

# Model Question of HSC Examination 2020 (All Board)

## Physics Second Paper (Creative)

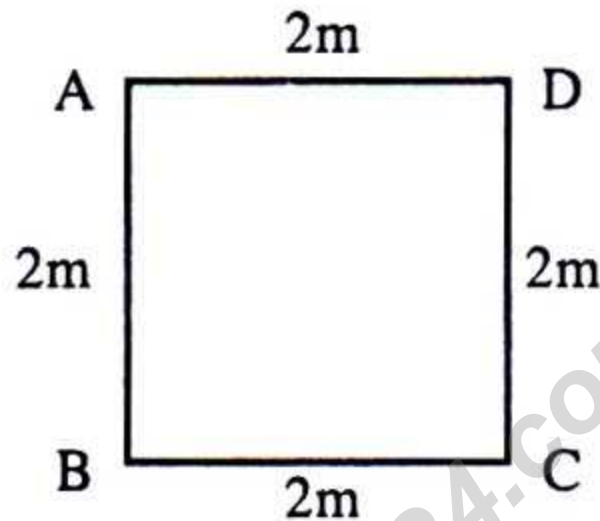
Sub Code : 175

Time: 2 Hrs 35 min

Full marks: 50

[Read the following stems and answer any five of the following questions:]

1. ★



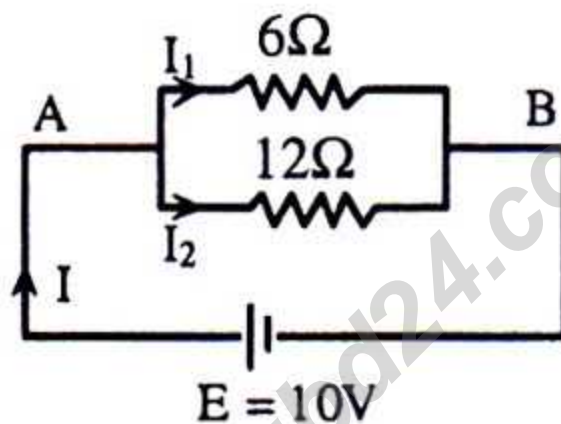
If charges of equal value are placed at four corners of this square in air, the potential at the centre will 50.91 volt.

- What is shunt? 1
- Explain Wheatstone bridge. 2
- What is the value of charge at each corner of this square? 3
- Is it possible to get the value of potential at the centre of this square is zero with the change of the value of the charge of one corner of this square? explain it with mathematical logic. 4

2. ► The focal length of the objective & eye-piece of a compound microscope are respectively 1cm & 4cm, length of the tube 14.5cm. If an object having diameter 0.5mm is placed at a distance 1.1cm from the objective then the clear magnified image is found.

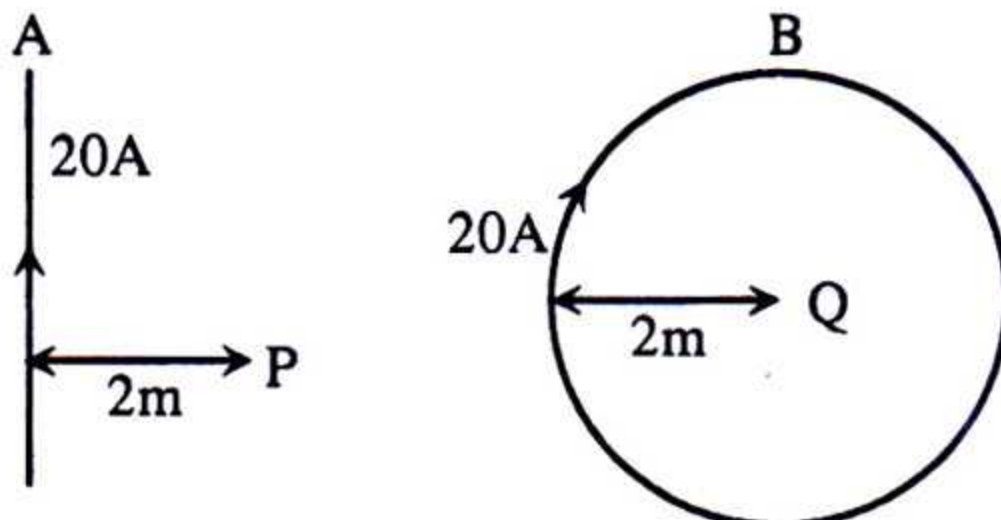
- What is principal focus? 1
- In thin prism why does deviation angle not depend on incident angle? 2
- Calculate the magnification of this microscope. 3
- In the stem which lens has more magnification power among these two lenses in this microscope? Explain & take your decision with mathematical logic. 4

