MBZ-003-0491004

Seat No. _____

B. Sc. / M. Sc. (Sem. I) (CBCS) Examination

December – 2016

Applied Physics - I : Paper - III

Faculty Code : 003

Subject Code : 0491004

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

Instructions : (1) All questions are compulsory.
(2) Figures on right side show full marks.
(3) Symbols have their usual meanings.

1 Answer any **seven** : (out of ten) **14**

(1) Write dimensions of

(a) Area

(b) Volume

(c) Linear momentum

(d) Power

(2) What is Pseudo or fictitious force?

(3) Define :

(a) Ampere

(b) Kelvin

(4) Write down important characteristics of fluids.

(5) Modulus of rigidity (η).

(6) State desirable qualities of a thermometric substance.

(7) How a bimetallic thermometer works?

(8) Explain: A perfect Black body.

(9) What are sound waves? Explain in short.

(10) What are free or natural vibrations? Give examples.

2 (a) Answer the following questions in short : **4**

(1) Define :

(i) Mole

(ii) Radian

(2) What is an inertial frame?

(b) Write down the rules for writing units. **5**

(c) Explain: Newton's third law of motion in detail. **5**

OR

2 (a) Answer the following questions in short : **4**

(1) Define :

(i) Metre

(ii) Kilogram

(2) What is a non-inertial frame?

(b) What are the limitations of dimensional analysis? **5**

(c) Explain: Uniform circular motion and derive an equation $v = \omega r$ **5**

3 (a) Answer the following questions in short : **4**

(1) Write down Pascal's law.

(2) Define: Viscosity.

(b) Derive an expression showing relation between Young's modulus Y and bulk modulus K. **5**

(c) Explain the experimental determination of surface tension. **5**

OR

3 (a) Answer the following questions in short : **4**

(1) Define : Strain

(2) Define: Surface tension of a liquid

(b) Derive an equation of Young's modulus of the material of a wire. **5**

(c) Derive an equation for the rise(h) of liquid in a capillary tube having small radius r. **5**

4 (a) Answer the following questions in short : **4**

(1) Describe advantages of constant volume hydrogen thermometer.

(2) Write Kirchoff's law for heat radiation with equation.

(b) Write short note on : **5**

(1) Total radiation Pyrometer

(2) Magnetic thermometer

(c) Write practical applications of thermal conductivity. **5**

OR

4 (a) Answer the following questions in short : **4**

(1) Describe use of thermistor as a thermometer.

(2) Explain Wien's displacement law for black body radiation in short.

(b) Write short notes on : **5**

(1) Interference thermometer

(2) Optical Pyrometer

(c) Derive Newton's law of cooling, $T - T_0 = e^{(-kt+C)}$. **5**

5 (a) Answer the following questions in short : **4**

(1) Compare: transverse waves and longitudinal waves.

(2) Define :

(i) Frequency

(ii) Wavelength.

(b) Explain damped harmonic motion in detail. **5**

(c) Define displacement equation $x = A\sin(\omega t + \theta)$ for simple harmonic motion. **5**

OR

5 (a) Answer the following questions in short : **4**

(1) What is time period in simple harmonic motion? Write equation of time period.

(2) Define :

(i) Crest

(ii) Trough.

(b) Write a note on forced oscillations and resonance. **5**

(c) Write a detailed note on sound waves. **5**