

Reg. No. : .....

Name : .....

**VI Semester B.Sc. Degree (CBCSS – Reg./Supple./Improv.)**  
**Examination, April 2021**  
**(2014 – 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. AC load line of a transistor is \_\_\_\_\_ than its dc load line.
2. Virtual ground in an op-amp is a point in the circuit which has zero voltage and \_\_\_\_\_.
3. The dimension of  $h_{ie}$  parameter is \_\_\_\_\_.
4. With negative feedback input impedance is \_\_\_\_\_.

**SECTION – B**

Answer any **seven**. **Short** answer type. **Each** question carries **two** marks.

5. Define CMMR.
6. State the characteristics of an ideal op-amp.
7. Distinguish between Oscillators and amplifiers.
8. What is Class B Amplifier ?
9. Draw the circuit diagram of a Colpitts oscillator with labels on the components. Give expression for its frequencies.
10. How will you achieve impedance matching with transformer coupling ?



11. What are Encoders and Comparators ?
12. Explain the following terms :
  - i) Frequency response.
  - ii) Decibel gain.
13. State and explain De Morgan's Laws.
14. How does negative feedback increase bandwidth of an amplifier ?
15. What are h-parameters ? Why are they called so ?
16. What is meant by A.C. Load line of transistor circuit ?
17. Differentiate Common mode and difference mode signals.
18. Define Barkhausen criterion for sustained oscillation.

## SECTION – C

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

19. Using Karnaugh map, prove the following :  

$$A\bar{C}\bar{D} + A\bar{B}D + AC\bar{D} = A(\bar{B} + \bar{D})$$
20. A transformer coupling is used in the final stage of a multi stage amplifier. If the output impedance of transistor is  $1k\Omega$  and the speaker has a resistance of  $10\Omega$ , find the turn ratio of the transformer so that maximum power is transferred to the load.
21. A certain amplifier has voltage gain of 15 dB. If the input signal voltage is 0.8 V, what is the output voltage ?
22. The gain of an amplifier without feedback is 500 and with negative feedback the gain is 100. Determine the feedback fraction. If after sometime, the gain without feedback falls to 20%, find the percentage fall in gain with feedback.
23. Calculate the voltage gain of an emitter follower. Given that the emitter resistance  $R_E = 3.3k\Omega$  and the emitter current is 2.062 mA.



24. To the input of an integrating op-amp a steady voltage of 12 V is applied over a time interval of 3s. If  $R = 15k\Omega$  and  $C = 100\mu F$ , calculate the output voltage.
25. Show that  $A + CB = (A + B)(A + C)$ .
26. Using Boolean Algebra, verify that  $\overline{(\bar{A} + B)} + \overline{(\bar{A} + \bar{B})} = A$ .

## SECTION – D

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

27. Distinguish a half adder and full adder. With neat diagram describe the working with truth table.
28. Explain the working of a non inverting amplifier. Derive its expression for voltage gain.
29. Describe the term feedback in amplifiers. Explain the principle of negative feedback and discuss the advantages of negative feedback.
30. What is an OPAMP ? State the characteristics of an ideal OP-AMP. Describe the use of OPAMP as Summing amplifier.
31. Explain the working of a transformer coupled Class A power amplifier. Obtain an expression for its efficiency.
32. What is a power amplifier ? Distinguish between Class A, Class B and Class C amplifiers.