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B.Sc. DEGREE (C.B.C.S.S.) EXAMINATION, OCTOBER 2016

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 Admission onwards]

Time : Three Hours

Maximum : 60 Marks

Part A (Short Answer Questions)

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

1. Diffusion capacitance is the capacitance shown by a pn junction under _____ bias.
2. The _____ filter shows ripple factor independent of the load.
3. The PIV rating of the diode used in bridge rectifier is _____.
4. Cross-over distortion is present in class _____ amplifier.
5. Emitter follower circuit uses _____ configuration of the transistor.
6. The type of negative feedback in Emitter follower is _____.
7. The amplitude Modulation index ranges from _____ to _____.
8. _____ oscillator is required when highly stable frequency oscillations are to be produced.

(8 × 1 = 8)

Part B (Brief Answer Type questions)

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

9. State the diode current equation and explain each term in it.
10. Explain the mechanism of Zener breakdown.
11. Describe the working of a positive clamper.
12. Compare the *four* properties of CB and CE configurations.
13. What is thermal runaway ? Why CE configuration exhibits the same, whereas CB configuration is not ?
14. Define load line ? What is its significance in the design of an amplifier ?

Turn over

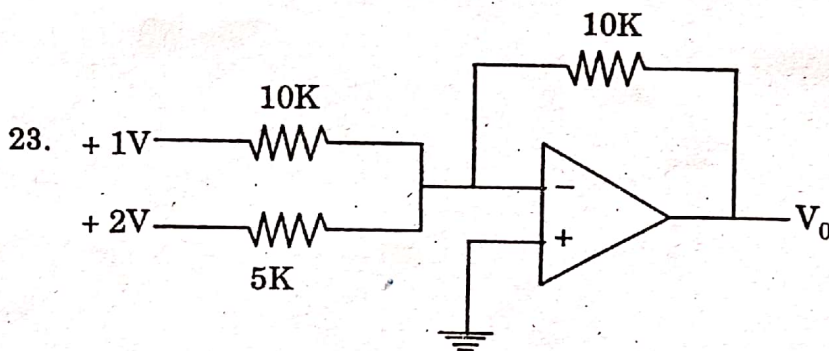
15. How FET can be used as VVR ?
16. Prove that stability increases with negative feedback in amplifiers.
17. List four properties of an op-amp giving typical values for practical op-amp and in ideal case.
18. Define FM ? Give the expression for modulation index for FM ?

(6 × 2 = 12)

Part C (Short Essays/Problems)

Answer any four questions.
Each question carries 4 marks.

19. Derive expressions for (i) Ripple factor ; (ii) Efficiency of rectification of bridge rectifier.
20. Draw and design a Zener shunt voltage regulator for $V_0 = 5V$, I_L varying between 5 mA and 15 mA.
21. A Silicon transistor having $\beta = 150$ measures $150 \mu A$ base current. Calculate α , I_E and I_C . Derive the formula used.
22. Draw a non-saturated transistor CE switch calculate the values for R_B and R_C . $V_{CC} = 10V$, $V_{in} = 1.2 V$.



calculate the value of V_0 in the above.

24. The transmitter antenna current is 8 Amp when there is no modulating signal. The current increases to 8.2 Amp. When amplitude modulation is present. Calculate the modulation index.

(4 × 4 = 16)

Part D (Long Answer Type Questions)

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

25. With related waveforms, explain the working of C, L, LC and π filter used in a centre tapped full wave rectifier. Give expressions for ripple factor in each case.
26. Draw the circuit of a voltage divider bias CE amplifier and explain the function of each component.
27. Draw the circuit of a tuned collector oscillator and explain how sustained oscillations are produced.
28. Draw the circuit of a diode detector for AM demodulation. Show the modification in a practical detector circuit and explain.

(2 × 12 = 24)

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