Reg. No. : ...............................

Name : ...............................

**V Semester B.Sc. Degree (CBCSS – OBE-Regular/Supplementary/
Improvement) Examination, November 2022
(2019 Admission Onwards)
CORE COURSE IN PHYSICS
5B09PHY : Electronics – II**

Time : 3 Hours                                                                     Max. Marks : 40

### PART – A

Short answer questions. Answer **all** questions, **each** question carries 1 mark.

1. Write any important characteristics of an emitter follower.
2. Draw the logic circuit for the Boolean expression A(B + CD).
3. Mention any two advantages of negative feedback.
4. Write the expression for power gain in dB.
5. The expression for frequency of phase shift oscillator is
6. Draw three variables of K-map format.                                  **(6×1=6)**

### PART – B

Short essay questions. Answer **any 6** questions, **each** question carries 2 marks.

7. Explain Barkhausen criterion of oscillator.
8. Sketch a typical frequency response graph for an amplifier and identify the upper and lower cutoff frequencies and bandwidth.
9. Explain crossover distortion in a class B amplifier. How it is eliminated ?
10. Define $h_{ie}$ and $h_{oe}$ and how these parameters may be derived from the transistor characteristics ?
11. Develop a truth table for the standard SOP expression $\overline{A}\,\overline{B}\,C + A\,\overline{B}\,\overline{C} + A\,B\,C$.
12. Design 2-bit comparator.
13. Construct a difference amplifier. Write its output voltage.
14. What is meant by CMRR ? Explain the significance of a relatively large value of CMRR.                                                                   **(6×2=12)**

P.T.O.

### PART – C

Problems. Answer **any 4** questions, **each** question carries 3 marks.

15. A transformer coupled class A amplifier with following circuit parameters. Draw dc and ac load lines. $V_{CC}$ = 13 V, $R_1$ = 4.7 kΩ, $R_2$ = 3.7kΩ, $R_E$ = 1 kΩ and $R_L$ = 56 Ω. The transformer primary winding resistance $(R_{PY})$ = 40Ω and number of turns in primary and secondary are $N_1$ = 74 and $N_2$ = 14.
16. With neat circuit diagram explain action of direct coupled two stage CE amplifier.
17. Draw the circuit diagram of an op-amp Wein bridge oscillator and explain the circuit operation.
18. Map the following SOP expression on a Karnaugh map : $\overline{A} + A\overline{B} + AB\overline{C}$.
19. Suppose a three-valuable truth table has a high output for these input conditions : 000, 010, 100 and 110. What is the sum-of-products circuit ?
20. With a neat circuit diagram discuss the operation of an op-amp integrator. Obtain the expression for the voltage gain.                           **(4×3=12)**

### PART – D

Long essay questions. Answer **any 2** questions, **each** question carries 5 marks.

21. What are the characteristics of an op-amp ? Construct inverting and non-inverting amplifier. Obtain its expression for gain.
22. Construct Half Adder using logic gates. Design a Full Adder using a Half Adder.
23. Draw a sketch to illustrate the principle of series voltage negative feedback and briefly explain. Derive an expression for voltage gain, input impedance and output impedance of an amplifier employed with series voltage negative feedback.
24. Sketch the circuit of a two-stage capacitor-coupled common emitter amplifier and briefly explain its operation. Draw its h-parameter equivalent circuit and write equation for $Z_i$, $Z_o$.                                       **(2×5=10)**