K23U 0241

**VI Semester B.Sc. Degree (C.B.C.S.S. – Supplementary)
Examination, April 2023
(2017 to 2018 Admissions)
CORE COURSE IN PHYSICS
6B14PHY : Electronics – II**

Time : 3 Hours

Max. Marks : 40

Instruction : Write answers in **English** only.

SECTION – A

(Answer **all** – Very short answer type – **Each** question carries **one** mark.)

1. A device used to convert a binary number to a 7 segment display format is _____

2. The output carry of a full adder for the inputs 011.

3. For a transistor _____ junction should be forward biased.

4. An amplifier employees _____ feedback.

SECTION – B

(Answer **any seven** – Very short answer type – **Each** question carries **two** marks.)

5. Why dual power supplies are used in Op-Amp ?

6. State and explain Demorgan's theorem.

7. What is voltage follower ?

8. How load line is useful in amplifiers ?

9. Convert the decimal number 87 into binary.

10. What will be the base current of a transistor of $\alpha = 0.99$ and $I_E = 8$ mA ?

11. What is the necessity of large CMRR value in differential amplifier ?

12. What is a feedback circuit ?

13. What is the differential input voltage in amplifiers ?

14. Draw the block diagram of half adder and write down its truth table.

SECTION – C

(Answer **any four** – Short essay/problem type – **Each** question carries **three** marks.)

15. A certain amplifier has voltage gain of 50. To reduce the distortion present in it, 10% negative feedback is employed. Calculate the voltage gain with feedback.

16. Obtain the output of a summing amplifier with following data.
Inputs are $V_1 = 0.1V$, $V_2 = 0.3$ V, $V_3 = 0.5V$, $R_1 = 2k\Omega$, $R_2 = 3k\Omega$ and $R_3 = 4k\Omega$ and the feedback resister R = 12kΩ.

17. Show that $A(A + B) = A$.

18. Determine the operating frequency and the feedback fraction for Colpitt's oscillator. Given $C_1 = 0.001$ μF, $C_2 = 0.01$ μF and L = 10 μH.

19. Briefly explain the concept of negative feedback and derive the expression for gain with feedback.

20. A multistage amplifier having an overall gain 150. The gain is reduced to 20 when negative feedback is applied. Calculate the fraction of the output that is feedback to the input.

SECTION – D

(Answer **any two** – Long essay type – **Each** question carries **five** marks.)

21. With the help of a diagram, explain the action of phase shift oscillator. Discuss its merits and demerits.

22. Draw the circuit diagram and explain the working of differentiator using Op-Amp. Also derive the expression for its output.

23. Draw the circuit diagram of a single stage transistor amplifier. Describe it's working with necessary theory and explain frequency response.

24. Use a Karnaugh map to minimize the following standard SOP expressions.
$\bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}B\bar{C}\bar{D} + AB\bar{C}\bar{D} + \bar{A}BC\bar{D} + A\bar{B}C\bar{D} + \bar{A}BC\bar{D} + \bar{A}B\bar{C}D + ABC\bar{D} + A\bar{B}C\bar{D}$