

GANPAT UNIVERSITY

B.Tech. Semester -I (A) (IT, CE, EC, BM &I) Examination Nov/Dec-2010

EC 101 Engineering Science

Max. Time: 3 Hrs.]

[Max. 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.

SECTION -I

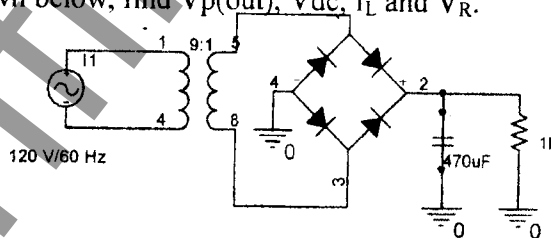
- 1 (A) Define: 5
1. Barrier potential
 2. Energy gap
 3. Peak inverse voltage
 4. Peak repetitive reverse voltage
 5. Surge resistor
- (B) Explain full wave rectifier in detail. 4
- (C) For the Si diode, ambient temperature is 25°C . If temperature is changed to 1.75°C 2. 10°C 3. -20°C find new barrier potential for all the three cases. 3

OR

- 1 (A) Explain energy hill for all biasing conditions of P-N junction. 6
- (B) Explain both positive and negative biased clipper circuit in detail. 6
- 2 (A) Explain capacitor input filter. How it is different from choke input filter? 6
- (B) Explain positive and negative clamper. 6

OR

- 2 (A) For the circuit shown below, find $V_p(\text{out})$, V_{dc} , I_L and V_R . 4



- (B) Explain positive and negative clipper in detail. 4
- (C) Compare half wave, full wave and bridge rectifier. 4
- 3 (A) For CE connection of transistor considered in 2nd approximation, $V_{BB}=12\text{V}$, $V_{CC}=10\text{V}$, $R_B=330\text{K}\Omega$, $R_C=0.8\text{K}\Omega$ and $\beta_{dc}=200$, Find the values of I_B, I_C, V_{CE}, P_D . 3
- (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) Explain diode clamp circuit. 3
- (D) Give difference between all the three regions of BJT. 2

SECTION- II

- 4 (A) Explain Joule-Thomson effect. 3
 (B) Explain resistance thermometer in details. 5
 (C) Describe types of optical fiber with respect to modes. 4
- OR**
- 4 (A) Define following terms: 3
 1. Normalized frequency
 2. Numerical aperture
 (B) Describe types of optical fiber with respect to materials. 4
 (C) Explain Thermoelectric thermometer in details. 5
- 5 (A) Write down equation and unit of thermal conductivity. 2
 (B) Describe Huygen's principle in detail. 3
 (C) The core of a glass fiber has a refractive index of 1.5 while its cladding is doped to give a fractional refractive index change of 0.005 4
 (1) Refractive index of cladding (2) Critical internal reflecting angle
 (3) Acceptance angle (4) Numerical aperture
 (D) Write short note on Dia-magnetic material. 3
- OR**
- 5 (A) Write applications of magnetic material. 2
 (B) Write short note on Ferri-magnetic material. 3
 (C) Explain Doppler-effect with equations. 3
 (D) Explain piezo-electric generator with necessary diagram. 4
- 6 (A) List out properties of Nucleus and explain nano-materials. 5
 (B) The apparent frequency of the whistle of an engine changes in the ratio 6:5 as the engine passes a stationary observer. If the velocity of sound is 352 m/sec. Calculate the velocity of the engine. 3
 (C) List out the applications of ultrasonic waves. 3

End of Paper