NEPNY—86—2023

FACULTY OF SCIENCE

M.Sc. (NEP) (First Year) (First Semester) EXAMINATION

NOVEMBER/DECEMBER, 2023

PHYSICS

Paper–SPHYE–401

(Electronic Devices)

(Thursday, 28-12-2023)   **Time : 10.00 a.m. to 12.30 p.m.**

Time—2½ Hours   *Maximum Marks—60*

N.B. :— (i)   *All* questions carry equal marks.

(ii)   Question No. **1** is compulsory.

(iii)   Solve any *three* of the remaining five questions (Q. No. **2** to Q. No. **6**)

(iv)   Figures to the right indicate full marks.

1.   Solve the following questions (Each question **5** marks) :   15

(a)   Explain construction of npn & pnp transistor.

(b)   Explain in brief IV characteristics of solar cell.

(c)   With logic diagram and truth table explain J-K flip-flop.

P.T.O.

2. (a) What is SCR ? Explain its structure and characteristics. 8

   (b) Draw the structure of PN junction diode and explain its IV characteristics.

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3. (a) Discuss construction and working of phototransistor. 8

   (b) What are photoconductive cell ? Explain its working in brief. 7

4. (a) Draw the circuit diagram for op-amp used as subtractor. Explain its working and derive equation for output voltage. 8

   (b) With neat circuit diagram explain op-amp as comparator. 7

5. (a) Define counters and explain in brief 2-bit asynchronous counter. 8

   (b) With logic symbol and truth table, discuss NAND and NOR gates.

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6. Write short notes on (Each question **5** marks) : 15

   (a) Extrinsic semiconductor

   (b) LED

   (c) T and D-type flip-flop.