

Roll No.

24024

B. Tech. 3rd Sem. (Electrical Engg.)

Branch - I Examination – December, 2013

ELECTRONIC DEVICES & CIRCUITS

'F' Scheme

Paper : EE-201-F

Time : Three hours]

[Maximum Marks : 100

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Question No. 1 is *compulsory*. Attempt any *one* question from each Section.

1. (a) Explain the properties of silicon and germanium. 5
- (b) Explain drift and diffusion current in detail. 5
- (c) Explain photodiode in brief. 5
- (d) Explain characteristics of common-base BJT in forward biased mode. 5

SECTION – A

2. (a) Define forbidden energy gap for semiconductor. 5

- (b) Explain drift velocity and mean free path. 5
- (c) What are the factors affecting the conductivity of material ? Explain. 10
3. (a) Explain the following : 10
- (i) Relaxation time,
 - (ii) Mean free path,
 - (iii) Effect of magnetic field on conducting material.
- (b) What is Super Conductivity ? Explain. 5
- (c) Explain Wiedmann-Franz Law. 5

SECTION - B

4. (a) Derive an expression for diffusion capacitance in a P-N junction diode. 10
- (b) Explain avalanche and zener breakdown mechanism in detail. 10
5. (a) Explain construction, working and characteristics of Photo-detector. 10

(b) Derive and explain continuity equation. 10

SECTION - C

6. Explain construction, working and characteristics of a P-type MOSFET in detail. 20

7. Explain the following : 20

(i) MESFET

(ii) MISFET

(iii) Common-Emitter BJT.

SECTION - D

8. (a) What is IMPATT diode ? Explain. 7

(b) Explain Tunnel diode in detail. 6

(c) Differentiate between DIAC and TRIAC. 7

9. (a) How does an avalanche photodiode obtains a higher current sensitivity than a PIN diode ? Does it have a fast response ? 10

(b) What is Photodiode ? Explain.

(c) Explain P-N-P-N diode.