C 25091 (Pages : 2) Name.....

Reg. No.....

SECOND SEMESTER B.Sc. DEGREE EXAMINATION, MARCH 2012

(CCSS)

Physics — Core Course

PH 2B 03—PROPERTIES OF MATTER, WAVES AND ACOUSTICS

Time : Three Hours Maximum : 30 Weightage

Section A

I. Objective Type Questions. Answer *all* questions.

1 What is workdone in terms of stress and strain ?

2 What is the unit of Poisson's ratio ?

3 A system executing SHM is called ————.

4 When K.E. of an SHM is maximum its P.E. is ———— ?

5 What is the condition for overdamped case ?

6 If damping of oscillation system is high Q factor is ————.

7 If particles of the medium vibrate parallel to the direction of propagation of wave motion, it is a ———— wave.

8 What is the unit of Q factor ?

9 Velocity of longitudinal wave in a gas depends upon density of the medium and ————.

10 Piezoelectric crystal method is used for the production of ————.

11 Decibel is the unit of ————.

12 Curtians, carpets etc. in a hall reduces ————.

(12 × ¼ = 3 weightage)

Section B

II. Short Answer Type Questions. Answer *all* nine questions :

13 What is elastic limit ?

14 Compare stress and strain.

15 What is a forced harmonic oscillator ?

16 What is resonant frequency ?

17 Write down the differential equation for wave motion.

18 What are modes of vibrations ?

19 What are the conditions for a periodic motion to become a simple harmonic ?

20 What is loudness of sound ?

21 What is acoustic grating ?

(9 × 1 = 9 weightage)

Turn over

Section C

III. Short Essay or Paragraph Questions. Answer any *five* questions :

22 With figure, explain bending moment.

23 A 10 cm. wide and 0.3 mm. thick metal sheet is bent to form a cylinder of 10 cm. length 50 cm. radius. If the $Y = 1.5 \times 10^{12}$ $Wm.^{-2}$ Calculate (a) stress and strain on the co surface and (b) the bending moment.

24 Show that total energy of a harmonic oscillator at an instant is a constant.

25 A mass 1.6 kg. extends a spring 8 cm. from its unstretched position. The mass is replaced body of 50 gm. The mass is pulled and released. Find the period of oscillation.

26 A brass rod of length 3 m. is clamped at the centre. It emits a note of frequency 600 Hz. it vibrates longitudinally. If density of brass is 8,300 $kg/m.^3$, Calculate Young's modulu

27 How can you determine velocity of ultrasonic waves in a liquid ?

28 Differentiate phase velocity and group velocity.

(5 × 2 = 10 weigh

Section D

IV. Essay Questions. Answer any *two* questions :

29 With figure, explain bending of beams. Explain beam supported at its ends and loaded i middle.

30 Explain longitudinal waves in gases.

31 Define periodic motion, SHM and derive equations for velocity acceleration and displace of SHM.

(2 × 4 = 8 weigh