Seat No. | 17936

B.Sc. (Part - II) (Semester - III) (CBCS) (New)
Examination, November - 2019
PHYSICS
DSC - C2 : Waves and Optics - I (Paper - VI)
Sub. Code : 73301

Day and Date : Friday, 29 - 11 - 2019   **Total Marks : 50**
Time : 12.00 noon to 2.00 p.m.

Instructions :   1)   All questions are compulsory.
                  2)   Figures to the right indicate full marks.
                  3)   Neat diagram should be drawn wherever necessary.
                  4)   Use of calculator/log tables is allowed.

Q1) Select the correct alternatives.   **[10]**

a)   Kundsen absolute gauge uses the principle of _____.

  i)   molecular flow   ii)   radiometric effect

  iii)   photoelectric effect   iv)   diffusion of gas

b)   Diffusion pump is used to produce low pressures upto _____.

  i) 10^{-6} torr   ii) 10^{-3} torr

  iii) 10^{-2} torr   iv) 10^{-4} torr

c)   The C.G.S. unit of coefficient of viscosity is _____.

  i)   gm/cm. sec   ii)   gm.cm/s

  iii)   gm.sec/cm   iv) $gm/cm.sec^2$

d)   Active transducer _____.

  i)   requires the external power supply

  ii)   does not requires the external power supply

  iii) cannot convert one form of energy into another form of energy

  iv)   none of these

P.T.O.

e) Loudspeaker converts _____

    i)   electrical energy into sound energy

    ii)   optical energy into an electrical energy

    iii) sound energy into an electrical energy

    iv)   mechanical energy into sound energy

f) The resultant of two SHM's acting at right angles to each other and having same frequency but different amplitudes and phase difference of $\pi/2$ is _____.

    i)   an ellipse   ii)   a straight line

    iii) hyperbola   iv)   a circle

g) Beats are produced due to superposition of two _____

    i)   collinear oscillations

    ii)   harmonic oscillation

    iii) oscillations with slightly different frequencies

    iv)   none of these

h) Ultrasonic waves are sound waves having frequency _____.

    i)   less than 20 KHz   ii)   greater than 20KHz

    iii) less than 20 Hz   iv)   none of these

i) Phase velocity of a wave is $V =$ _____.

    i) ω/k ii) k/ω

    iii) $\omega.K$ iv) ωk^2

j) Nodes in standing waves are the points where the _____.

    i)   displacement is zero   ii)   amplitude is zero

    iii) displacement is maximum   iv)   amplitude is maximum

Q2) Attempt any tow of the following.   **[20]**

a) Derive an expression for rate of flow of liquid through capillary tube.

b) Derive Sabine's formula for the reverberation of time.

c) What is beat? Discuss analytically the resultant vibrations of two collinear SHM's having different frequencies.

-2-

Q3) Attempt any four of the following. [20]

 a) Explain the construction and working of diffusion pump.

 b) Write note on Pirani gauge.

 c) Explain any two methods used for the detection of ultrasonic waves.

 d) Write note on plane and spherical wave fronts.

 e) Obtain the differential equations of coupled oscillatory system.

 f) Write note on normal modes and normal co-ordinates.

♦ ♦ ♦