Progressive Education Society's
Modern College of Arts, Science & Commerce Ganeshkhind, Pune – 16
(Autonomous)
End Semester Examination: 2024
Faculty: Science and Technology

Program: B.Sc. Code (Gen03) **Semester: IV** **SET: B**
Program (Specific): General B.Sc. **Course Type: Core course**
Class: S.Y.B. Sc. (Gen) **Max. Marks: 35**
Name of the Course: Oscillations ,Waves and Sound

Course Code: 23-PHY-241 **Time: 2Hr**
Paper: I

Instructions to the candidate:

1) ***There are 4 sections in the question paper. Write each section on separate page.***
2) ***All Sections are compulsory.***
3) ***Figures to the right indicate full marks.***
4) ***Draw a well labeled diagram wherever necessary.***
5) ***Use of calculator and log table is allowed.***

SECTION: A

Q1) Answer the following (<u>any 5</u>) **5**

i) Define angular simple harmonic motion
ii) What is Lissajous figures ?
iii) What is red shift ?
iv) Define reverberation time
v) Define threshold of audibility
vi) Define intensity of wave. Give its unit
vii) What is mean by resonance ?

SECTION: B

Q2) Answer the following (<u>any 5</u>) **10**

i) Explain Lissajous figures
ii) Explain Resonance
iii) Obtain differential equation of forced oscillation in series LCR circuit
iv) Explain stable equilibrium

v) Write in short any two applications of Doppler effect.

vi) Explain quality / Timber of sound

vii) What are gravitational waves

viii) What are forced oscillations ? give one example

SECTION: C

Q3) Answer the following (<u>any 4</u>) 12

i) Obtain resultant path equation when composition of two S.H.M mutually perpendicular to each other and explain case if Ø = 0 , having frequency ratio 1:1

ii) Explain Amplitude resonance

iii) Obtain quality factor in case of forced oscillations

iv) Aspectral line of wavelength 5890 Angstrom in the spectrum of a star is found to be displaced by 1.178 Angstrom from its normal position towards the red end of the spectrum. Determine the velocity of the star and mention sense of the motion.

v) A simple harmonic oscillator of mass 50 gm oscillates along apath length of 0.2 m at a frequency of 10 Hz. What is its energy

vi) Explain L- waves

vii Obtain differential equation of motion of a simple harmonic oscilliator

SECTION: D

Q4) Answer the following (<u>any 2</u>) 8

i) In case of undamped free oscillation obtain periodic time and frequency equations.

ii) The equation of forced oscillations is given by

$2\left(\frac{d2x}{dt2}\right) + 3\left(\frac{dx}{dt}\right) + 16x = 30 \sin 2t$

All quantities are expressed CGS units. Find velocity amplitude and maximum kinetic energy

iii) Explain amplitude, phase characteristics of forced oscillation

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