

# Model Question of HSC Examination 2020 (All Board)

## Physics Second Paper (Creative)


Sub Code : 

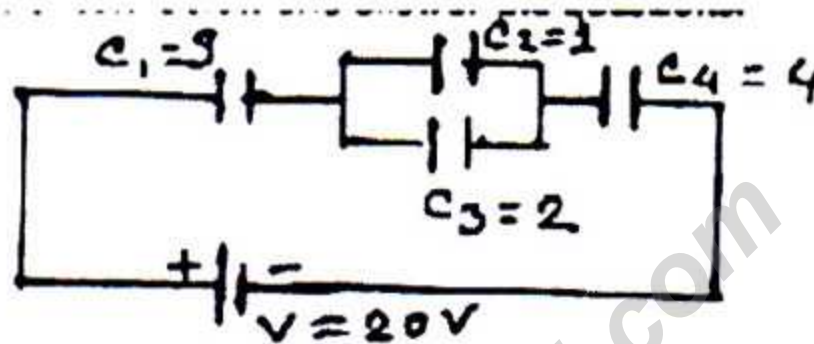
1	7	5
---	---	---


Time: 2Hrs 35 min

Full marks: 50

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

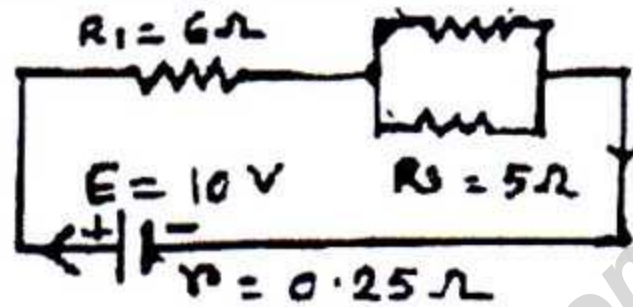
1.  Observe the circuit below and answer the questions.



- a. What is Hall effect? 1
- b. What do you mean by the dip at 15°N? 2
- c. Find the equivalent capacitance of the circuit. 3
- d. If all the capacitors of the circuit are connected in parallel then the energy obtained will be more or less than energy of the given circuit— show with mathematical reasoning. 4
2.  The refracting angle of a glass prism is 60° and the refractive index of the material is  $\sqrt{2}$ .
- a. What is called electrical dipole? 1
- b. What do you mean by mechanical equivalent of heat is 4.2Jcal<sup>-1</sup>? 2
- c. Find the minimum angle of deviation of the prism of the stem. 3

- d. At the minimum deviation position of the prism of the stem, determination of the first angle of incidence is possible— Justify the statement with mathematical analysis. 4

3. ► An electric circuit is given below:



- a. What is wave front? 1
- b. Explain Fermat's principle. 2
- c. Calculate the main current in the circuit of the stem. 3
- d. If  $5\Omega$  resistance is connected with  $R_3$  of the circuit of the stem once in series and then is parallel in which case the main current will be more. Given opinion with mathematical analysis. 4

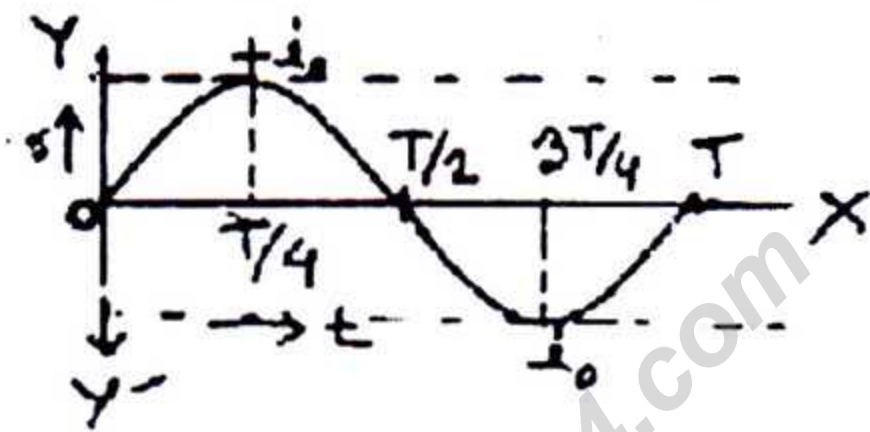
4. ★ In Young's double slit experiment the distance between two slits  $0.3\text{ mm}$ . The distance of the screen from the slits is  $1\text{ m}$ . In an experiment in air medium the distance of the 4<sup>th</sup> bright fringe from the central bright fringe is  $6.2\text{ mm}$ . Keeping the arrangement into water the observation was taken ( $\mu_w = 4/3$ ).

