Reg. No…………………...……..Name………………………………

BSC DEGREE END SEMESTER EXAMINATION – OCTOBER 2015

SEMESTER-**3**: **PHYSICS COMPLEMENTARY COURSE FOR BSc MATHS**
COURSE: **U3CPPHY5 - QUANTUM MECHANICS, SPECTROSCOPY NUCLEAR PHYSICS,**
BASIC ELECTRONICS AND DIGITAL ELECTRONICS

Time: 3 Hours   Max. Marks: 60

PART-A

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

1. Explain the planck's quantum Hypothesis.
2. State Einstein's photoelectric equation. Explain its symbols.
3. What is threshold wavelength for photo emission?
4. What are the drawbacks of Ruther ford's nuclear atom model?
5. State the Postulate of Bohr atom model.
6. Distinguish between Stoke's and Antistoke's lines.
7. Draw the V- I characteristics of P-N junction diode.
8. Explain the term half-life of radioactive element.
9. Convert 29 in to binary number.
10. What is the next number to the hexa decimal number 835C.   (1 x 10 = 10)

PART B

(Answer any **seven** questions. Each question carries **2** Marks)

11. Explain the deBrogle's hypothesis.
12. What are the quantum numbers associated with the vector atom model? Explain.
13. Explain "mass defect" with respect to a nucleus.
14. What do you understand by the binding energy of the nucleus?
15. Draw the output characteristics of transistor in CE configuration and mark the saturation and cutoff regions.
16. Explain the function of an OR gate. Sketch the truth table.
17. State the first and second De Morgan's theorems.
18. Diatomic molecules such as HF, HCl show rotational spectrum whereas O_2, H_2 do not.Why?
19. Explain the effect of isotopic substitution on the rotational spectrum of molecules.

$(2 \times 7 = 14)$

PART C

(Answer any **four** questions. Each question carries **4** Marks Necessary data are taken from Clerk's table)

20. A Sodium surface with a work function 2.28 eV is illuminated by light of wavelength400nm. Find the maximum kinetic energy and speed of the photo electrons emitted.

PTO

21. Compute the de Broglie wavelength of an electron having kinetic energy 1eV.

22. Give the block diagram and truth table of half adder. Explain its working.

23. Obtain the binding energy of the nuclei $_{26}Fe^{56}$ in units of Mev from the following data m_H -1.007825 u; m_n – 1.008665 u; $m[_{26}Fe^{56}]$ – 55.934939 u.

24. When the base current in a common emitter transistor is 15µA the collector current is 1.875mA, at constant collector emitter voltage. Find the value of β.

25. A carbon specimen found in a cave contained 1/8 as much $_6C^{14}$ as an equal amount of carbon in living matter. Calculate the approximate age of the specimen. Half-life period of $_6C^{14}$ is 5568 years.   (4 x 4 = 16)

PART D

(Answer any **two** questions. Each question carries **10** Marks)

26. Describe Davission and Germer experiment for the study of electron diffraction. What are the results of the experiment?

27. What is Raman scattering ? Give the quantum theory of Raman scattering. Why anti-Stokes lines are less intense than Stokes lines?

28. With a neat diagram describe the action of a full wave bridge rectifier. Compare its merits over that of a center tap full wave rectifier.

29. What are the basic laws of radioactive disintegration? Derive an expression for the mean life of a radioactive element.   (10 x 2 = 20)

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