

2017**M.Sc. 2nd Seme. Examination****PHYSICS****PAPER—PHS-204***Full Marks : 40**Time : 2 Hours**The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.**Illustrate the answers wherever necessary.**Answer Q. No. 1 and any three from the rest.***1. Answer any five of the following : 5×2****(a) State Archimede's principle.****(b) What are the basic properties of nano-materials ?***(Turn Over)*

- (c) What is radioactivity ? Mention two names of radioactive elements.
- (d) How many electrons make up one coulomb of charge ?
- (e) How a laser radiation is differ from sodium light source ?
- (f) What is the difference between microwave oven and induction oven ?
- (g) What do you mean by modulation ? Write the names of different types of modulation.
- (h) What is 'cell concept' in mobile communication ?
2. (a) Describe the concept of Quantum Mechanics.
- (b) Write down the observations and conclusions of Rutherford's α -scattering experiment.
- (c) Establish a relation between half and mean lives of the radioactive materials. 4+4+2

3. (a) Describe the concept of inertia from Newton's 1st law of motion.

(b) What is the force of attraction between two people, one of mass 80 kg and the other 100 kg, if they are 0.5 m apart ?

Given, universal gravitational constant = 6.67×10^{-11} in S.I. unit.

(c) State the laws of refraction of light.

(d) Write short note on Rainbow. 2+2+3+3

4. (a) An audio signal of 5 kHz and peak voltage of 8 volts is used to modulate a carrier of frequency 500 kHz and peak voltage of 10 volts. Determine modulation index and the frequency of the sideband produced.

(b) Draw the block diagram of amplitude demodulation.

(c) In photo-electric effect, why should the photo-electric current increases with the intensity of incident radiation ?

(d) Compare the properties of α , β and γ radiations.

2+2+3+3

5. (a) Give a brief outline for the production of x-ray and ultrasonic wave.
- (b) Write the applications of ECG, USG and MRI.
- 5+5
6. (a) Compare amongst filament bulb, CFL and LED.
- (b) Give a brief outline for the development of atomic model from ancient time to modern time.

5+5