

Q11-ASSERTION (A)-in a non uniform electric field . a dipole will have translatory as well as rotatory motion

REASON (R)-in a non uniform electric field . a dipole experiences a force as well as torque

Q12-ASSERTION (A) –a convex lens of focal length 30cm cannot be used as simple microscope in normal setting

REASON (R) –for normal setting the angular magnification of simple microscope is  $M=D/f$

Q13-ASSERTION (A)-a convex mirror cannot form real images

REASON (R)-convex mirror converges the parallel rays

Q14-ASSERTION (A)-Highest energy state corresponds with the electron revolving in an orbit closest to nucleus.

REASON (R)-Energies of the excited states come closer together as  $n$  decreases

#### SECTION –B

Questions 15 and 16 are case study based questions and are compulsory .Attempt any four sub parts from each question . Each question carries 1 mark

Q15-DUAL NATURE OF MATTER-matter cannot exist both as particle and wave simultaneously .At a particular instant of time ,it is either the one or the other aspects ,ie the two aspects are complementary to each other.According to De-Broglie ,a wave is associated with moving particles .The

wave is known as matter waves or de Broglie waves .The wave length is known as de Broglie wave length.

(1) the debroglie wave does not depnd on

(a) mass (b) charge (c) velocity (d) momentum

(2) The de Broglie wave length of a particle of K.E ,K is  $\lambda$ .What will be wave length of particle if its K.E is  $K/9$

(a) $\lambda$  (b)  $2\lambda$  (c) $3\lambda$  (d) $4\lambda$

(3) Relation between wavelength and momentum is

(a) $p=\lambda$  (b)  $\lambda=h/p$  (c)  $h\lambda=p$  (d) none

(4) An alpha particle and a proton are accelerated by same potential difference the ratio of de Broglie wavelength associated with them

(a)1:1 (b) 2:1 (c) 1:2 (d) none

(5) An electron is accelerated by potential difference of 100volt .the wave length associated with it is

(a)0.123nm (b) 1.1nm (c) 12.27nm (d)none

Q16-Transformer is a device which is used to increase the alternating voltage.There are two type of transformer (1)step up (2) step down .it is based on mutual induction .primary coil is known as input coil and secondary coil is known out put coil

1 –what is not possible in a transformer

(a) eddy currents (b) direct current (c) alternating current (d) induced current

2-Which quantities do not change during transformer operation

(a) power (b) frequency (c) voltage (d) both (a) and (b )

3- The ratio of primary to secondary turns in ideal transformer is 4:5 .The ratio of input power to out put power is

(a) 1:1 (b) 4:9 (c) 9:4 (d) 5:4

4-Direct voltage x is applied in primary of step up transformer out put voltage is y then

- (a)  $x=y$                       (b)  $x>y$                       (c)  $x<y$                       (d) none

5-Humming loss in a transformer can be minimised by

- (a) thick wire    (b) laminated core    (c) soft iron core                      (d) none

#### SECTION –C

Q17-An old saying suggests that it is more safe to run fast than walk during an overhead lightning storm and it has been observed that cattles are more likely to be killed by a nearby lightning strike than humans,comments

Q18-State kirchoff's loop rule for an electrical network.using this rule find balancing condition of wheatstone bridge.

Q19-Using Huygen's principle when an oblique wavefront is incident on the reflecting surface making an angle  $i$  with the surface ,show that it gets reflected making the same angle.

OR

An oblique wave front is incident on interface by necessary drawing prove snell's law

Q20-Six charges each of magnitude  $q$  are placed at six corners of regular hexagon of side  $x$ .find energy of system.

Q21-Draw a labelled graph to show how electrical resistance varies with temperature for (a) a silver wire

(b) a piece of carbon

Q22-If the frequency of incident light on a metal surface is doubled will the kinetic energy of photoelectrons be doubled.give reasons.

Q23-What is TIR .derive a relation between refractive index and critical angle.

Q24-What is diffraction of light .write its essential condition .Differentiate between diffraction of sound and light.

Q25-A resistor of resistance  $2.0\Omega$  and an inductor of inductance  $5.0mH$  are in series .potential difference of  $220v,50Hz$  is applied across this combination .find current in the circuit.

#### SECTION –D

Q26-Explain how LED WORKS.

Q27-State Gauss's law in electrostatics .using this law derive an expression for the electric field due to uniformly charged infinite plane sheet.

Q28-A conducting rod of length L is rotating in perpendicular magnetic field B . find induced emf across it.

Q29-A convex lens of refractive index 1.5 and focal length 20.0cm is immersed in liquid of refractive index 1.60 .find change in focal length.

Q30-Draw a phasor diagram to show the phase relation between voltage and current when A.C is applied across (a) a pure inductor (b) pure capacitor (c) resistor

#### SECTION- E

Q31-Explain diffraction of light at single slit.Find an expression for linear width of central maxima in diffraction pattern of single slit.Also draw a graph of intensity distribution pattern on the screen.

OR

(a)What is interference of light .find the expression of fringe width(b)In ydse two slits are 1mm apart and screen is placed 1.0 m away.it is found that 5<sup>th</sup> bright fringe is formed at 2.5 mm from central bright fringe .Find wave length of light used.

Q32-Write three postulates of Bohr' atomic model.Find the expression of (a) radius of orbit (b) velocity of electron (c) energy of electron in orbit (d) explain different spectral series

OR

Explain why diode is used in rectifier.write working of (a) half wave rectifier (b) full wave rectifier

Q33-(a)What is potentiometer .why it is preferred over voltmeter.How internal resistance of primary cell can be measured by it?(b) when a resistor of  $5\Omega$  is connected across cell .,its terminal p.d is balanced by 150cm of potentiometer wire and when a resistor of  $10\Omega$  resistance is connected across the cell,the terminal p.d is balanced by 175cm of the potentiometer wire .find the internal resistance of cell.

OR

(A)What is Biot and savart law .using this law find the expression of magnetic field on the axis of current carrying coil .Also draw a graph between distance and magnetic field(B). In the fig two insulated copper

wires carrying currents  $i$  and  $i_1$  find the magnetic field of point  $p$  coordinates of which are  $(x,y)$

