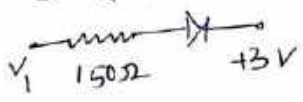




9. ଏକ  $V_1$ , 2V (କାର 6V ଏକ 150Ω ରେ ଏକ ସର୍କିଟ୍ ସଂଯୋଗ କରାଯାଇଛି) ସଂଯୋଗ କରାଯାଇଛି।



- a) 20mA b) 200mA c)  $\frac{80}{3}$  mA d) 10mA

10. 9:16 ଭୋଲଟେଜ୍ ଡିଭିଜନ୍ ସର୍କିଟ୍ ଦ୍ୱାରା ସୃଷ୍ଟି କରାଯାଇଥିବା ଭୋଲଟେଜ୍ ସଂକ୍ଷେପଣ କରାଯାଇଛି। ଏହାକୁ ସଂକ୍ଷେପଣ କରାଯାଇଛି ଏବଂ ଏହାକୁ ଭୋଲଟେଜ୍ ଡିଭିଜନ୍ ଭୋଲଟେଜ୍ ସଂକ୍ଷେପଣ କରାଯାଇଛି।

- a) 49:1 b) 49:16 c) 7:1 d) 4:3

11. ଏକ ସର୍କିଟ୍ ଭୋଲଟେଜ୍ ସଂକ୍ଷେପଣ 1% କରାଯାଇଛି ଏବଂ ଏହାକୁ ଭୋଲଟେଜ୍ ସଂକ୍ଷେପଣ କରାଯାଇଛି। ଏହାକୁ ଭୋଲଟେଜ୍ ସଂକ୍ଷେପଣ କରାଯାଇଛି।

- a) ଭୋଲଟେଜ୍ 1% କରାଯାଇଛି b) ଭୋଲଟେଜ୍ 2% କରାଯାଇଛି  
c) ଭୋଲଟେଜ୍ 1% କରାଯାଇଛି d) ଭୋଲଟେଜ୍ 2% କରାଯାଇଛି।

12. ଏକ ସର୍କିଟ୍ ଭୋଲଟେଜ୍ ସଂକ୍ଷେପଣ କରାଯାଇଛି ଏବଂ ଏହାକୁ ଭୋଲଟେଜ୍ ସଂକ୍ଷେପଣ କରାଯାଇଛି। ଏହାକୁ ଭୋଲଟେଜ୍ ସଂକ୍ଷେପଣ କରାଯାଇଛି।

- a) 1 b)  $\frac{1}{4}$  c)  $\frac{1}{2}$  d) 4

13. ଏକ ସର୍କିଟ୍ ଭୋଲଟେଜ୍ ସଂକ୍ଷେପଣ କରାଯାଇଛି ଏବଂ ଏହାକୁ ଭୋଲଟେଜ୍ ସଂକ୍ଷେପଣ କରାଯାଇଛି। ଏହାକୁ ଭୋଲଟେଜ୍ ସଂକ୍ଷେପଣ କରାଯାଇଛି।

- a) ଭୋଲଟେଜ୍ ସଂକ୍ଷେପଣ କରାଯାଇଛି b) ଭୋଲଟେଜ୍ ସଂକ୍ଷେପଣ କରାଯାଇଛି  
c) ଭୋଲଟେଜ୍ ସଂକ୍ଷେପଣ କରାଯାଇଛି d) ଭୋଲଟେଜ୍ ସଂକ୍ଷେପଣ କରାଯାଇଛି

14. ଏକ ସର୍କିଟ୍ ଭୋଲଟେଜ୍ ସଂକ୍ଷେପଣ କରାଯାଇଛି ଏବଂ ଏହାକୁ ଭୋଲଟେଜ୍ ସଂକ୍ଷେପଣ କରାଯାଇଛି। ଏହାକୁ ଭୋଲଟେଜ୍ ସଂକ୍ଷେପଣ କରାଯାଇଛି।

