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MBH-003-001202 Seat No. _____

B. Sc. (Sem. II) (CBCS) Examination

March / April - 2018

Physics : Paper - 201

(Waves, Optics, Crystallography, Electronics & Modern Physics)

(Old Course)

Faculty Code : 003

Subject Code : 001202

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

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

1 Answer all questions : (Each 1 mark) **20**

(1) Write an eqn. for wave in differential form.

(2) Write a formula of Laplace for the velocity of sound in air.

(3) State Bragg's law in mathematical form.

(4) What is Compton Effect?

(5) Who discovered X-rays?

(6) Write Snell's law in mathematical form.

(7) Soap bubble looks colored due to which optical phenomenon?

(8) Splitting of white light into different colors is known as _____.

(9) Write the value of min. energy required for a γ photon in pair production.

(10) Half life of radioactive element depends on which factor?

(11) Write an eqn. for average or mean life for any radioactive element.

(12) Write an eqn. for plane parallel to X and Z axis, miller indices.

(13) According to Bravis, how many space lattice is possible?

(14) Identify/Name the space Lattice structure of Diamond.

(15) Write the unit of ripple factor.

(16) What is the r_{ms} value of o/p current in half wave rectifier?

(17) In which rectifier is widely used in electrical circuit?

(18) When light falls on the junction of the diode, current flows through it. What is it called?

(19) How the photo diode is normally biased?

(20) Write an eqn. for relation between I_{ceo} and I_{cbo}.

2 (A) Answer the following questions : (Any **Three**) **6**

(1) What are waves?

(2) What are the laws of vibrating string?

(3) Write the properties of X-rays.

(4) Define angular dispersion.

(5) What is natural radioactivity?

(6) What is radioactive decay constant?

(B) Answer the following questions : (Any **Three**) **9**

(1) Derive Newton's formula for velocity of sound in air and apply Laplace's correction to it.

(2) An X-ray tube works on 50 kV, what will be min. wavelength of X-rays emitted by it?

(3) Explain Laue's spot, describe its physical significance.

(4) Discuss in brief the Fermat's principle.

(5) What is meant by interference of light? State its fundamental conditions.

(6) What are radioactive radiations? Mention its properties.

(C) Answer the following questions : (Any **Two**) **10**

(1) Describe Melde's experiment and show that frequency in transverse mode is twice as that in longitudinal mode.

(2) Explain Bragg's spectrometer, its uses, and explain its use in determining the wavelength of X-rays.

(3) Discuss the law of reflection and refraction as special cases of Fermets's principle.

(4) Write the properties of γ rays.

(5) Describe Compton effect and pair production phenomenon.

3 (A) Answer the following questions : (Any **Three**) **6**

(1) What is crystal lattice?

(2) Define unit cell and primitive cell.

(3) Explain working of π – filter.

(4) Explain typical circuit of an optoisolator.

(5) What is counter circuit?

(6) Find the value of, if $\alpha = 0.98$.

(B) Answer the following questions : (Any **Three**) **9**

(1) Explain with schematic diagram : Diamond structure

(2) How miller indices are decided?

(3) Explain full wave bridge rectifier circuit diagram and construction.

(4) Gvie a complete analysis of Half Wave rectifier.

(5) Explain CE connections/configurations.

(6) Describe about alarm circuit, in photodiode.

(C) Answer the following questions : (Any **Two**) **10**

(1) What is transistor? Explain briefly its classifications, construction and biasing.

(2) Explain the terms : Dark current and Saturation current for a photodiode.

(3) Summarize seven crystal divided into fourteen type of Bravais Lattice.

(4) Give a complete mathematical analysis of full wave rectifier.

(5) Describe in details of the i/p and o/p characteristics of CB configurations.