- a. What is called electromagnetic wave? 1



- b. Explain with diagram Huygen's principle. 2
- c. Calculate the wavelength light used in the experiment. 3
- d. Analyze what change in the fringe will take place when the arrangement of the stem is kept into water. 4

5. ★ In the following figure an alternating current is shown.



- a. What is magnetic flux? 1
- b. Establish a relation between the electric intensity and the potential difference the two point in an electric field. 2
- c. Calculate i. peak value, ii. frequency, iii. root mean square value of the equation of current  $i=50 \sin 628t$  in the stimulus. 3
- d. If the value of T is made four times then what percent of average current will be changed? 4

6. ► Half life of Radium is  $4.36 \times 10^{-6}$  y.

- a. What is called doping? 1
- b. On what factors do the capacitance depend? 2
- c. How long will it take to disintegrate 75%? 3

d. If it is possible to 100% disintegrate of Radium? Analyze mathematically. 4

7. **★** X-ray 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 Plank's constant is  $6.63 \times 10^{-34}$  Js.

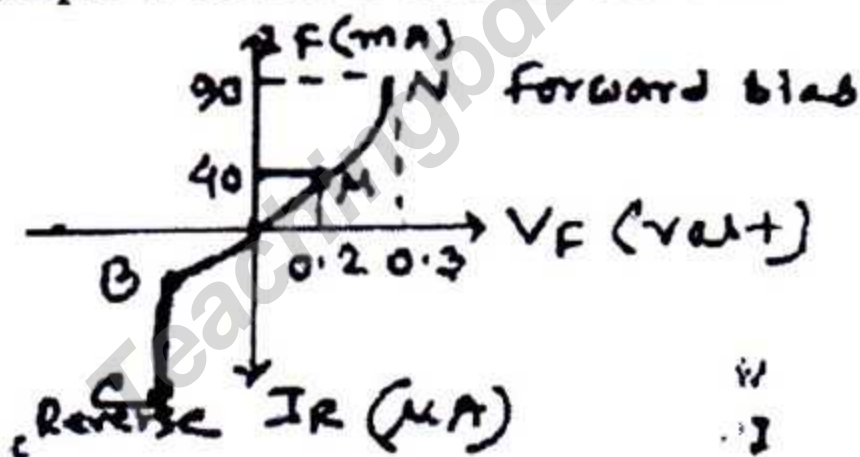
a. What is Compton effect? 1

b. What do you mean by stopping potential? 2

c. Calculate the wavelength of the scattered X-ray? 3

d. The energy of incident X-ray is greater than energy of scattered X-ray. Analyze it mathematically. 4

8. **▶** The V-I graph a diode is shown below:



a. What is called Knee voltage? 1

b. Explain dynamic resistance. 2

c. Determine the dynamic resistance of the diode from the figure of the stem. 3

d. To flow current for a longer time it is safer to flow in the MN portion than in the BC portion— explain. 4



# Model Question of HSC Examination 2020 (All Board)

Physics Second Paper (MCQ)

Sub Code : 175

Full Marks : 25

Time : 25 Minutes

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

1. **★** What is the equivalent unit of entropy?

