GANPAT UNIVERSITY
B. TECH SEM.I (IT, CE, EC, BM&I) ENGINEERING
EXAMINATION NOV/DEC-2011
EC 101 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)	Explain conduction, convection and radiation with appropriate example.	3
	(B)	Discuss different types of fiber optics in context of modes.	4
	(C)	An optical fiber has a N.A. of 0.18 and cladding refractive index of 1.56. Determine the acceptance angle for the fiber in water which has a refractive index of 1.23.	5

OR

Que.-1	(A)	Find the NA and acceptance angle for an optical fiber having core and cladding refractive indices 1.45 and 1.40 respectively.	3
	(B)	Discuss different types of fiber optics in context of materials.	4
	(C)	Explain Joule-Thomson effect with net diagram.	3
	(D)	List out four applications of ultrasonic waves.	2
Que.-2	(A)	Explain resistance thermometer with its merits and demerits.	5
	(B)	The total area of glass window pane is 0.6 m^2. Calculate how much heat is conducted/hour through the pane if thickness of glass is 0.3cm, the inside temperature is 30°C and outside temperature is 5°C, K for glass is 1W/m/K.	3
	(C)	Enlist different types of magnetic material and also its application.	3

OR

Que.-2	(A)	Explain thermoelectric thermometer with its merits and demerits.	5
	(B)	Explain about Huygens principle.	3
	(C)	Find the core diameter necessary for single mode operation at 850µm in S.I. fiber with n1=1.480 and n2=1.47. What is the numerical aperture and maximum acceptance angle of this fiber? Take V=2.405.	3
Que.-3	(A)	Find the velocity of source when the frequency appears to be (1) 1/3 (2) 1/4 the original frequency to a stationary observer.	3
	(B)	Write brief short note on ferri-magnetic material.	2
	(C)	Write short notes on following: 1. Properties of nucleus 2. Plasma	4
	(D)	Define and explain isothermal change and adiabatic change.	3

SECTION-II

Que.-4	(A)	Compare half wave, full wave and bridge rectifier.	4
	(B)	Explain energy hill for all biasing conditions of P-N junction.	6
	(C)	Explain surge current and surge resistor.	2

OR

Que.-4	(A)	Explain silicon crystal structure and its thermal behavior.	6
	(B)	Explain in detail	6
		1. Up-down circuit analysis	
		2. Ideal Diode	
		3. Second approximation of Diode	

| Que.-5 | (A) | Explain both positive and negative biased clipper circuit in detail. | 5 |
| | (B) | Explain CE configuration of BJT in detail | 6 |

OR

Que.-5	(A)	Explain positive and negative clamper.	5
	(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)	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

Que.-6	(A)	Explain capacitor input filter. How it is different from choke input filter?	5
	(B)	Explain biased transistor in detail with working of all doped regions in detail.	5
	(C)	Explain third approximation of diode.	2

End of Paper