E 8639

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Reg. No.....

Name.....

B.Sc. DEGREE (C.B.C.S.S.) EXAMINATION, OCTOBER 2019

Third Semester

Complementary Course—Physics

QUANTUM MECHANICS, SPECTROSCOPY NUCLEAR PHYSICS, BASIC ELECTRONICS AND DIGITAL ELECTRONICS

(For B.Sc. Mathematics and Statistics)

[2013–2016 Admissions]

Time : Three Hours

Maximum Marks : 60

Part A

Answer **all** *questions briefly.*
Each question carries 1 *mark.*

1. The wave nature and ———— nature complement each other.
2. Photomultiplier tube is based on the principle of ———— electric effect.
3. The work required to remove an electron from an atom in its ground state is called its ———— energy.
4. The quantisation of electron energy in the hydrogen atom is described by the ———— quantum number.
5. The ———— life of a radionuclide is not the same as its mean life time.
6. A lightly doped diode has a higher break-down ————.
7. The binary equivalent of decimal number 46 is ————.
8. The electronic gates are high speed switches made of ————.

(8 × 1 = 8)

Part B

Answer any **six** *questions.*
Each question carries 2 *marks.*

9. State and explain uncertainty principle.
10. Explain box normalisation.
11. State the modifications for Thomson's model for atom.
12. What is Raman scattering ?

Turn over

13. What is meant by packing fraction ?
14. What are the advantages of carbon dating ?
15. Explain doping in semiconductors.
16. Differentiate between positive and negative feedbacks.
17. What are binary numbers ? Explain.
18. What is an OR gate ?

(6 × 2 = 12)

Part C

Answer any **four** *questions.*
Each question carries 4 *marks.*

19. Find the energy of a X-ray photon which can impart a maximum energy of 50 k eV to an electron.
20. Find the wavelength and frequency of 100 MeV photon.
21. Bring out the fine structure, of hydrogen atom.
22. Obtain the relationship between half life and mean life.
23. Differentiate between octal and hexadecimal number systems.
24. Obtain the truth table of NAND gate.

(4 × 4 = 16)

Part D

Answer any **two** *questions.*
Each question carries 12 *marks.*

25. Discuss the photoelectric effect with theory. Give Einstein's explanation.
26. Describe Rutherford's atom model. Compare and contrast it with Bohr atom model.
27. Give an account on nuclear constituents along with properties.
28. State and prove De-Morgans' theorems.

(2 × 12 = 24)