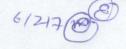
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Exam. Code : 103205 Subject Code: 1412

B.A./B.Sc. 5th Semester PHYSICS (Electronics)

Paper-B

Time Allowed—3 Hours [Maximum Marks—35

Note: Section A is compulsory. Attempt one question from Sections B, C, D and E.

SECTION-A

- (a) What is the difference between an ideal voltage 1. source and practical voltage source?
 - What is the charge on a p-type or n-type (b) semiconductor?
 - Describe the filtering action of a capacitor. (c)
 - (d) Why the base of a transistor is made very thin as compared to that of emitter and collector?
 - Calculate the gain of a negative feedback amplifier (e) with an internal gain, A = 100 and feedback factor,

$$\beta = \frac{1}{10}.$$

- Why at least three RC sections are used in Phase (f) shift oscillator?
- What is the power dissipation in the Zener diode? (g) $7 \times 1 = 7$

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SECTION-B

- Discuss the difference between the centre tapped and bridge type Full Wave Rectifier (FWR). Show that the Peak Inverse Voltage (PIV) becomes half in a bridge rectifier in comparison to a centre tapped rectifier.
- 3. Discuss and draw the I-V characteristics of a p-n diode and show that total current through it is given by the expression $I = \left[exp \left(\frac{eV}{kT} \right) 1 \right]$, where symbols have their usual meanings.

SECTION-C

- Define stability factor. Draw a fixed bias circuit diagram and derive an expression for its stability factor. Also give advantages of this technique.
- 5. Explain the terms saturation voltage and saturation current in connection with a common source drain characteristics. How do they vary when gate reverse bias increases?

SECTION-D

6. Draw the low frequency h-parameters equivalent circuit of a CE transistor amplifier. Derive expressions for input resistance, output resistance, current gain, voltage gain and power gain.

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(Contd.)

7. Show that negative feedback (a) reduces the phase distortion of an amplifier and (b) improves the gain stability and reduces the noise level of an amplifier.

SECTION-E

- 8. Describe the operation of a tuned collector oscillator from the circuit diagram. Derive the condition from the sustained oscillations.
- Draw the circuit diagram of a phase shift oscillator and explain its working.

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