3. ★



- What is the unit of electric fuse? 1
- State the Gauss's law and write its equation. 2
- Calculate the value of  $I_1$  &  $I_2$  for this stem. 3
- What sort of change you will bring about to keep 5 amp current in this circuit? Explain it mathematically. 4

4. ►



See the figure and answer the following questions


- a. What is hall effect? 1
- b. How can you increase the magnetic field at the centre of circular coil? 2
- c. Calculate the value of magnetic field at the point P. 3
- d. If the distance of P & Q from current carrying wire is same then one of the magnetic field will be more. Analysis it mathematically & give your own opinion. 4

### 5. ★


Element	Number of Proton	Mass Number	Mass of Nucleus amu	1 amu = 931 MeV
U	92	235	235.0439	Mass of proton, $m_p = 1.00728$ , Mass of neutron, $m_n = 1.00876$
C	6	12	12.0000	
Fe	26	56	56.0000	
He	2	4	4.00276	

- a. What is half life? 1
  - b. In Rutherford's  $\alpha$ -particle scattering experiment what is the reason of bending of few  $\alpha$ -particles. 2
  - c. Find the mass defect of Uranium. 3
  - d. Using the information given in the stem draw graph of binding energy per Nucleon versus the mass number. 4
- 6. ►** In Young's double slit experiment the distance between two slits 0.3 mm. The distance of the screen from the slits is 1m. The distance of the screen from the slits in 1m. In an experiment in air medium the distance of the 8th bright fringe from the central bright fringe is 6.2mm.

- a. What is called polarization of light? 1
- b. No sources in nature are coherent— explain. 2
- c. Find the wavelength light used in the experiment. 3
- d. Analyse what change in the fringe will take place when the arrangement of the stem is kept into water. 4

7.  X-rays of wavelength 0.2500 nm is scattered at an angle of  $60^\circ$  after hitting a target. The rest mass of electron is  $9.1 \times 10^{-31}$  kg and Planck's constant is  $6.63 \times 10^{-34}$  Js.

- a. What is called time dilation? 1
- b. Explain De-Broglie wavelength. 2
- c. Find the wavelength of the scattered X-ray. 3
- d. The energy of the scattered X-ray is a little bit less than the energy of the incident X-ray. Verify it with mathematical analysis. 4

8.  A Carnot engine working within the temperatures  $327^\circ\text{C}$  and  $27^\circ\text{C}$ , takes 6000J heat from the source and then converting a portion of the heat into work rejects the rest amount of heat to the sink.

- a. What is entropy? 1
- b. What is the first law of thermodynamics? How is it related with the internal energy? 2
- c. Find the amount of heat to the sink. 3
- d. Explain with mathematical analysis weather it is possible to double its efficiency. 4

# Model Question of HSC Examination 2020 (All Board)

## Physics Second Paper (MCQ)

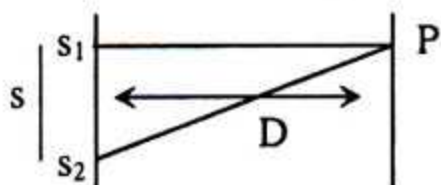
Sub Code : 175

Time : 35 Minutes

Full Marks : 35

[ N.B. Fill the circle of the correct answer with a black ball point pen. Each question bears 1 mark. ]

See the figure & answer the questions no 1 & 2.



1. According to the stimulus constructive interference is created at point P if phase difference between waves emitted from two sources  $S_1$  and  $S_2$  is—

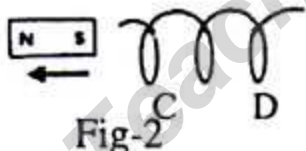
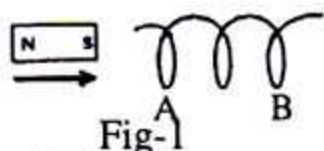
- (a)  $\frac{3\pi}{2}$       (b)  $2\pi$       (c)  $\pi$       (d)  $\frac{\pi}{2}$

2. If the distance between the two sources  $S_1$  and  $S_2$  the stimulus is reduced to half and distance D from the slit to the screen is made double then width of the interference fringe created on the screen in comparison to the previous value will be—

- (a) half                      (b) double  
(c) equal                      (d) four times

In the light of the following stem answer the question no 3 & 4.

