

This question paper contains 3 printed pages]

**WT—160—2024**

**FACULTY OF SCIENCE**

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

**NOVEMBER/DECEMBER, 2024**

**(CBCS/New Pattern)**

**PHYSICS**

**Paper PHY-104**

**(Electronic Devices and Applications)**

**(Saturday, 14-12-2024)**

**Time : 10.00 a.m. to 1.00 p.m.**

*Time—Three Hours*

*Maximum Marks—75*

*Note :— (i) All questions are compulsory.*

*(ii) Figures to the right indicate full marks.*

1. What is MOSFET ? What are the types of MOSFET ? Explain the construction and working of *n*-channel E-MOSFET. 15

*Or*

(a) What is extrinsic semiconductor ? Why does current flow in the forward bias and there is no current in the reverse bias condition ? 8

(b) What is bipolar transistor ? Explain working of PNP transistor in FR bias. 7

P.T.O.

- 2 Explain in detail the construction, working principle and I-V characteristics of solar cell. 15

*Or*

- (a) What is Phototransistor ? Explain the operation and V-I characteristics of phototransistor. 8
- (b) Explain the construction, working of photodiode and give its applications. 7
3. Describe the function of an op-amp as an adder and subtractor. 15

*Or*

- (a) Explain operation with the help of diagram for first order high pass filter using Op-Amp. 8
- (b) Explain in ideal characteristics of Op-Amp. 7
4. What are synchronous and asynchronous counters ? Explain MOD-6 asynchronous counter. 15

*Or*

- (a) Define flip-flops. Draw neat circuit diagram and explain the truth table for S-R flip-flop. 8
- (b) What is encoder and decoder ? Explain the working of BCD to decimal decoder. 7

5. Write short notes on any *three* out of four :

15

- (a) Principle of operation of UJT
- (b) LED (Light Emitting Diode)
- (c) Op-Amp as an differentiator
- (d) Basic gates.