

Model Question of HSC Examination 2020 (All Board)

Physics Second Paper (Creative)

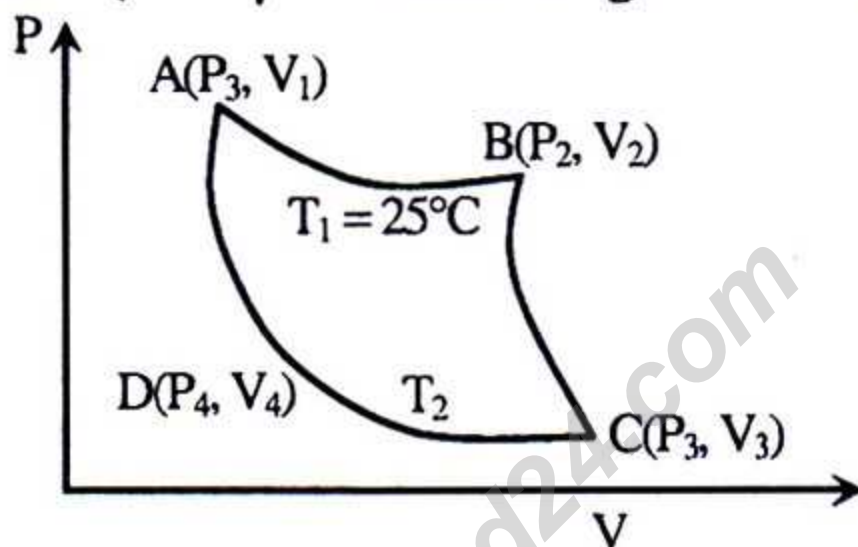
Sub Code : **175**

Time: 2Hrs 35 min

Full marks: 50

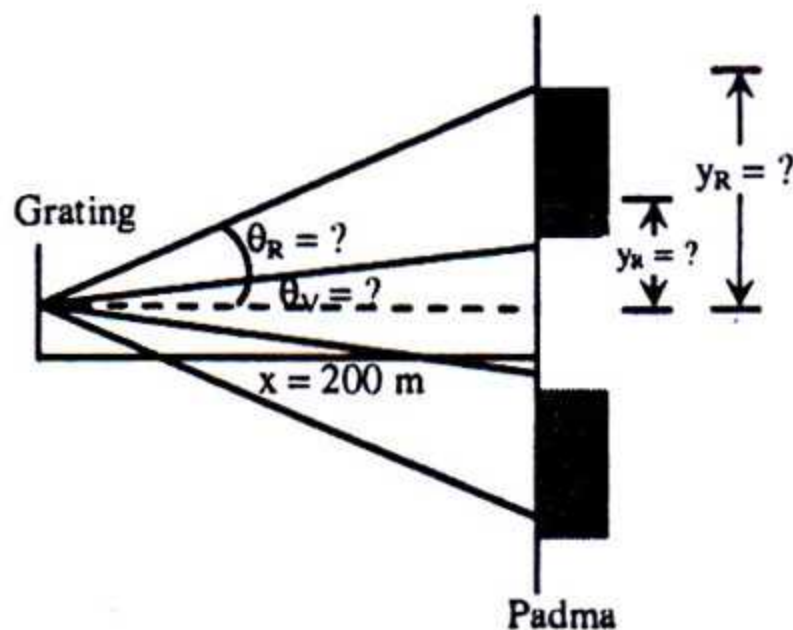
[Read the following stems and answer any five of the following questions:]

1. ► The ratio of compression and expansion in each step of Carnot's engine is 1:2. 5 mole diatomic gas is used as the working substance (The γ of diatomic gas is 1.41)



- State the 2nd law of thermodynamics. 1
- Why all natural processes are irreversible? Explain. 2
- Calculate the work done to bring the graph of Carnot's cycle from A to B. 3
- In the stem, is it possible the efficiency of the engine be more than 45%— Answer with mathematical argument? 4