Radius of the coil,  $r = 1\text{cm}$ ; electric current  $I = 2\text{A}$ , magnetic induction,  $B = 3.19 \times 10^3 \text{T}$



3. According to the fig-1 what is the value of self-inductance?

- (a) 0.41 H                      (b) 1.50 H  
(c) 1.29 H                      (d) 2.57 H

4. Which of the following statement is correct?

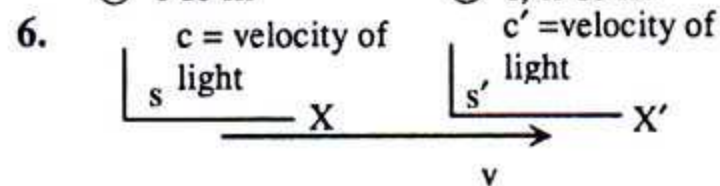
- (a) A = North Pole, D = North pole  
(b) B = North Pole, D = South Pole  
(c) A = South Pole, C = North pole  
(d) B = South pole, C = North pole

5. What is the unit of magnetic field B?

- i. tesla                      ii. Weber/m<sup>2</sup>  
iii.  $\frac{\text{N}}{\text{Amp.m}}$

Which one of the following is correct?

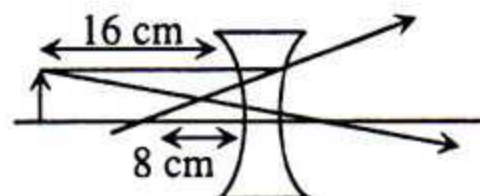
- (a) i & ii                      (b) ii & iii  
(c) i & iii                      (d) i, ii & iii



If  $S'$  moves with  $v$  with respect to  $S$  along X-axis, then—

- (a)  $C' = C - v$               (b)  $C' = C$   
(c)  $C' = C + v$               (d)  $V = C + C'$

See the figure & answer the questions no. 7 & 8



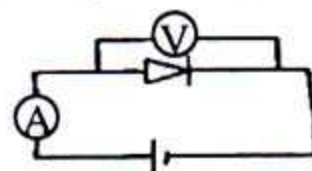
7. What is the value of  $m$  for this figure?

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

8. The length of image is 2 cm. What is the length of object?

- (a) 4cm      (b) 5cm      (c) 6cm      (d) 8cm

9.



Which graph is correct for this figure?

- (a)      (b)      (c)      (d)

10. The mass defect of any nucleus is 0.0377 a.m.u. What is the binding energy of this nucleus?

- (a) 31.2 MeV                      (b) 32.5MeV  
(c) 33.1 MeV                      (d) 35.2 Mev

11.  ${}_8\text{O}^{16} + {}_1^1\text{n} + ?$

- i.  ${}_6\text{C}^{13}$                       ii.  ${}_1\text{H}^2$   
iii.  ${}_2\text{He}^4$

Which one of the following is correct?

- (a) i & ii                      (b) ii & iii  
(c) i & iii                      (d) i, ii & iii

12. The boundary of the black hole region is called—

- (a) Event horizon              (b) Schwarzschild radius  
(c) Nebula                      (d) White dwarf

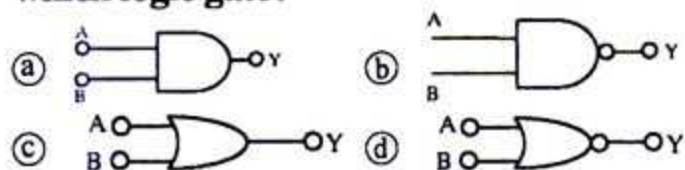
13. The Universe is expanding it was proposed by—

- (a) Stephen Hawking (b) Edwin Hubble  
(c) Freedman (d) Einstein

14.

A	B	Y
0	0	1
1	0	0
0	1	0
1	1	0

The table in the stimulus is applicable for which logic gate?



