

B.Sc. DEGREE (C.B.C.S.S.) EXAMINATION, OCTOBER 2015**Third Semester****Core Course—ELECTRONICS**

(Common for B.Sc. Physics Model I—B.Sc. Physics Model II B.Sc. Physics—EEM,
B.Sc. Physics—Instrumentation)

[2013 Admissions onwards]

Time : Three Hours

Maximum : 60 Marks

Part A (Short Answer Questions)

Answer all questions.

1 mark each.

1. What is meant by peak inverse voltage ?
2. Explain the term static and dynamic resistances of a PN-junction diode.
3. What is Q point of a transistor ?
4. What is known as thermal run away in a transistor ?
5. Explain the switching action of a transistor.
6. Why is negative feedback employed in high gain amplifier ?
7. What is called Barkhausen criterion ?
8. Define the term percentage modulation in Amplitude Modulation.

(8 × 1 = 8)

Part B (Brief Answer Questions)

Answer any six questions.

2 marks each.

9. What are the differences between zener break down and avalanche breakdown ?
10. Explain the working of a clipper circuit with neat diagram.
11. What is a filter circuit ? How does a π section filter work ?
12. Define β of a transistor. Show that $\beta = \frac{\alpha}{1 - \alpha}$.
13. Briefly describe the working of a FET.
14. How can we analyze a transistor amplifier using h -parameter ?

Turn over

15. Explain the operation of a push-pull class B transistor amplifier.
16. How can we use an operational amplifier as :
 - (a) inverting amplifier ;
 - (b) non-inverting amplifier.
17. Explain the advantages of FM over AM.
18. Explain the working of a modulating amplifier circuit with a neat diagram.

(6 × 2 = 12)

Part C (Problems/Descriptive)

*Answer any four questions.
4 marks each.*

19. A zener regulator has $V_z = 12V$. The input voltage is constant at 24V and the value of series resistance is 160Ω . The output load varies from 200Ω to ∞ . Calculate :
 - (i) the current through the series resistor ;
 - (ii) minimum load current ;
 - (iii) maximum zener current.
20. A class A power amplifier has zero signal collector current of 50mA. If the collector supply voltage is 5V, find :
 - (i) the maximum a.c. power out put ;
 - (ii) the power rating of transistor ;
 - (iii) the maximum collector efficiency.
21. In a CE transistor circuit, collector load is $4k\Omega$. whereas the zero signal collector current is 1mA.
 - (i) What is the operating point if $V_{cc} = 10V$ and ;
 - (ii) what will be the operating point if $R_c = 5k\Omega$.
22. Calculate the :
 - (i) operating frequency and ;
 - (ii) feed back fraction for Hartley oscillator if the inductance in the tank are $L_1 = 100\mu H$ and $L_2 = 100\mu H$ and $C = 20pF$.
The mutual inductance between the coils $M = 20\mu H$.
23. The maximum peak to peak voltage of an AM wave is 16mV and the minimum peak to peak voltage is 4mV. Calculate the modulation factor.
24. Explain the working of a voltage quadrupler with a neat diagram.

(4 × 4 = 16)

Part D (Long Answer / Problem Questions)

Answer any two questions.

12 marks each.

25. What is a full wave bridge rectifier ? Explain its working with a neat diagram. Derive the expression for efficiency and ripple factor.
26. Why the biasing is needed in transistor amplifiers ? Briefly explain the various biasing methods in CE transistor amplifiers.
27. What is an OP-AMP ? Discuss in detail, its applications.
28. Give a detailed description of modulation and modulation techniques.

(2 × 12 = 24)