W—132—2018

FACULTY OF SCIENCE

B.Sc. (Second Year) (Third Semester) EXAMINATION

OCTOBER/NOVEMBER, 2018

(CBCS/CGPA)

PHYSICS

Paper-VI

(Waves, Acoustics and Oscillations)

(MCQ+Theory)

(Thursday, 25-10-2018)   **Time : 2.00 p.m. to 4.00 p.m.**

Time—Two Hours   *Maximum Marks—40*

N.B. :—   (*i*)   Attempt *All* questions.

     (*ii*)   Q. No. **1** is MCQ type, answer MCQ questions on OMR sheet only.

     (*iii*)   Q. Nos. **2, 3** and **4** are descriptive type.

     (*iv*)   Negative marking system is applicable to MCQ questions.

     (*v*)   Symbols used in the question paper have their usual meanings.

MCQ   10

1.   (*i*)   In stationary wave, every antinode is separated by a distance of :

     (*a*) λ (*b*) $\dfrac{\lambda}{2}$

     (*c*) $\dfrac{\lambda}{4}$ (*d*) 2λ

     (*ii*)   Differential equation of wave motion is given by :

     (*a*) $\dfrac{d^2 y}{dt^2} = v^2 \dfrac{dy}{dx}$ (*b*) $\dfrac{d^2 y}{dt^2} = v \dfrac{dy}{dx}$

     (*c*) $\dfrac{d^2 y}{dx^2} = v^2 \dfrac{d^2 y}{dt^2}$ (*d*) $\dfrac{d^2 y}{dt^2} = v^2 \dfrac{d^2 y}{dx^2}$

P.T.O.

(*iii*) In a stationary wave the strain is minimum at ....

    (*a*)   Antinodes   (*b*)   Nodes

    (*c*)   Nodes and Antinodes   (*d*)   None of these

(*iv*) The velocity of sound wave is given by ....

    (*a*) $v = \dfrac{n}{\lambda}$ (*b*) $v = \dfrac{\lambda}{n}$

    (*c*) $v = n\lambda$ (*d*) $v = n^2 \lambda$

(*v*) In oscillatory motion of a particle the sum of K.E. and P.E. will be :

    (*a*)   Increase   (*b*)   Decrease

    (*c*)   Zero   (*d*)   Constant

(*vi*) The equation of critically damped motion is :

    (*a*) $y = y_0 e^{-kt}$ (*b*) $y = y_0 e^{-kt}(kt)$

    (*c*) $y = y_0 e^{-kt}(1 - kt)$ (*d*) $y = y_0 e^{-kt}(1 + kt)$

(*vii*) The reverberation time depends upon ....

    (*a*)   Nature of reflecting materials on walls and ceilings

    (*b*)   Volume of the auditorium

    (*c*)   Area of the reflecting surface

    (*d*)   All of the above

(*viii*) In piezoelectric generator, which of the following crystals is used ?

    (*a*)   Iron   (*b*)   Nickel

    (*c*)   Quartz   (*d*)   Cobalt

(*ix*) The velocity of ultrasonic waves can be measured in liquid and gases with the help of :

    (*a*)   Acoustic grating   (*b*)   Diffraction grating

    (*c*)   Plane grating   (*d*)   None of these

(*x*) The method for production of the ultrasonic waves is :

(*a*) Piezoelectric oscillator (*b*) Magnetostriction oscillator

(*c*) Galton whistle (*d*) All of these

Theory

2. Attempt any *five* of the following : 10

(*a*) Define stationary wave.

(*b*) Define ultrasonics.

(*c*) Write down the relation between maximum particle velocity and wave velocity.

(*d*) What do you mean by resonance ?

(*e*) Define piezoelectric effect.

(*f*) What do you mean by forced vibration ?

(*g*) Write Sabine's formula.

3. Attempt any *two* of the following : 10

(*a*) Derive an expression for velocity of transverse wave along a string.

(*b*) Show that energy is not transferred in a stationary wave.

(*c*) What do you mean by free undamped vibrations ? Obtain differential equation for it.

(*d*) Explain different methods for detection of ultrasonic waves.

4. Attempt any *one* of the following : 10

(*a*) Give analytical treatment of stationary wave, when closed end organ pipe.

(*b*) What is magnetostriction effect ? Explain magnetostriction oscillator for prodction of ultrasonic waves.