E 8640 (Pages : 2) Reg. No.....

Name.....

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

Third Semester

Complementary Course—Physics–QUANTUM MECHANICS, SPECTROSCOPY, NUCLEAR PHYSICS AND ELECTRONICS

[For B.Sc. Chemistry and B.Sc. Geology]

(2013—2016 Admissions)

Time : Three Hours Maximum Marks : 60

Part A

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

1. The ability of a body to radiate energy is closely related to its ability to ———— radiation.
2. For alkali metals even visible light produces ———— electric emission.
3. A moving body behaves as if it has a ———— nature.
4. The electron orbit of the electron in a hydrogen atom is one ———— wavelength in circumference.
5. All atomic nuclei are made up of ———— and neutrons.
6. Nuclear fission can be explained on the basis of the liquid drop model of the ————.
7. In forward bias the external field reduces the ———— barrier of the p-n junction.
8. A ———— transfers a signal from a low resistance region to a high resistance region.

(8 × 1 = 8)

Part B

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

9. Explain de Broglie hypothesis.
10. What are normalised wave functions ?
11. Differentiate between stoke and antistoke lines.
12. List the merits of relativistic atom model due to Somerfield.
13. How packing fraction is different from binding energy ?

Turn over

14. What is meant by artificial radioactivity ? Explain.
15. State the fundamental principle of atom bomb.
16. What is meant by breeder reactor ?
17. Explain negative feedback.
18. What is ripple factor ?

(6 × 2 = 12)

Part C

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

19. Find the de Broglie wavelength of an electron with a velocity of 10^6m/s.
20. Obtain the conditions for normalisation of wave functions.
21. Find the atomic mass of $_{10}Ne^{20}$ if the binding energy of neon is 160 MeV.
22. Calculate the density of the $_{12}C^6$ nucleus.
23. The applied input ac power to a half wave rectifier is 100 Watts. The dc output power obtained is 40 Watts.What is the rectification efficiency ?
24. Explain the action of a Zener diode as a voltage stabiliser with a circuit diagram.

(4 × 4 = 16)

Part D

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

25. Obtain the Schrodinger equation in time dependent form and obtain steady state equation.
26. Discuss the rotational energy levels of a diatomic molecule taking it as a rigid rotor.
27. Bring out the theory and experimental evidences for nuclear fission.
28. Describe the rectification process due to a full wave bridge rectifier with circuits and graphs.

(2 × 12 = 24)