

E 5646

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Reg. No.....

Name.....

B.Sc. DEGREE (C.B.C.S.S.) EXAMINATION, OCTOBER 2018

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. Due to diffusion of free carriers across the junction, a _____ layer is formed on either side of the $p-n$ junction.
2. Zener diode is a highly doped _____ junction with a high resistance.
3. For a full wave voltage doubler, the ripple frequency is _____ the input frequency.
4. The forward bias on emitter - base junction causes the _____ current to flow in a $n-p-n$ transistor.
5. Faithfull _____ is the process of raising the strength of a weak signal without any change in its shape.
6. The p -region of the n -channel MOSFET is called _____.
7. Negative _____ feedback increases the bandwidth of the amplifier.
8. Demodulation is the process in which the _____ signal is recovered from the modulated wave.

(8 × 1 = 8)

Part B

Answer any six questions.

Each question carries 2 marks.

9. Explain avalanche breakdown of a diode.
10. Differentiate between shunt capacitor and series induction filtering.
11. What is meant by clamper circuit ? Explain.
12. Explain thermal runaway in transistors.

Turn over

13. What is voltage divider biasing ? Explain.
14. How FET is more efficient than an ordinary transistor ?
15. List the features of h -parameters.
16. State the fundamentals of phase-shift oscillators.
17. Why carrier waves are necessary for modulation ? Explain.
18. What is diode detector ?

(6 × 2 = 12)

Part C

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

19. A half wave rectifier with filter has an input voltage $200 \sin \omega t$. The diode resistance is 2 K. ohm and the load resistance is 10 K. ohm. Calculate maximum current and DC power output.
20. For a transistor $\beta = 45$ and voltage drop across 1 K. ohm which is connected in the collector circuit is one volt. Find the base current for common emitter connection.
21. A transistor uses potential divider method of biasing. $R_1 = 50 \Omega$, $R_2 = 10 \Omega$ and $R_E = 1k \Omega$. If $V_{CC} = 12 V$, find the value of I_C when $V_{BE} = 0.3 V$.
22. An amplifier has a gain of 300. When negative feedback is applied the gain is reduced to 240. Find the feedback ratio.
23. For an inverting amplifier $Z_1 = 1 K.ohm$ and $Z_2 = 1 M ohm$. Determine the voltage gain, input resistance and output resistance in the case of an ideal OP-AMP.
24. The centre frequency of a FM carrier is 105 MHz. The highest frequency of modulating signal is 105.04 MHz when modulated by a signal of 8 kHz. Find modulation index.

(4 × 4 = 16)

Part D

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

25. Bring out positive, negative and biased clipping circuits with salient features.
26. Discuss the action of a full-wave rectifier with mathematical support.
27. Design Colpitt's oscillator for a frequency of your own choice and establish your circuitry. Bring out Hartley oscillator too.
28. Describe amplitude modulation with the theory of side bands.

(2 × 12 = 24)