

# Board of Secondary Education Rajasthan, Ajmer

## Practice Question Paper-1 Sr. Secondary Examination-2022

### SUBJECT: PHYSICS CLASS-XII

Time: 2 Hours 45 Minutes

Marks: 56

#### (SECTION-A)

#### Multiple Choice Questions

**Q.1.** Write the correct answer from multiple choice questions 1 (i to ix) and write in given answer book.

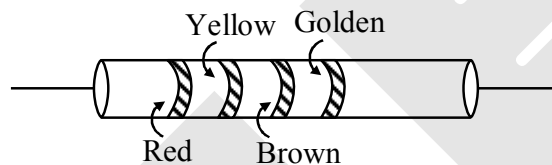
(i) The unit of permittivity of free space is [1]

- (A)  $C^2N^1m^{-2}$       (B)  $C^{-2}N^{-1}m^{-2}$       (C)  $C^2N^{-1}m^{-2}$       (D)  $C^2N^{-1}m^2$

(ii) Dielectric materials are - [1]

- (A) conductors      (B) Non conductors      (C) semi-conductors      (D) none of these

(iii) Resistance of the carbon resistor shown in figure in ohm will be [1]



- (A)  $420 \pm 10\%$       (B)  $240 \pm 10\%$       (C)  $420 \pm 5\%$       (D)  $240 \pm 5\%$

(iv) An electric charge  $q$  is moving with uniform velocity  $v$  in the direction of magnetic field  $B$ . Magnetic force acting on the charge will be [1]

- (A)  $qvB$       (B) Zero      (C)  $\frac{qv}{B}$       (D)  $\frac{vB}{q}$

(v) "The magnitude of the induced emf in a circuit is equal to the time rate of change of magnetic flux through the circuit." This law is given by [1]

- (A) Lenz      (B) Ampere      (C) Faraday      (D) Henry

(vi) Photo electric equation of Einstein is [1]

- (A)  $h\nu = \frac{1}{2}mv_m^2 - \phi_0$       (B)  $h\nu = \frac{1}{2}mv_m^2 + \phi_0$       (C)  $\frac{1}{2}mv_m^2 = eV_0$       (D)  $\phi_0 = h\nu_0$

(vii) The atomic masses of two different nuclei are 3 and 81 then the ratio of their radii are [1]

- (A) 3 : 81      (B) 81 : 3      (C) 1 : 3      (D) 3 : 1

(viii) The acceptor impurity in following is- [1]

- (A) Arsenic      (B) Indium      (C) Antimony      (D) Phosphorous

(ix) The universal gate in following is [1]

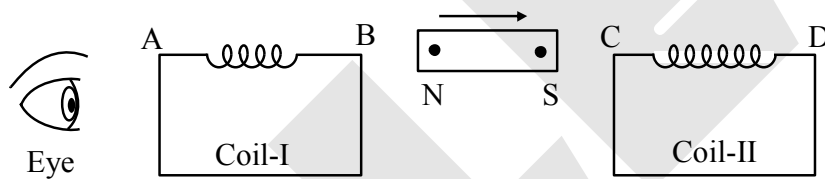
- (A) AND      (B) OR      (C) NOR      (D) NOT

**Q.2. Fill in the blanks -**

- (i) The capacitance of the parallel plate capacitor in vacuum is  $C_0$ . A material of dielectric constant  $K$  is filled completely between the plates then the new value of capacitance is ..... [1]
- (ii) The resistivity of semiconductor ..... with increasing temperature. [1]
- (iii) Lenz's law obey the ..... conservation law. [1]
- (iv) ..... diode is used as a voltage regulator. [1]

**Q.3. Give the answer of the following question in one line.**

- (i) Draw circuit diagram for comparison of emf of two primary cells with the help of potentiometer. [1]
- (ii) How is a galvanometer converted into a voltmeter ? [1]
- (iii) A bar magnet NS is moved in the direction indicated by an arrow between two coils AB and CD as shown in the figure. in which Coil the direction of current will look like anti- clockwise if viewed from left side ? [1]



- (iv) Write the name of experiment supporting the wave nature of particle. [1]
- (v) An alpha particle and a proton have same kinetic energies. Which one of these particles has lowest de-Broglie wavelength ? [1]
- (vi) Write the difference between Nuclear fission and Nuclear fusion. [1]
- (vii) Draw a graph between the binding energy per nucleon and mass number. [1]
- (viii) Write the names of the logic gates related to figure P and Table Q. [1/2+1/2=1]