- a) ଭୋଲଟେଜ୍ ସଂକ୍ଷେପଣ କରାଯାଇଛି b) ଭୋଲଟେଜ୍ ସଂକ୍ଷେପଣ କରାଯାଇଛି  
c) ଭୋଲଟେଜ୍ ସଂକ୍ଷେପଣ କରାଯାଇଛି d) ଭୋଲଟେଜ୍ ସଂକ୍ଷେପଣ କରାଯାଇଛି

SECTION - II

Group - A

ଏକ ସର୍କିଟ୍ ଭୋଲଟେଜ୍ ସଂକ୍ଷେପଣ କରାଯାଇଛି ଏବଂ ଏହାକୁ ଭୋଲଟେଜ୍ ସଂକ୍ଷେପଣ କରାଯାଇଛି। ଏହାକୁ ଭୋଲଟେଜ୍ ସଂକ୍ଷେପଣ କରାଯାଇଛି। 1x4 = 4

ଏକ ସର୍କିଟ୍ ଭୋଲଟେଜ୍ ସଂକ୍ଷେପଣ କରାଯାଇଛି ଏବଂ ଏହାକୁ ଭୋଲଟେଜ୍ ସଂକ୍ଷେପଣ କରାଯାଇଛି। ଏହାକୁ ଭୋଲଟେଜ୍ ସଂକ୍ଷେପଣ କରାଯାଇଛି।









RAMAKRISHNA VIVEKANANDA MISSION VIDYABHAWAN  
(HIGHER SECONDARY UNIT)  
HOCK TEST  
CLASS-XII, F.M-70  
PHYSICS

SECTION-I

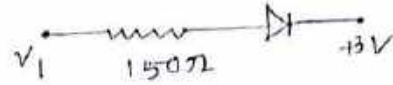
Choose the correct answer:

$$1 \times 14 = 14$$

- Two point charges separated by a distance  $d$  apart each other with a repulsion force  $9\text{ N}$ . If the separation between them becomes  $3d$ , the force of repulsion will be - a)  $1\text{ N}$  b)  $3\text{ N}$  c)  $6\text{ N}$  d)  $27\text{ N}$
- A Capacitor of capacitance  $C_1$  is charged up to potential  $V$  and then connected in parallel to an uncharged capacitor of capacitance  $C_2$ . The final potential difference across each capacitor will be -  
a)  $\frac{C_2 V}{C_1 + C_2}$  b)  $\frac{C_1 V}{C_1 + C_2}$  c)  $(1 + \frac{C_2}{C_1})V$  d)  $(1 - \frac{C_2}{C_1})V$
- Which of the following phenomenon does not occur to both sound and light waves?  
a) Interference b) Diffraction c) Coherence d) Polarisation
- Dimension of magnetic flux -  
a)  $ML^2T^{-2}A^{-1}$  b)  $MLT^{-1}A^{-2}$  c)  $MLT^{-1}A^{-1}$  d)  $MT^{-1}A$
- Two cells each of emf  $e$  but internal resistances  $r_1$  and  $r_2$  are connected in series through an external resistance  $R$ . If the potential difference across the first cell is zero while current flows, the relation between  $r_1$  and  $r_2$   
a)  $R = r_1 + r_2$  b)  $R = r_1 - r_2$  c)  $R = \frac{1}{2}(r_1 + r_2)$  d)  $R = \frac{1}{2}(r_1 - r_2)$
- In an astronomical telescope, focal length of the objective is made -  
a) half that of the eye piece b) equal to that of the eye piece  
c) shorter than that of the eye piece d) greater than that of the eye piece.
- The relative magnetic permeability of a diamagnetic substance is -  
a) zero b) slightly greater than 1 c) slightly less than 1  
d) slightly less than zero