2. ★



Diffraction grating with 10000 lines per centimeter are ready

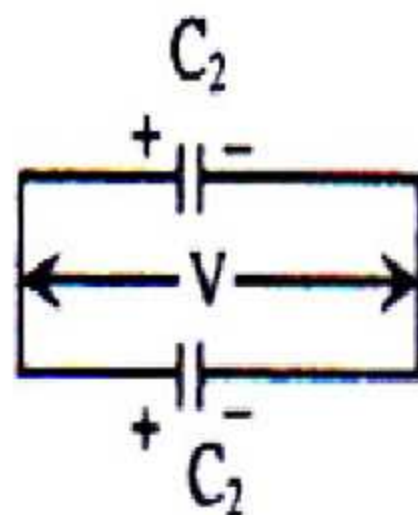
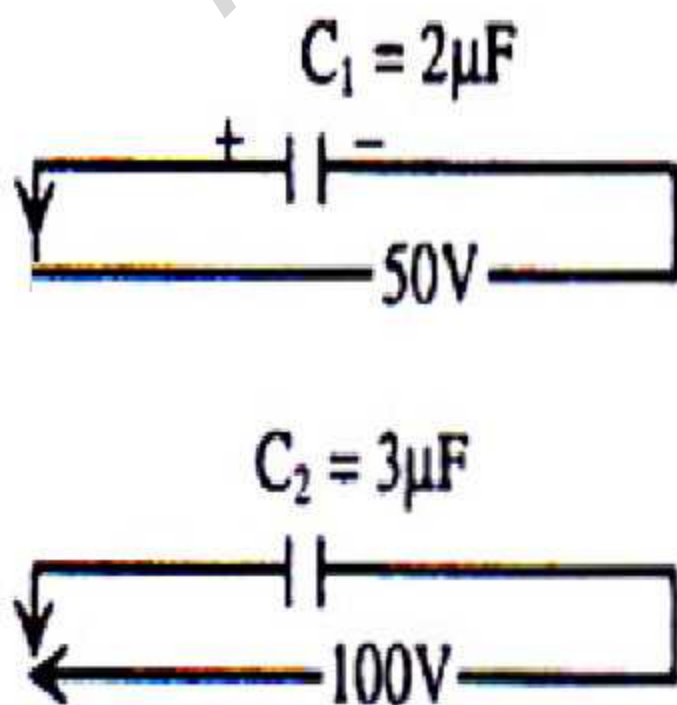
available. Suppose you have one, and you send a beam of white light through it to screen 2m away. The shortest wavelength of visible light is 380nm. The longest wavelength of visible light is 760 nm.

- What is called wave front? 1
- How does the polarization occur in electromagnetic wave? 2
- Find the angles for the first-order diffraction of the shortest wavelength of visible light? 3
- For first order interference, what is the distance between the ends of the rainbow of visible light produced on the screen? Explain mathematically. 4

3. ► A train moving with a speed $0.8c$ passes by the platform of a small station without being slowed down the observer on the platform note that the length of the train is just equal to the length of the platform which is 200m.

- What is called relativity of mass? 1
- Why can't light escape from black hole? 2
- Find the length of the stationary train. 3
- How much length of the platform will be increase or decrease when measured by the observer in the train. Explain in mathematically. 4

4. ★



- What is called electric dipole? 1
- Why intensity at the centre or inside any point of sphere is zero? 2
- Determine the total charge in fig-1? 3
- Compare the fig-1 & fig-2 then what will get be the more energy either before connection or after connection? 4

