Set 5

Model Question -5

Grade: XII Subject: Physics (102)
Full marks: 75 (11 marks Obj+ 64 marks Sub) **Time: 3 Hours**

Attempt all the questions:

Group "A"

Rewrite the correct option in your answer sheet: **11X1=11**

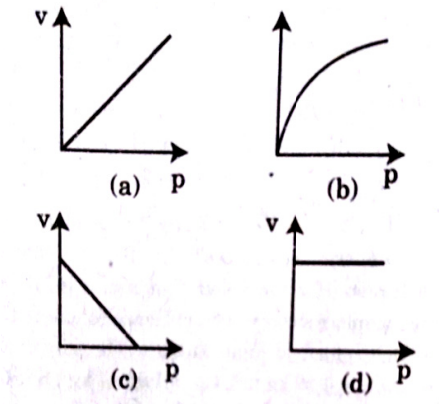
1) What happens in adiabatic process?
   a. volume remains constant
   b. Pressure remains constant
   c. temperature remains constant
   d. the system is insulated from the surrounding
2) Which of the following is the most efficient?

a. Carnot cycle based carnot engine
b. petrol cycle based petrol engine
c. diesel cycle based diesel engine
d. All of these are equally efficient

3) What is the phase difference between two successive crest in the wave?

a. π b. $\frac{\pi}{2}$ c. 2π d. 4π

4) The variation of speed of sound in a gas with its pressure is best represtened by curve



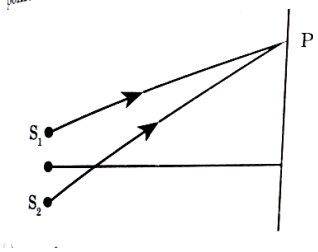
5) A closed organ pipe and an open organ pipe have their first overtone identical in frequency. Their lengths are in the ratio

a. 1:2 b.2:3 c.3:4 d. 4:5

6) Quantity of two sounds is different because

a. their frequency are different
b. their intensities are different
c. their amplitude are different
d. different overtones are there

7) If in the interference pattern $S_2P - S_1P = 1.5$ microns and wavelength of light used is $6000A^0$, then point P is



a. second maximum
b. second minimum
c.third minimum
d. an intermediate point between second maximum and third minimum

8) Electromotive force is most closely ranked to

a. electric field b. magnetic field
c.potential difference d. mechanical force

9) Two straight parallel conductor carrying current in opposite direction

a. attract each other b. repel each other
c.do not experience any force d. cancel Is each other's force

10) Which circuit element opposed the change in circuit current?

a. resistance b. inductance c.capacitance d. impedance

11) The area of hysteresis loss is a measure of

a. Permitivity b. energy gain per cycle
c.energy less per cycle d. magnetic flux

Group "B"

Short answer questions: **8X5=40**

1)

a) State and prove principle of conservation of angular momentum. Give any example of conservation of angular momentum. 2+1=3

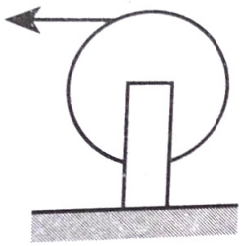
b) A disc of M.I. 5 X 10^{-4} kgm^2 is rotating freely about an axis through its centre at 40 r.p.m. Calculate the new r.p.m. if some wax of mass 0.02 kg is dropped gently on the disc 0.08 m from its axis. 2

OR

a) Define angular momentum. 1

b) A planet revolves around a massive star in a highly elliptical orbit . Is its angular momentum constant over the entire orbit? 2

c) A string is wrapped around the rim of a wheel of M.I. 0.20 kgm^2 and radius 20 cm. the wheel is free to rotate about its axis as in figure. Initially the wheel is at rest. The string is now pulled by a force of 20N. find the angular velocity of the wheel after 5 second.2



2)

a) Define molar heat capacity of gas at constant pressure (C_P) and molar heat capacity heat capacity of gas at constant volume. 1-1=2

b) Why $C_P > C_V$? 1

c) Prove $C_P - C_V = R$ 2

3)

a) Write down Newton's formula for velocity of sound in gas. How Laplace corrected Newton's formula? 0.5+1.5=2

b) The velocity of sound is generally greater in solids than in gases at NTP. Why?2

c) Why is the sound produced in air not heard by a person deep inside the water?1

4)

a) Differentiate between interference and diffraction of light. 2

b) What is the cause of diffraction? 1

c) A screen is placed 2m away from the sinlge narrow slit. Calculate the slit width if the first minima lies 5 mm on either side of the central of the central maximum and incident plane waves have a wavelength of 5000A^0. 2

5)

a) State Kirchhoff's laws. 1

b)

i) Draw the circuit diagram of Wheatstone Bridge circuit.

ii) Write down the balanced condition of Wheatstone Bridge circuit.

c) Find the value of I_1, I_2 and I_3 om the circuit. 2