8. A biconvex lens behaves like a convergent in air but behaves like a divergent in water. Then refractive index ( $\mu_L$ ) of the lens will be -  
 a)  $\mu = 1$    b)  $\mu = 1.33$    c)  $\mu > 1.33$    d)  $1 < \mu < 1.33$

9. If  $V_1$  increases from 2V to 6V then change of current will be -



a) zero   b) 20mA   c) 80/3 mA   d) 10mA

10. Two waves whose intensities are 9:16 are made to interfere. The ratio of maximum and minimum intensities in the interference pattern is -

a) 49:1   b) 49:16   c) 7:1   d) 4:3

11. A wire is stretched by 1% but volume remains constant, then

a) resistance increased by 1%   c) resistivity decreased by 1%  
 b) resistance increased by 2%   d) resistivity decreased by 2%

12. An  $\alpha$  particle and proton having same momentum enter into a region of uniform magnetic field and move in circular paths. The ratio of the radii of curvature of their circular paths  $r_\alpha/r_p$  in the field is

a) 1   b)  $1/4$    c)  $1/2$    d) 4

13. Angle of dip is  $90^\circ$  at

a) Magnetic south pole   b) Magnetic north pole  
 c) Geographic south pole   d) Geographic north pole

14. What will happen if the amount of reverse biasing in a p-n junction diode is gradually increased?

a) Thickness of depletion region will increase  
 b) Flow of current due to majority carriers will increase.  
 c) Thickness of depletion region will decrease  
 d) Flow of current due to majority carriers will decrease.



Answer the following questions in one sentence each

1. what do you mean by magnetic flux density?

OR

A long straight wire of length  $l$  is moving with-in a uniform magnetic field  $B$  with a velocity  $v$  perpendicular to the field. How much emf will induced?

2. what is the decimal equivalent of the binary number 10011?

OR

Draw the symbol of a two-input NOR gate.

3. write down lens maker's formula.

4. which physical quantity has unit  $\text{Wb m}^{-2}$ ?  
Is it scalar or vector?

Group-B

2x5 = 10

Answer the following questions

5. write down Kirchhoff's law for electrical circuit.

OR

A carbon resistor is coloured with four different bands — red, green, orange and silver respectively. Find the range of its probable resistance.

6. write down Biot-Savart law. show its vector form.

OR

show that, if the range of an ammeter is increased to  $n$  times, its resistance becomes  $\frac{1}{n}$  times of its previous value.

7. show that the units of  $RC$  and  $\frac{L}{R}$  are of time.  $R$ ,  $L$  and  $C$  carry their usual significance.

8. calculate the speed of light in a medium whose critical angle is  $45^\circ$ .

9. The focal length  $f$  of a equi-convex lens is related to the radius of curvature  $r$  of the surface by  $f = r$ . find out the refractive index of the material of the lens.

why is red <sup>OR</sup> light always used as danger-signal?

Group-C

$$3 \times 9 = 27$$

Answer the following questions:

10. Define electric dipole moment. An electrical dipole is placed with in a uniform electric field ( $E$ ) and is rotated to an angle  $\angle \theta = 180^\circ$ . Find out the work done. 1+2

what is <sup>OR</sup> surface charge density? The surface density of charge on a large vertical positively charged plate is  $\sigma \text{ C.m}^{-2}$ . A string attached a metal ball of mass  $m$  and charge  $+q$  with the plate. Find out the angle between the string and the plate in the equilibrium. 1+2

11. 2  $\mu\text{F}$  capacitor is charged to a potential of 20V. Another 3  $\mu\text{F}$  uncharged capacitor is connected in parallel with the first capacitor. what would be the terminal potential difference of the combination; find out the charges on the two capacitors. 3

12. a) what do you mean by angle of dip at a place? At what place on the earth's surface will the horizontal and vertical components of earth's magnetic field be equal?  
b) Mention how the relative magnetic permeability differs for diamagnetic, paramagnetic and ferro-magnetic substance. 1+1+1

