22PHU519A

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2025
(Fifth Semester)

Branch – **PHYSICS**

MAJOR ELECTIVE COURSE- I: SEMICONDUCTOR ELECTRONICS

Time: Three Hours Maximum: 50 Marks

SECTION-A (5 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (5 x 1 = 5)

1 In a p-type semiconductor, the current conduction is due to
(i) atoms (ii) holes
(iii) electrons (iv) protons

2 The base of a transistor is ---------- doped
(i) heavily (ii) moderately
(iii) lightly (iv) none of the above

3 Negative feedback is employed in
(i) oscillators (ii) rectifiers
(iii) amplifiers (iv) none of the above

4 An oscillator converts
(i) ac power to dc power (ii) dc power to ac power
(iii) mechanical power to ac power (iv) none of the above

5 The multivibrator generates square wave of its own
(i) astable (ii) monostable
(iii) bistable (iv) none of the above

SECTION - B (15 Marks)
Answer **ALL** Questions
ALL Questions Carry **EQUAL** Marks (5 x 3 = 15)

6 a Explain the variation of fermi level with temperature in n-type semiconductor.
OR
b Define ripple factor and give its equation.

7 a Draw the input and output characteristics of CE connection.
OR
b Draw the diagram for pull push amplifier.

8 a Why is negative feedback applied in high gain amplifiers?
OR
b Draw the diagram for zenor diode voltage regualator.

9 a Write down the principle of Colpitt's oscillator with a neat sketch.
OR
b Define frequency modulation with example.

10 a Give the circuit diagram for differentiating circuit.
OR
b Provide the circuit diagram for SCR as full wave rectifier.

Cont...

SECTION -C (30 Marks)

Answer **ALL** questions
ALL questions carry **EQUAL** Marks (5 x 6 = 30)

11 a Derive an expression of carrier concentration in p-type semiconductor.

OR

b With a neat sketch, explain the different types of filter circuits.

12 a Establish the following relation
(i) $I_C = \alpha I_E + I_{CBO}$ (ii) $IC = \beta I_B + I_{CEO}$

OR

b Explain transformer coupled amplifer with a frequency response.

13 a Explain the following of OP-AMP
(i) Inverting amplifier (ii) non- Inverting amplifier

OR

b Explain the following of OP-AMP
(i) Differentiator (ii) Integrator

14 a Describe crystal oscillator with a neat diagram.

OR

b Explain different parts of super heterodyne receiver.

15 a With a suitable diagram, explain monostable multivibrator.

OR

b Explain the construction and working of SCR.

Z-Z-Z END