

# GANPAT UNIVERSITY

## B. Tech. Sem. I (CE/IT/EC/BM&I) Regular Examination November/December-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

- |           |   |   |
|-----------|---|---|
| 1         | (A) Explain construction of optical fiber with the help of diagram.   | 4 |
|           | (B) With the help of figure, briefly explain hysteresis.  | 4 |
|           | (C) What are the limitations of optical fiber cable?  | 4 |
| <b>OR</b> |   |   |
| 1         | (A) With the aid of neat figures, explain multimode step index fiber and explain multimode graded index fiber   | 7 |
|           | (B) Write a brief note on types of thermodynamic processes.   | 5 |
| 2         | (A) Derive the equation for torque experienced by a bar magnet freely suspended in uniform magnetic field.  | 5 |
|           | (B) Two trains A and B are approaching each other from opposite direction with the uniform speed of 540kmph each. Before they cross each other, a passenger in train B hears the whistle of train A to be 2000Hz. Find out what is the actual frequency of whistle of train A. Velocity of sound =350m/s. | 6 |
| <b>OR</b> |   |   |
| 2         | (A) Derive the equation for measuring temperature using platinum resistance thermometer. How will convert it to the uniform scale for direct reading?   | 5 |
|           | (B) An optical fiber has a N.A. of 0.23 and cladding refractive index is 1.59. Determine the acceptance angle for the fiber when being placed in water which has refractive index of 1.37.  | 6 |
| 3         | (A) Define the following terms:<br>1. Acceptance cone 2. Doppler effect 3. Magnetization 4. Thermometry   | 4 |
|           | (B) The resistance of platinum wire at 0°C 100°C and 444.6°C is found to be 5.5, 7.5 and 14.5 ohms respectively. Find the value of $\alpha$ and $\beta$ .   | 4 |
|           | (C) State 0 <sup>th</sup> and 1 <sup>st</sup> law of thermodynamics. What are their limitations?  | 4 |

## SECTION-II

- 4 (A) Define the following terms: 6
1. Barrier potential
  2. Energy gap
  3. Peak inverse voltage
  4. Bulk resistance
  5. Third approximation of diode
  6. Q-point
- (B) Explain CE configuration of BJT in detail 6
- OR
- 4 (A) Explain in detail 6
1. Up-down circuit analysis
  2. Ideal Diode
  3. Second approximation of Diode
- (B) Explain capacitor input filter. How it is different from choke input filter? 6
- 5 (A) Explain positive and negative clipper in detail. 5
- (B) Compare half wave, full wave and bridge rectifier. 4
- (C) Explain surge current and surge resistance 2
- OR
- 5 (A) Explain forward bias and reverse bias connection of diode. 5
- (B) Draw the diagram of the clamper circuit with necessary waveforms and 6
- 6 (A) Explain the unbiased transistor. 4
- (B) Draw the symbols of n-p-n and p-n-p transistor. Explain the current relations and derive equation for  $\alpha$  and  $\beta$ . 3
- (C) Explain bridge wave rectifier with necessary diagram. 5

END OF PAPER