- (a) Nm/K (b) Nm  
(c) N/K (d) J

2. What will be the change in internal energy if work done by 10 moles gas in adiabatic compression is 350J?

- (a) 300J (b) 350J  
(c) 400J (d) 450J

3. Radius of an atom is  $9 \times 10^{-13}$  cm. What is the electric potential at the nucleus ( $Z=50$ ) of the atom?

- (a)  $5 \times 10^6$  V (b)  $6 \times 10^7$  V  
(c)  $7 \times 10^8$  V (d)  $8 \times 10^6$  V

4. In the case of relativity—

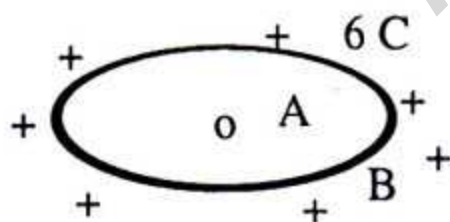
- i. A moving clock runs faster than a stationary clock  
ii. The length of an object in motion is smaller than its stationary length  
iii. The mass of an object in motion is greatest than its rest mass

Which one is correct?

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

Answer the questions no. 5, 6.

A charged sphere has charge 6C and radius 5cm. Point A lies inside the sphere and B on the surface.



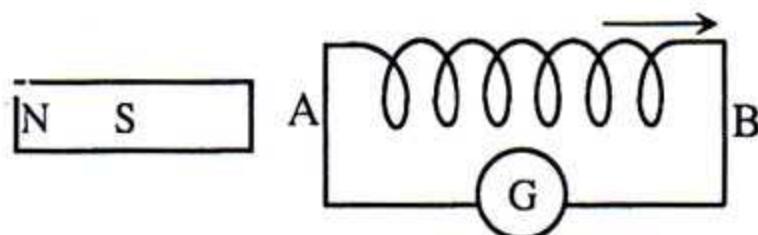
5. **★** What is value of electric intensity at point A?

- (a) 0 N/C (b)  $5 \times 10^6$  N/C  
(c)  $5 \times 10^7$  N/C (d)  $8 \times 10^6$  N/C

6. **★** The value of electric potential at point B is—

- (a)  $2 \times 10^6$  V (b)  $1.08 \times 10^{12}$  V  
(c)  $5 \times 10^6$  V (d)  $6 \times 10^6$  V

On basis of the following fig. answer the questions 7 and 8.



7. Which pole will be created at point A?

- (a) N (b) S  
(c) N+S (d) Neutral

8. What type of force will be created at point B?

- (a) Attraction (b) Repulsion  
(c) Both (d) Neutral

9. The horizontal and vertical components of geomagnetic field in a place are  $32.46 \mu\text{T}$  and  $48.27 \mu\text{T}$ . How much is the dip in that place?

- (a)  $56^\circ$  (b)  $60^\circ$   
(c)  $70^\circ$  (d)  $80^\circ$

10. In Young's double slit experiment the distance between two slits is 2.0mm. The separation between two consecutive fringes at a distance 1m from the slits is found to be 0.295mm. What will be the wavelength of light?

- (a)  $4900 \text{ \AA}$  (b)  $5900 \text{ \AA}$   
(c)  $6900 \text{ \AA}$  (d)  $7900 \text{ \AA}$

Answer the questions (11 & 12) according to the figure in below :

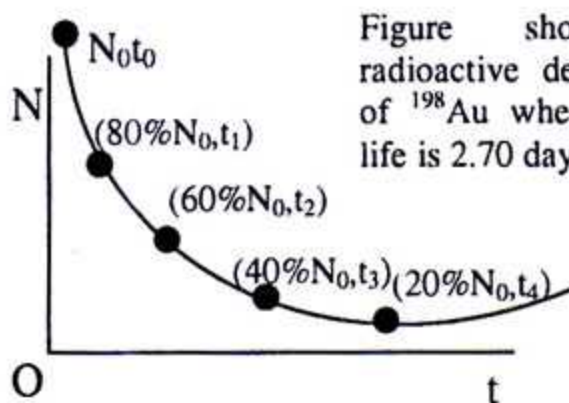


Figure shows the radioactive decay curve of  $^{198}\text{Au}$  where its half life is 2.70 days.

11. What is the value of decay constant of radioactive material in stem?

- (a)  $0.192 \text{ d}^{-1}$  (b)  $0.257 \text{ d}^{-1}$   
(c)  $0.469 \text{ d}^{-1}$  (d)  $0.576 \text{ d}^{-1}$

12. According to the the above curve in figure which time difference for radioactive disintegration of  $^{195}\text{Au}$  atoms is less?

