Reg. No. : ....

Name : ....

IV Semester B.Sc. Degree (CCSS – Reg./Supple./Improv.)
Examination, May 2014
COMPLEMENTARY COURSE IN PHYSICS
4C04 Phy : Modern Physics and Electronics

Time : 3 Hours

Max. Weightage : 30

SECTION – A

Choose the correct answer; **Each** bunch carries a weightage of **1**.

1. i) For a transistor the value of $\beta = 50$, the value of the parameter α is

   a) $\dfrac{50}{51}$　　　b) $\dfrac{49}{50}$　　　c) $\dfrac{50}{49}$　　　d) None of the above

   ii) Barkhausen criterion for sustained oscillation is

   a) $|A\beta| < 1$　　b) $|A\beta| > 1$　　c) $|A\beta| = 0$　　d) None of the above

   iii) The inverter is a

   a) NOT gate　　b) OR gate　　c) AND gate　　d) None of the above

   iv) Which of the following radiations possess the maximum penetrating power ?

   a) α-rays　　b) β-rays　　c) γ-rays　　d) None of the above

2. i) The planet appears red in colour

   a) Mars　　b) Venus　　c) Mercury　　d) None of the above

   ii) The particles with integer spin obey the Bose-Einstein statistics are called

   a) Fermions　　b) Bosons　　c) Hyperons　　d) None of the above

iii) In Frenkel's defect, the displaced atom is called

    a) Anion   b) Cation   c) Hole   d) None of the above

iv) In crystal imperfections, the lattice sites from which atoms are missing are called

    a) Vacancies   b) Impurities

    c) Dislocations   d) None of the above   (2×1=2)

SECTION – B

Answer **any six**. **Each** question carries a weightage of **1**.

3. What are the classifications of amplifiers based on transistor configuration ?

4. What are the main parts of a transistor oscillator ?

5. What are logic gates ? Give two examples.

6. Draw the circuit symbol of a three input OR gate.

7. How the Sun and stars get their energy ?

8. What is a H-R diagram ?

9. What is screw dislocation ?

10. Write a short note on imperfection in crystals.   (6×1=6`

SECTION – C

Answer **any nine**. **Each** question carries a weightage of **2**.

11. What is an oscillatory circuit ? Explain the Barkhausen criterion for oscillations.

12. Write a short note on digital integrated circuit.

13. Define half life of a radioactive element.

14. 1 gram of a radioactive substance disintegrates at the rate of 3.7×10^{10} disintegrations per sec. The atomic weight of the substance is 226. Calculate its mean life.

15. Draw the circuit symbol and truth table of AND gate.

16. What is a Full adder ? Write down its truth table.

17. Explain the principle of Breeder reactor.

18. Give an account of classification of stars.

19. Briefly explain stellar evolution.

20. What are the basic ideas of Quarks ?

21. Explain the different types of surface defects.

22. Discuss the elementary particle quantum numbers. (9×2=18)

SECTION – D

Answer **any one**. **Each** question carries a weightage of **4**.

23. With neat circuit diagram, explain the principle and working of a Hartley oscillator.

24. Write a short note on the following :
    a) Black holes
    b) Elementary particles. (1×4=4)

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