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(6th Semester)

PHYSICS

TWELFTH (B) PAPER

(**Electronics—II**)

Full Marks : 55

Time : 2½ hours

(PART : B—DESCRIPTIVE)

(*Marks : 35*)

*The figures in the margin indicate full marks
for the questions*

1. With the help of a neat circuit diagram, explain the working of Anderson's AC bridge. Obtain the two balance conditions and also discuss how they can be used to measure inductance. 3+3+1=7

Or

- (a) What are *p*-type and *n*-type semi-conductors? Give a brief explanation of the energy barrier formation in *p-n* junction diode. 1+3=4
- (b) Using appropriate diagram, give a brief discussion of load line analysis of diode. 3

(2)

2. Explain the working of half-wave rectifier using appropriate circuit diagram. Also obtain ripple factor and rectification efficiency of the circuit. $3+2+2=7$

Or

How is Zener diode different from normal diode? Draw a circuit diagram showing the use of Zener diode as a voltage regulator. Explain how the circuit performs load regulation and line regulation. $1+2+2+2=7$

3. Explain the working of RC-coupled amplifier with the help of a neat circuit diagram. Also draw the frequency-response curve of the amplifier and discuss the low frequency, mid frequency and high frequency region. $2+1+4=7$

Or

Describe the voltage divider bias method. Explain how stabilization of operating point is achieved by this method. $4+3=7$

4. Discuss the circuit operation of Hartley and Colpitt's oscillators. $3\frac{1}{2}+3\frac{1}{2}=7$

Or

What is multivibrator? With a neat sketch, explain the working of astable multivibrator. $1+6=7$

(3)

5. What is the difference between a JFET and a bipolar transistor? Explain the characteristics of JFET with its structural diagram. $2+5=7$

Or

Explain amplitude modulation. Derive the voltage equation of an AM wave and also give a brief discussion of the sideband frequencies. $2\frac{1}{2}+2\frac{1}{2}+2=7$

Subject Code : PHY/VI/12 (b)

Booklet No. **A**

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Date Stamp

To be filled in by the Candidate

DEGREE 6th Semester
(Arts / Science / Commerce /
.....) Exam., **2016**
Subject
Paper

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To be filled in by the Candidate

DEGREE 6th Semester
(Arts / Science / Commerce /
.....) Exam., **2016**

Roll No.

Regn. No.

Subject

Paper

Descriptive Type

Booklet No. B

INSTRUCTIONS TO CANDIDATES

- 1. The Booklet No. of this script should be quoted in the answer script meant for descriptive type questions and vice versa.**
- 2. This paper should be ANSWERED FIRST and submitted within 45 minutes of the commencement of the Examination.**
- 3. While answering the questions of this booklet, any cutting, erasing, overwriting or furnishing more than one answer is prohibited. Any rough work, if required, should be done only on the main Answer Book. Instructions given in each question should be followed for answering that question only.**

Signature of
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Signature of
Examiner(s)

Signature of
Invigilator(s)

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PHY/VI/12 (b)

2 0 1 6

(6th Semester)

PHYSICS

TWELFTH (B) PAPER

(Electronics—II)

(PART : A—OBJECTIVE)

(Marks : 20)

The figures in the margin indicate full marks for the questions

SECTION—I

(Marks : 5)

Choose the correct answer by putting a Tick (✓) mark in the brackets provided for it : 1×5=5

1. In intrinsic semiconductors

- (a) no density of free electrons is greater than holes ()
- (b) no density of holes is greater than free electrons ()
- (c) there is equal amount of free electrons and holes ()
- (d) no density of free electrons is infinity ()

/335

(2)

2. In the output characteristic of a transistor in CE configuration, the active region is the region where

(a) collector junction is reverse biased and emitter-base junction is forward biased ()

(b) collector junction as well as emitter-based junction is forward biased ()

(c) collector junction as well as emitter-based junction is reverse biased ()

(d) emitter-based junction is reverse biased and collector junction is forward biased ()

3. Class _____ operation gives the maximum distortion.

(a) A ()

(b) B ()

(c) C ()

(d) AB ()

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(3)

4. An oscillator employs

- (a) positive feedback ()
- (b) negative feedback ()
- (c) neither positive nor negative feedback ()
- (d) Data insufficient ()

5. A MOSFET has _____ terminals.

- (a) two ()
- (b) five ()
- (c) four ()
- (d) three ()

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(4)

SECTION—II

(Marks : 15)

Answer the following questions in brief :

3×5=15

1. What is an ideal diode? How does it differ from a real diode?

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(5)

2. What are tunnel diode and LED?

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(6)

3. Find the voltage gain in a CE amplifier, when the input resistance is $3 \text{ k}\Omega$ and the load resistance is $24 \text{ k}\Omega$ with $\beta = 60$.

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(7)

4. Write a short note on Barkhausen's criterion for self-sustained oscillations.

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(8)

5. Draw the diode detector circuit and explain its action.

G16—150/335

PHY/VI/12 (b)