- (a)  $t_1 - t_0$  (b)  $t_1 - t_2$   
(c)  $t_2 - t_3$  (d)  $t_3 - t_4$



13. Which one of the following is the Milky Way?

- (a) A planet of the solar system  
 (b) The center of the solar system, the sun  
 (c) A Galaxy of the universe  
 (d) Total member of the solar system

14. The sun radiates energy continuously and keeps its brightness, what is the cause for it?

- (a) In the sun carbon is burnt in its core  
 (b) In the sun fission reaction is occurred  
 (c) Chemical reaction is occur in it  
 (d) In the sun fusion reaction is occurred

15. The work-function of platinum is 6.31eV. What is its threshold frequency? (Planck's constants =  $6.63 \times 10^{-34}$  js.)

- (a)  $15.4 \times 10^{-34}$  Hz (b)  $15.24 \times 10^{14}$  Hz  
 (c)  $14.25 \times 10^{-14}$  Hz (d)  $14.4 \times 10^{34}$  Hz

16. ★ If the path difference between two

points in a wave is  $\frac{\lambda}{4}$ , what is the phase difference between the points?

- (a)  $\frac{\pi}{2}$  (b)  $2\pi$   
 (c)  $8\pi$  (d)  $\pi$

17. In case of interference dark fringe will be created when—

- i. the wave will combine at same phase  
 ii. the phase difference is the odd multiple of  $\pi$   
 iii. intensity is the lowest

Which one is correct?

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

18. If the angle between  $\vec{A}$  and  $\vec{B}$  is  $\theta$ , which one below is correct?

- (a) If  $\theta = 45^\circ$ . The magnetic flux will be zero  
 (b) If  $\theta = 90^\circ$ . The magnetic flux will be maximum  
 (c) If  $\theta = 0^\circ$ . The magnetic flux will be maximum  
 (d) If  $\theta = 180^\circ$ . The magnetic flux will be zero

19. ★ To increase the capacitance of the capacitor—

- i. increase the area of each plate  
 ii. decrease the distance between two plates  
 iii. increase the distance between two plates

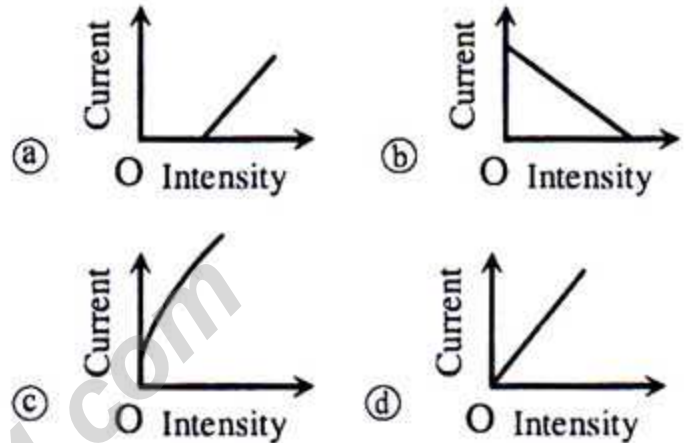
Which one is correct?

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

20. The rest mass ( $m_0$ ) of an electron is  $9.1 \times 10^{-31}$ . How many times greater the mass of an electron whose velocity is 0.99c than the electron's rest mass?

- (a) 7 (b) 9  
 (c) 64 (d) 99

21. In photo electric effect, if intensity changes the flow of current also changes when frequency remains unchanged. Which one is the intensity vs. current graph?



22. In case of doping in semiconductor—

- i. Addition of impurity  
 ii. To increase the conductivity  
 iii. To decrease the conductivity

Which one is correct?

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

Answer the questions no 23 and 24.

The focal length of a convex lens is 0.75m.

23. At what distance an object be placed so that a image of three times the size of the object are formed?

- (a) 1m (b) 3m  
 (c) 4m (d) 75m

24. At what distance an object be placed so that a real image of three times the size of the object are formed?

- (a) 0.50m (b) 0.75m  
 (c) 3m (d) 4m

25. Colour of quark is—

- (a) Red, purple, blue  
 (b) Red, green, blue  
 (c) Red, yellow, blue  
 (d) Red, green, purple

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