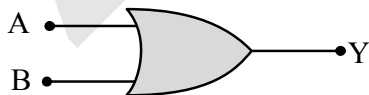


Figure P

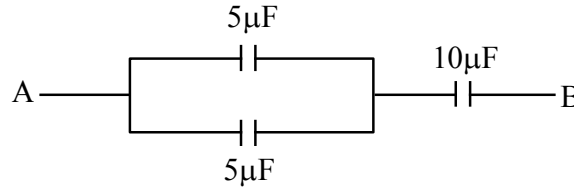
Input		Output
A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

Table Q

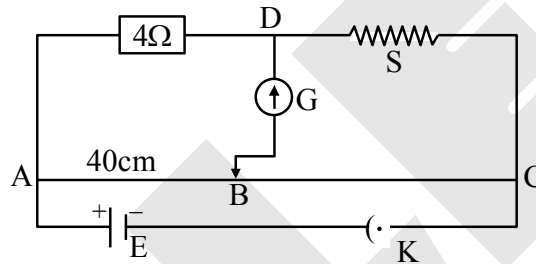
(SECTION-B)

Short Answer type question:-

4. Derive an expression for electric potential due to a point charge at a distance  $r$  from the charge. [1½]
5. Calculate the equivalent capacity of the combination of capacitors between A and B in given diagram. [1½]



6. Write two differences between the terminal voltage ( $V$ ) and e.m.f. ( $\epsilon$ ) of the cell. [1½]
7. In the given circuit diagram, find the value of unknown resistance  $S$ , in the balancing condition of meter bridge. [1½]



8. A conducting rod of length ' $l$ ' is moving with constant linear speed  $v$  in a uniform magnetic field  $B$ . This arrangement is mutually perpendicular. Obtain the expression of motional electromotive force. [1½]
9. Current in a circuit falls from 5 Amp to zero in 0.1 second. If an average e.m.f. of 100 volt is induced then calculate self-inductance of inductor in the circuit. [1½]
10. Define total internal reflection. Write the name of any two phenomena based on it. [1½]
11. Write any three differences between primary and secondary rainbow. [1½]
12. Establish the relation between focal length ( $f$ ) and radius of curvature ( $R$ ) for a spherical mirror. [1½]
13. The focal lengths of an objective lens and eyepiece are 192 cm and 8 cm respectively in a telescope. Calculate its magnifying power and the separation between the two lenses. [1½]
14. Write the function of moderator, coolant and control rods in the nuclear reactor. [1½]
15. In a radioactive sample the numbers of active nuclei remains 6.25% of its initial value in 6 hours. find the half-life of the radioactive sample. [1½]

## (SECTION-C)

**Long Answer type question:-**

16. Obtain an expression for magnetic field on the axis of a current-carrying loop (coil) with the help of Biot-savart's law. Draw necessary diagram. [2+1=3]
17. For refraction at a spherical surface derive the relation  $\frac{n_2}{v} - \frac{n_1}{u} = \frac{n_2 - n_1}{R}$  in object distance (u), image distance (v) refractive index of media ( $n_1, n_2$ ) and radius of curvature (R). Draw necessary ray diagram. [2+1=3]

OR

Draw a ray diagram for the formation of image by compound microscope. Derive an expression of the angular magnification of it when the final image is formed at the closest comfortable distance (D) for viewing the image.

18. (i) Define photo electric effect. [1+1+1=3]
- (ii) Plot a graph of variation of photo electric current with collector plate potential for three incident radiations of same intensity and different frequencies.
- (iii) The work function for cesium metal is  $3.31 \times 1.6 \times 10^{-19}$  J. Determine its threshold frequency for it.

OR

- (i) Define stopping voltage. [1+1+1=3]
- (ii) Plot a graph of variation of photo electric current with collector plate potential for three incident radiations of same frequency and different intensities.
- (iii) Determine the de-Broglie wave length of an electron accelerated by potential difference of 100 Volt.

## (SECTION-D)

**Essayistic question:-**

19. Define electric dipole. Derive an expression for electric field intensity due to an electric dipole at a point on the equatorial plane of the electric dipole. Draw necessary diagram. [1+2+1=4]

OR

Define electric field intensity. Derive an expression for electric field intensity at a point due to an infinitely long uniformly charged straight wire with the help of Gauss law. Draw necessary diagram. [1+1+1+1=4]

20. What do you mean by rectification? Draw circuit diagram and explain the working of full wave rectifier. Represent the wave form of input and output voltages also. [1+1+1+1=4]

OR

What do you mean by reverse biasing of P-N junction diodes? Draw circuit diagram for reverse biasing of P-N junction diode and explain its working process. Draw V-I characteristic curve for reverse biasing. [1+1+1+1=4]