<sup>OR</sup>  
Two long parallel straight wire P and Q separated by a distance 5 cm in air carry currents of 4A and 2A respectively in same direction. Find the magnitude of the force acting per cm of the wire P and indicate the direction of the force. 2+1

13. What is eddy current? The magnetic flux through a coil is varying according to the relation  $\phi = (4t^2 + 2t - 5) \text{ mWb}$ ,  $t$  measured in seconds. Calculate the induced current through the coil at  $t = 2 \text{ s}$  if the resistance of the coil is  $5 \Omega$ . 1+2

14. a) What is wavefront of a wave?  
b) Prove the laws of reflection by using Huygen's principle 1+2

OR

What are coherent sources? Green light of wavelength  $5100 \text{ \AA}$  is incident on a double slit. If the overall separation of 10 fringes on a screen  $200 \text{ cm}$  away from the slits is  $2 \text{ cm}$ , find the distance between the slits. 1+2

15. a) Draw the  $V-I$  characteristic curve for forward and reverse bias of a p-n junction diode  
b) What are the majority and minority carriers in a p-type semiconductor?  
c) Write down symbol and truth table of OR gate 1+1+1

16. a) Transistor  $\rightarrow$  What does it mean?  
b) How is an n-p-n transistor used as an amplifier? Show with its circuit diagram. 1+2

OR

a) What do you mean by an oscillator?  
b) In a common-emitter circuit, collector-emitter voltage is fixed at  $5 \text{ V}$ . For base currents  $30 \mu\text{A}$  and  $40 \mu\text{A}$ , the collector currents are  $8.2 \text{ mA}$  and  $9.1 \text{ mA}$  respectively. Calculate current gain of the circuit. 1+2

17. a) An object of height  $2.5 \text{ cm}$  is placed perpendicularly on the principal axis of a concave mirror of focal length  $f$  at a distance of  $\frac{3}{4}f$ . What will be the nature of the image of the object and its height?

b) A person uses Spectacles of power +2D. What type of defect of vision is it? 2+1

18. a) If the current through a conducting loop in the shape of an equilateral triangle of side  $a$  be  $I$ , what will be the magnitude of the magnetic field at the point of intersection of its three medians?

b) Write down the equation of Lorentz force acting on a moving charged particle. 2+1

**Group-D**

5 × 3 = 15

Answer the following questions:

19. a) Define mobility of free electron. From the concept of drifting of free electrons establish Ohm's law for a metallic conductor.

b) A Copper wire of cross-sectional area  $1 \text{ m}^2$  carries a current of  $0.21 \text{ A}$ . Find the drift velocity of free electrons. Given density of the free electron in Copper =  $8.4 \times 10^{28} \text{ m}^{-3}$  and electronic charge  $e = 1.6 \times 10^{-19} \text{ C}$ . 3+2

20. a) State Lenz's law, Define Henry. What is a choke?

b) If a rate of change of current of  $2 \text{ A-s}^{-1}$  induces an emf of  $10 \text{ mV}$  in a solenoid, what is the self inductance of the solenoid? 3+2

OR

a) Determine the limiting value of <sup>the</sup> angle of ~~the~~ incidence of a prism for which there will be no emergent ray.

b) A charge  $q$  is revolving along a circular path of radius  $r$  with velocity  $v$ . Determine its magnetic moment. 3+2

21. a) State Brewster's law.

b) An unpolarised light is incident at an angle of polarisation on a reflector. Determine the angle

between the reflected and transmitted rays.

c) what are uniaxial and biaxial crystals?

or

1+2+2

a) The focal length of a glass-lens in air is 5 cm. what will be its focal length in water? Refractive index of glass = 1.51 and refractive index of water = 1.33

b) focal length of two thin lenses kept in contact are  $f_1$  and  $f_2$ . Prove that their equivalent focal length  $f$  is given by  $\frac{1}{f} = \frac{1}{f_1} + \frac{1}{f_2}$

3+2