5. ►

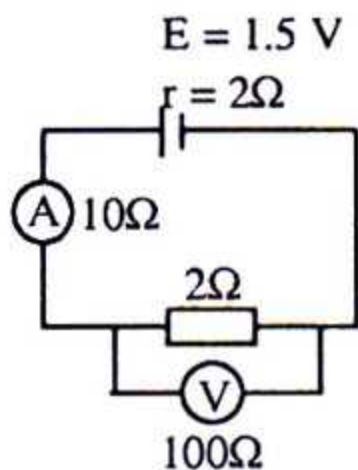


Fig-1

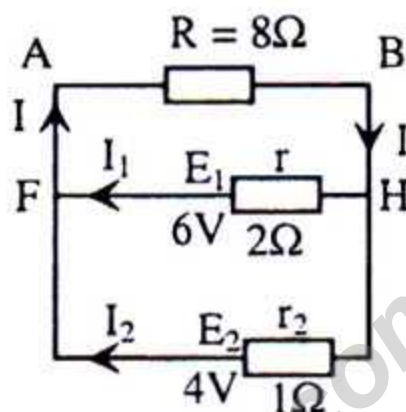
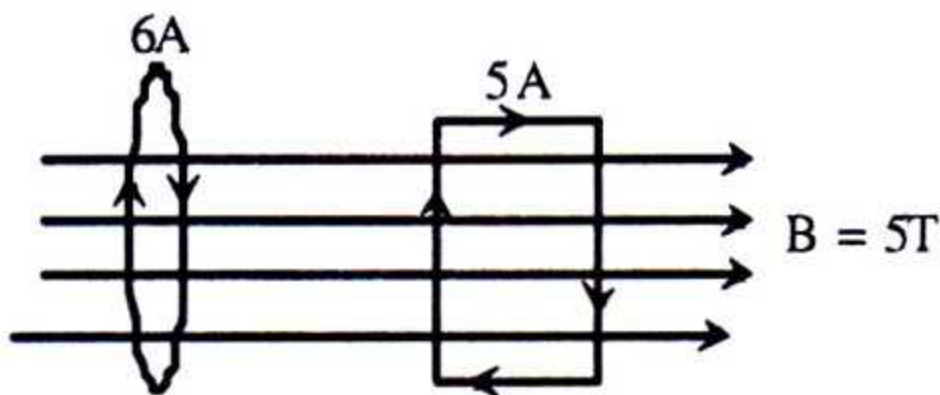


Fig-2

- What is called Shunt? 1
- How does resistance of a conductor change with temperature? 2
- Find the voltmeter reading in case of fig-1. 3
- Which one is more current flow through I_1 or I_2 according to the fig-2? Explain mathematically. 4

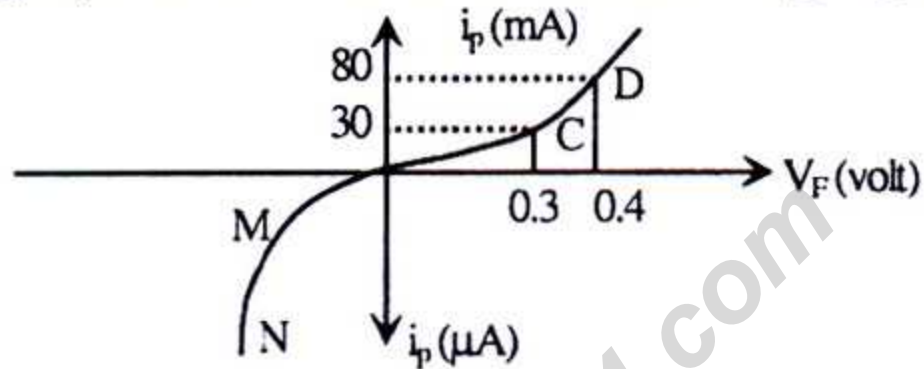
6. ★



Number of turn = 20
Diameter = 4 cm

Number of turn = 20
Length of every arm = 4 cm

- a. What is called Hall Voltage? 1
 - b. Explain the hysteresis curve of ferromagnetic substances. 2
 - c. What is the value of magnetic flux in circular coil? 3
 - d. Which one of coils to create rotation is more according to stem— Explain mathematically? 4
7. ► A V—I graph is shown in the following figure.



