Reg. No……. Name…… **18U330**

B. Sc. DEGREE END SEMESTER EXAMINATION - OCTOBER 2018

SEMESTER – **3, PHYSICS (COMPLEMENTARY FOR B.Sc. CHEMISTRY)**

COURSE: **15U3CPPHY6: – QUANTUM MECHANICS, SPECTROSCOPY, NUCLEAR PHYSICS, ELECTRONICS**

(For Regular - 2017 Admission and Supplementary / Improvement 2016, Supplementary 2015 & 2014 Admissions)

Time : Three Hours Max. Marks : 60

PART A

(Answer ***all*** questions. Each question carries 1 mark)

1. Explain Planck's hypothesis.
2. What are matter waves?
3. What are the principal spectral series of hydrogen atom?
4. State uncertainty principle.
5. What is packing fraction?
6. What are magic numbers?
7. Draw the input characteristics of common emitter mode.
8. Explain mass defect with respect to a nucleus.
9. Explain nuclear fission.
10. Write down the relation between the current gains α and β. (1 x 10 = 10)

PART B

(Answer any ***Seven*** Questions. Each question carries 2 marks)

11. What is meant by a normalized wave function?
12. Explain the laws of radioactivity.
13. Explain proton-proton cycle.
14. Write a brief note on Bohr atom model.
15. How is a Zener diode different from an ordinary diode?
16. Homonuclear diatomic molecules do not show vibrational spectra. Why?
17. Define the quantities half-life and mean life.
18. Write a note on vector atom model.
19. Explain the input characteristics common base configuration.

(2 x 7 = 14)

PART C

(Answer any ***four*** questions. Each question carries 4 Marks)

20. Compute the de Broglie wavelength of an electron having kinetic energy (i) 1eV (ii)100MeV
21. Calculate the radioactive decay constant for an element whose half-life is 20 years.
22. The average spacing between adjacent rotational lines of CO molecule is 3.8626 cm^{-1}. Calculate the length of the CO bond.

23. The wavelength of first line of Balmer series is 6563 Å. Calculate Rydberg constant.
24. A 9 V voltage regulated supply is required to run a car stereo system from 12 V battery. A Zener diode with V_Z= 9 V and P_{max} =0.25 W is used as a voltage regulator. Find the value of the series resistor.
25. How many fissions take place per second in a 300 MW reactor? Assume that 200 MeV is the energy released per fission.

(4 x 4 = 16)

PART D

(Answer any ***two*** questions. Each carries 10 marks)

26. With necessary theory, explain Davison – Germer experiment. What are the inferences? Explain the results.
27. Explain the rotational spectra of rigid diatomic molecules.
28. What is nuclear fission? Explain nuclear fission on the basis of liquid drop model.
29. Explain the rectifying action of a p-n junction diode. With the help of a neat circuit diagram, explain the working of a full wave rectifier using two diodes.

(10 x 2= 20)

****