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**D.K.M.COLLEGE FOR WOMEN (AUTONOMOUS), VELLORE-1**  
**SEMESTER EXAMINATIONS**  
**APRIL - 2017**  
**ALLIED: PHYSICS II**

**15CAPH2A**

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**Time : 3 Hrs**

**Max.Marks : 75**

**SECTION-A (10 x 2 =20)**

**Answer ALL the questions.**

1. Why the de Broglie wave associated with a moving car is not observable?
2. Define "Heisenberg's uncertainty principle is it valid for all kinds of particles".
3. Both positrons and electrons are  $\beta$  particles: what is the difference between positron emission and electron emission?
4. How the carbon dating is done?
5. Which are called Primitive cell? Give examples.
6. Why a covalent bond is directional?
7. Explain principle of fibre optic communication.
8. A step-index fiber has a core index of refraction of  $n_1=1.425$ . The cut – off angle for light entering the fiber from air is found to be  $8.50^\circ$ . If the fiber were submersed in water, what would be the new numerical aperture and cut-off angle? Classify optical fiber.
9. Simplify any five expression in Boolean algebra.
10. Write any 5 application of IC.

**SECTION-B (5 x 5 =25)**

**Answer any FIVE of the following questions.**

11. The kinetic energy of the electron in a ground state hydrogen atom is  $+2.2 \times 10^{-18}$  J. Determine the velocity if the momentum associated with it is  $2.0 \times 10^{-24}$ . Hence calculate its de Broglie wavelength.
12. What are the quantities that are conserved when balancing a nuclear reaction? Explain with an example.
13. Are all isotopes are radioactive? Is carbon 12 & Carbon 14 are isotopes? How do you prevent the development of cancer?
14. Graph the plane and determine the axis intersects of a surface with the Miller Index (013).
15. Describe the silent features of ionic and metallic bonded crystals.
16. Compare the step index and graded index multimode fiber.
17. State de Morgan's theorem.
18. Give at least three merits and demerits of Integrated Circuit fabrication.

**SECTION-C (3 x 10 =30)**

**Answer ALL the questions.**

19. (a) What are matter waves? Explain with an experiment how do you confirm the wave nature of electron?

(Or)

(b) Explain Rutherford's scattering experiment? What are the conclusions which led Rutherford to put forward his model of an atom and nucleus?

20. (a) What is Bragg's law? Arrive at an expression for this law using X-ray diffraction.

(Or)

(b) With a neat block diagram discuss the primary elements of a fiber optic communication system. Mention its merits and demerits.

21. (a) Discuss with a neat sketch the fabrication of IC diode and transistor using monolithic integration technology.

(Or)

(b) Define Threshold energy, Derive an expression for threshold energy.

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