- a. What is called leakage current? 1
 - b. Why does the depletion layer of diode increase in reverse bias? 2
 - c. Find the dynamic resistance of the diode from the stem. 3
 - d. The CD part is much safer than the MN part for conducting for along time— Explain. 4
8. ★ X-rays of wave length 10.0 pm are scattered from a target electron.
- a. What is called threshold frequency? 1
 - b. Why electron cannot exist in the nucleus of an atom? Explain. 2
 - c. Find the wavelength of the x-rays scattered through 45° . 3
 - d. The maximum kinetic energy of the recoil electrons is equal to 40.8 KeV, verify the statement mathematically. 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. Which one of the expression is correct for the magnetic flux?

- (a) $\Phi = AB \cos\theta$ (b) $\Phi = AB \sin\theta$
(c) $\Phi = AB \cot\theta$ (d) $\Phi = AB \tan\theta$

2. Which property of light prove that light is a transverse wave?

- (a) Refraction (b) interference
(c) polarization (d) reflection

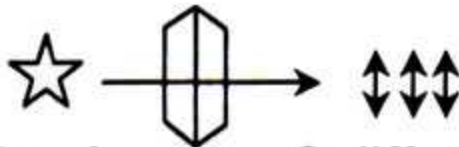
3. Hall potential determine—

- i. Magnitude of magnetic field
ii. number of free electron per unit volume
iii. nature of the charge

Which one is correct?

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

4. Which property of light represent by the following figure —



- (a) interference (b) diffraction
(c) polarization (d) dispersion

5. What is the peak value of voltage 220V?

- (a) 311V (b) 220V
(c) 140V (d) 110V

6. What is the rest mass energy of an electron?

- (a) 0.511MeV (b) 0.931 MeV
(c) 934 MeV (d) 939 MeV

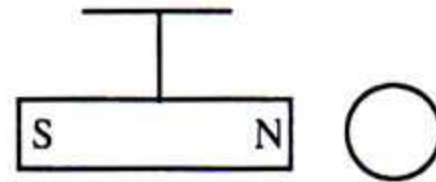
7. Electromagnetic wave is—

- i. Transverse wave
ii. Consist of \vec{E} and \vec{B}
iii. \vec{E} and \vec{B} are perpendicular each other.

Which one is correct?

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

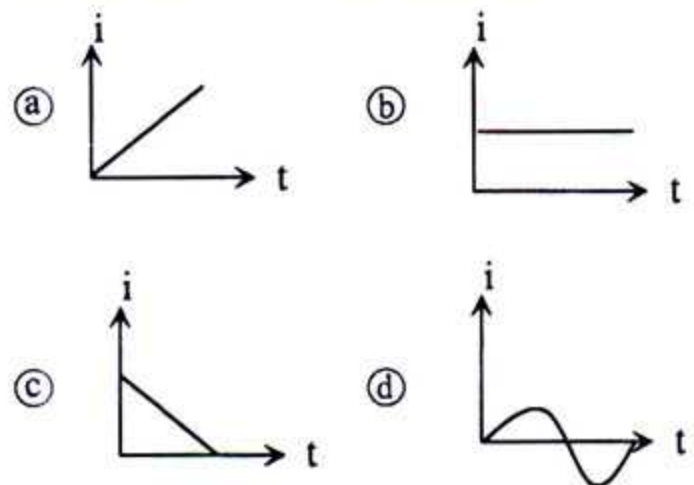
On the basis of the stem answer the question 8 and 9



8. Which one of the following will create if the magnet is taken towards the coil?

- (a) North pole, current flow in clock wise
(b) North pole, current flow in anti clock wise
(c) South pole, current flow in clock wise
(d) South pole, current flow in anti clock wise

9. Which one of the following graph is correct if the bar magnet is oscillate in front of fixed coil?



10. The minimum orbital angular momentum of the electron in a hydrogen atom is—

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

11. Non inductive coil is made by—

- (a) fold the wire into two
(b) fold the wire into three
(c) fold the wire into four
(d) fold the wire into five

12. **★** Weak nuclear force is responsible for the emission of—

- i. β particle
- ii. α particle
- iii. neutrino

Which one is correct?

