

GANPAT UNIVERSITY
B. TECH SEM.II (ME/MC/CI/EE) ENGINEERING
REGULAR EXAMINATION MAY/JUNE-2012
EC101 ENGINEERING SCIENCE

TIME: 3 HOURS

TOTAL MARKS: 70

INSTRUCTIONS:

1. Attempt all questions.
2. Answers to the two sections must be written in separate answer books.
3. Figures to the right indicate full marks.
4. Assume suitable data, if necessary.

SECTION-I

- Que.-1** (A) Write short note on: (Any Two) 6
1. Up-Down circuit analysis
 2. Transistor approximations
 3. Load line and Q-Point
- (B) Draw the symbols of n-p-n and p-n-p transistor. Explain the current relations and derive equation for α and β . 3
- (C) Briefly explain the concept of surge current, surge resistor and peak inverse voltage. 3
- OR**
- Que.-1** (A) Explain energy hill for all biasing conditions of P-N junction. 6
- (B) What is the significance of the rectifier circuit in power supply? Explain full wave rectifier and bridge rectifier with necessary circuit diagrams and waveforms. 6
- Que.-2** (A) For the Si diode, ambient temperature is 25°C. If temperature is changed to (1) 95°C (2) 70°C (3) -30°C find new barrier potential for all the three cases. 3
- (B) Draw the diagram of the clamper circuit with necessary waveforms and circuits. 4
- (C) Draw the collector curve and explain in brief, also show the operating regions of the transistor. 4
- OR**
- Que.-2** (A) Explain CE configuration of BJT in detail. 5
- (B) Define: 6
- | | |
|----------------------|----------------------------|
| 1. Lifetime | 2. Bulk Resistance |
| 3. Transient current | 4. Surface leakage current |
| 5. Valance Electron | 6. Energy Gap |
- Que.-3** (A) Explain forward bias and reverse bias connection of diode. 6
- (B) Explain biased transistor in detail with working of all doped regions in detail. 6

SECTION-II

- Que.-4** (A) Define the following terms: 4
 1. Critical angle
 2. Fraction refractive index
 3. Attenuation
 4. Acceptance angle
 (B) Explain Thermoelectric thermometer in details. 5
 (C) Find the velocity of source when the frequency appears to be 3
 (1) Triple (2) double the original frequency to a stationary observer.
- OR**
- Que.-4** (A) Prove that the acceptance angle of optical fiber $\theta_0 = \sin^{-1} \sqrt{n_1^2 - n_2^2}$ 5
 (B) If the platinum temperature corresponding to 50°C on the gas scale is 4
 50.25°C , what will be the temperature on the platinum scale corresponding to 150°C on the gas scale?
 (C) Derive the equation when source and observer both are in motion in Doppler effect. 3
- Que.-5** (A) Explain Ferro-magnetic material and application of magnetic material. 4
 (B) Explain the Magnetic Dipole moment. 4
 (C) Explain Joule-Thomson effect. 3
- OR**
- Que.-5** (A) Explain conduction, convection and radiation. 3
 (B) Describe types of optical fiber with respect to materials. 4
 A copper rod 19 cm long and 0.785 cm^2 area of cross-section which is thermally insulated is heated at one end through 100°C while the other end is kept at 30°C . Calculate the amount of heat that will flow in 10 minutes along the way. K of copper is 380 W/m/K . 4
- Que.-6** (A) Write short notes on following: 6
 1. Nano technology
 2. Plasma
 3. X-Rays production
 (B) Explain resistance thermometer in details. 4
 (C) Find the NA and acceptance angle for an optical fiber having core and cladding refractive indices of 1.45 and 1.40 respectively. 2

End of Paper