15. Binary value of  $(7BF6)_{16}$  is—

- (a)  $(1111011.1111110)_2$   
(b)  $(11011.1111011)_2$   
(c)  $(1101011.1100110)_2$   
(d)  $(11010111.11100011)_2$

16. Electrons cannot exist inside a nucleus because—

- i. the energy of electron is not more than 4 MeV  
ii. the energy of electron will have to be 37.6 MeV  
iii. the uncertainty of the position of electron will not be greater than  $2 \times 10^{-14}$

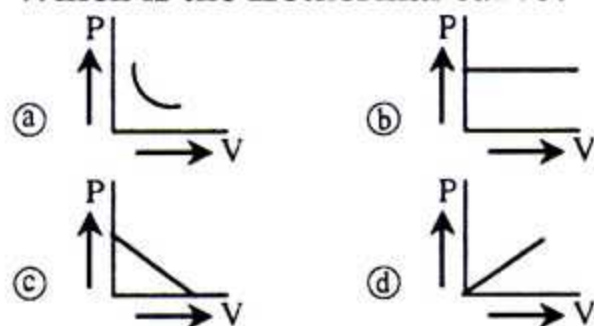
Which one of the following is correct?

- (a) i & ii (b) ii & iii  
(c) i & iii (d) i, ii & iii

17. Which is true in case of adiabatic process?

- (a)  $\Delta T = 0, \Delta Q = 0$  (b)  $\Delta T = 0, \Delta Q \neq 0$   
(c)  $\Delta T \neq 0, \Delta Q \neq 0$  (d)  $\Delta T \neq 0, \Delta Q = 0$

18. Which is the Isothermal curve?



19.  $1F = ?$

- (a)  $1CV$  (b)  $1CV^{-1}$   
(c)  $C \times 1V^2$  (d)  $1C^{-1}V$

20. Each with equal capacitance, connected in parallel combination is 4 times of the capacitance when they are

connected in series. Now combination of Capacitors is series and parallel is—

i.  $C_s = 2C_p$

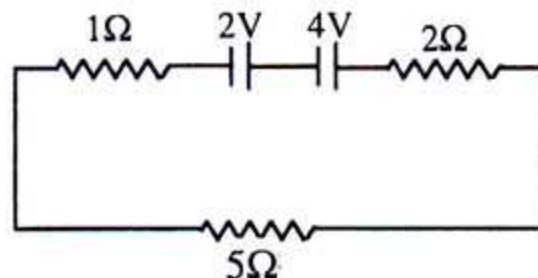
ii.  $C_s = \frac{C}{2}$

iii.  $C_p = 4C_s$

Which one of the following is correct?

- (a) i & ii (b) ii & iii  
(c) i & iii (d) i, ii & iii

See the figure & answer the question 21 & 22.



21. What is the amount of current in this circuit?

- (a) 0.25 amp (b) 0.3 amp  
(c) 0.35 amp (d) 0.5 amp

22. What is the total voltage drop across three resistances?

- (a) 2 volt (b) 3 volt  
(c) 5 volt (d) 6 volt

Read the passage & answer the questions no 23 & 24

The magnitude of earth's magnetic field at a certain place is  $5 \times 10^{-5}T$  and dip is  $60^\circ$ .

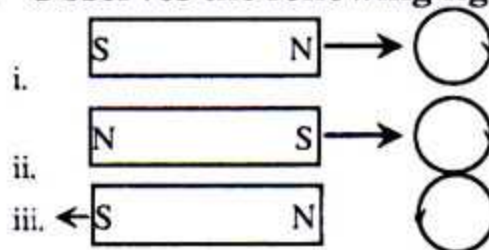
23. What is the magnitude of horizontal component of earth's magnetic field there?

- (a)  $25\mu T$  (b)  $2.5\mu T$   
(c)  $25\mu T$  (d)  $2.5T$

24. What is the magnitude of vertical component of earth's magnetic field there?

- (a)  $43.3 \times 10^{-5}T$  (b)  $43.3 \times 10^{-6}T$   
(c)  $13.3 \times 10^5T$  (d)  $43.3 \times 10^6T$

25. Observe the following figure:



Which one of the following is correct?

- (a) i & ii (b) ii & iii  
(c) i & iii (d) i, ii & iii

Ans.	1	(b)	2	(d)	3	(b)	4	(c)	5	(d)	6	(b)	7	(b)	8	(a)	9	(c)	10	(d)	11	(c)	12	(a)	13	(c)
	14	(d)	15	(a)	16	(d)	17	(d)	18	(a)	19	(b)	20	(b)	21	(a)	22	(a)	23	(a)	24	(b)	25	*		

25. N.B: Correct ans is only (ii)