



QP CODE: 18103344



18103344

Reg No :

Name :

B.Sc. DEGREE (CBCS) EXAMINATION, NOVEMBER 2018

Third Semester

COMPLEMENTARY COURSE - PH3CMT01 - PHYSICS-MODERN PHYSICS AND ELECTRONICS

(Common to B.Sc Mathematics Model I, B.Sc Statistics Model I)

2017 Admission Onwards

F6E607DA

Maximum Marks: 60

Time: 3 Hours

Part A

Answer any **ten** questions.

Each question carries **1** mark.

1. Explain the concept of spin of electron.
2. What is Gyromagnetic ratio?
3. Explain the uses of carbon dating.
4. Show that Planck's law reduces to Wein's law at high frequency radiations.
5. Write down the Schrodinger equation for a time dependent free particle in one dimension.
6. What is Raman effect?
7. Draw the forward and reverse characteristics of a junction diode.
8. Name the breakdown mechanism in a highly doped p-n junction under reverse biased condition.
9. Why CE configuration is preferred to other configuration.
10. Convert the binary number 1100 0110 into the hexadecimal number.
11. What is a truth table?
12. The Boolean function $A+BC$ is reduced form of ____.

(10×1=10)

Part B

Answer any **six** questions.

Each question carries **5** marks.

13. Calculate the binding energy per nucleon ${}_{92}\text{U} 238$ from the following data.
 $M({}^1\text{H}1)=1.008142\text{u}$, $M({}^0\text{n}1)=1.0089821\text{u}$, $M({}^{92}\text{U}238)=238.12493\text{u}$.
14. The half-life of a radioactive sample is 1 year. Calculate its mean life.





15. Determine the activity of 1 mg of a radioactive substance having atomic mass 222amu. Given the half-life is 3.8 days.
16. A photon with a wavelength of 1.5×10^{-8} m is emitted from an ultraviolet source into a vacuum. a. Calculate the energy of the photon. Calculate the de Broglie wavelength of an electron with kinetic energy equal to the energy of the photon.
17. The J=0 to J=1 absorption line of CO occurs at frequency 1.153×10^{11} Hz, Calculate the M.I, bond length of the molecule for J=1.
18. A full wave rectifier using four diodes of constant forward resistance of 1.5Ω is used to rectify an ac voltage of rms value 12 V. If the load resistance is 167Ω , calculate the maximum and mean load current.
19. Draw and compare the output waveform of full wave and half wave rectifier.
20. Write a short note on the significance of binary number in digital electronics.
21. By converting the following decimal numbers into binary, perform the subtraction between them using 2's complement method. (a) $10 - 28$ (b) $26 - 13$.

(6×5=30)

Part C

Answer any **two** questions.

Each question carries **10** marks.

22. Give an account of the Bohr model of atom. Explain the origin of spectral lines of hydrogen on the basis of this theory.
23. What is box normalization? Obtain the Eigen values and normalized Eigen functions of a particle confined to a one dimensional rectangular box.
24. Explain the working of a Zener diode. Describe its V-I characteristics.
25. State the De Morgan's theorems. Prove them by the method of pure induction illustrating the logical operations in a table.

(2×10=20)

