E 8514 (Pages : 2) Reg. No.....

Name.....

B.Sc. DEGREE (C.B.C.S.S.) EXAMINATION, OCTOBER 2019

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—2016 Admissions]

Time : Three Hours Maximum Marks : 60

Part A

Answer **all** *questions briefly.*
Each question carries 1 *mark.*

1. A *p-n* junction is fabricated by a special technique called ———.
2. Knee voltage is the ——— voltage at which the current through the junction starts to increase rapidly.
3. The current gain is very ——— in common emitter configuration.
4. The operating point should be ——— of transistor parameter variations.
5. The current in a FET is due to ——— carriers only.
6. When the feedback energy is out of ——— with the input signal, it is called negative feedback.
7. An operational amplifier is a ——— gain direct coupled amplifier.
8. The modulated carrier waves carry the ——— signal through space at the velocity of light.

(8 × 1 = 8)

Part B

Answer any **six** *questions.*
Each question carries 2 *marks.*

9. Differentiate between static and dynamic resistances of a diode.
10. Explain the filtering action of a π section filter.
11. What is a clipper circuit ? Explain.
12. Obtain the relation between α and β for a transistor.
13. What is meant by load line ? Explain.
14. Explain self bias for transistors.
15. State the characteristics of an ideal op-amp.
16. Define modulation index for AM.

Turn over

17. Give the basic principle of emitter follower.

18. What is meant by virtual ground ? Explain.

(6 × 2 = 12)

Part C

Answer any **four** *questions.*
Each question carries 4 *marks.*

19. A half wave rectifier is connected to 10 : 1 transformer operating at 250 V–50 Hz power line. It is used to drive a 20 ohm load. Sketch the circuit. Calculate the voltage across the load and obtain PIV.

20. Bring out the voltage regulation using a Zener diode.

21. The current gain of a *npn* transistor is 0.98. It is connected in CB mode and gives $I_{CO} = 12\ \mu A$. Find I_C for I_E for = 2 mA.

22. An AM radio transmitter radiates 20 kW at modulated index 75 %. Find carrier power.

23. Calculate the input impedance and the voltage gain of the OPAMP amplifier circuit. Given $Z_1 = 3.5\ k\Omega$. and $Z_2 = 15\ k\Omega$.

24. The carrier swing of a FM wave is 80 kHz. Find modulation index for a signal of frequency 8 kHz.

(4 × 4 = 16)

Part D

Answer **two** *questions.*
Each question carries 12 *marks.*

25. Explain the theory, with a circuit diagram, the action of a full wave rectifier using a centre tap transformer.

26. Discuss the working of voltage doubler, tripler and quadrupler with proper circuits.

27. Describe the experimental setup to draw the characteristics of transistor in CB and CE modes.

28. Explain the difference between voltage and power amplifiers. Distinguish between class A, class B and class C amplifiers. Why are power amplifiers classified on the basis of mode of operations ?

(2 × 12 = 24)