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

13. Which one of the following is called Ishwar particle?

- (a) Gluon
- (b) Lepton
- (c) Higgs Boson
- (d) Photon

14. Which one of the following is made with the combination of AND and NOT gate?

- (a) NAND gate
- (b) X-OR gate
- (c) NOR gate
- (d) OR gate

15. If the refractive index of glass is 1.5, then speed of light in glass is—

- (a) $1 \times 10^8 \text{ ms}^{-1}$
- (b) $2 \times 10^8 \text{ ms}^{-1}$
- (c) $3 \times 10^8 \text{ ms}^{-1}$
- (d) $1.5 \times 10^8 \text{ ms}^{-1}$

16. Whose theory is position and momentum at same time of a particle is uncertain?

- (a) Einstein
- (b) Heisenberg
- (c) De-Broglie
- (d) Compton

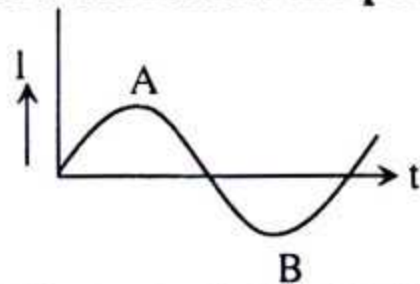
17. The energy of electron of first orbit of atom is E_1 then what is the energy of the electron nth orbit?

- (a) $\frac{E_1}{n^2}$
- (b) $\frac{E_1}{n}$
- (c) nE_1
- (d) n^2E_1

18. The average life of Uranium is 6.4935×10^9 yrs. What is to its half life?

- (a) 5×10^9 yrs
- (b) 4.5×10^9 yrs
- (c) 0.65×10^9 yrs
- (d) 6.05×10^9 yrs

19. In the fig what is the time period of AC current at the point-B?



- (a) $\frac{T}{4}$
- (b) $\frac{T}{2}$
- (c) $\frac{3T}{4}$
- (d) $\frac{3T}{2}$

20. The radius of even horizon is—

- (a) $R_s = \frac{2GM}{C^2}$
- (b) $R_s = \sqrt{\frac{2GM}{C}}$
- (c) $R_s = \frac{2GM}{R^2}$
- (d) $R_s = \sqrt{\frac{2GM}{R^2}}$

21. The total energy of moving object is 2 times of its rest energy. What is its velocity?

- (a) $2.5 \times 10^8 \text{ ms}^{-1}$
- (b) $2 \times 10^8 \text{ ms}^{-1}$
- (c) $3 \times 10^8 \text{ ms}^{-1}$
- (d) $2.5 \times 10^{-8} \text{ ms}^{-1}$

22. **★** Which one of the following expression is correct for energy of photon?

- (a) $E = \frac{hc}{\lambda}$
- (b) $E = \frac{hc}{\lambda^2}$
- (c) $E = \frac{h\lambda}{c}$
- (d) $E = \frac{hc^2}{\lambda}$

23. The most short range force is—

- (a) Weak nuclear force
- (b) Strong nuclear force
- (c) Gravitational force
- (d) Electromagnetic force

24. Which one of the following is the unit of electric permittivity ϵ_0 ?

- (a) $C^2N^{-1}m^{-2}$
- (b) Nm^2C^{-2}
- (c) $C^2N^{-2}m^{-1}$
- (d) $Nm^{-2}C^{-2}$

25. Which one of the following is Lorentz force?

- (a) $\vec{F} = q\vec{E} + q\vec{v} \times \vec{B}$
- (b) $e\vec{v}_d \vec{B}$
- (c) $\vec{F} = q\vec{E} + \vec{v} \times \vec{B}$
- (d) $\vec{F} = q\vec{E} + q(\vec{v} \times \vec{B})$

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