



Name : .....

Roll No. : .....

Invigilator's Signature : .....

**CS/B. TECH (ECE) /SEM-8/EC-802/2012**

**2012**

**ADVANCE COMMUNICATION ENGINEERING**

Time Allotted : 3 Hours

Full Marks : 70

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words as far as practicable.*

**GROUP – A**

**( Multiple Choice Type Questions )**

1. Choose the correct alternatives for any *ten* of the following:

10 × 1 = 10

- i) An SIF has a core with refractive index of 1.50 and a cladding with a refractive index of 1.46. Its numerical aperture is
  - a) 0.156
  - b) 0.244
  - c) 0.344
  - d) 0.486.
- ii) The number of modes that can propagate along the fibre is finite because of
  - a) interference in the wavefronts
  - b) existence of cut-off wavelength
  - c) finite group delay
  - d) phase velocity is greater than velocity of light.
- iii) A satellite transponder
  - a) is transmitter-receiver together
  - b) converts energy
  - c) is transmitter only
  - d) is receiver only.

- 8105



**GROUP – B**

**( Short Answer Type Questions )**

Answer any *three* of the following.  $3 \times 5 = 15$

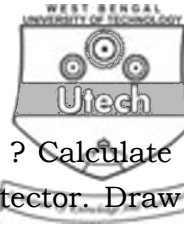
2. Define the terms 'acceptance angle' and 'numerical aperture' of an optical fibre. How are these related ? An optical fibre has an NA of 0.4. Find its acceptance angle. Write down the maximum value of V-number for an SMF.  $2 + 1 + 1 + 1$
3. Explain the difference between GSM and CDMA mobile system.
4. What is meant by handoff in the cellular system ? Explain the handoff process in mobile cellular system.  $2 + 3$
5. Describe placement of satellite in geo-stationary orbit.
6. Differentiate between control channels and data channels. How are channels assigned in a mobile communication system ?  $2 + 3$

**GROUP – C**

**( Long Answer Type Questions )**

Answer any *three* of the following.  $3 \times 15 = 45$

7. a) Draw and explain the schematic diagram of an optical communication system ?  
b) The refractive index of the core step index fibre is 1.46 and relative refractive index difference between core and cladding of the fibre is 2%. Then find out
  - i) Numerical Aperture
  - ii) Acceptance angle in air
  - iii) The critical angle at the core cladding interface within the fibre.
- c) What are the link time budget and rise time budget analysis ? Why is system margin provided ?  $4 + 6 + 5$



8. a) What are shot noise and Johnson noise ? Calculate the signal to noise ratio of a *p-i-n* photo-detector. Draw its equivalent circuit.
- b) A photo-detector has a quantum efficiency of 70% when photons with energy  $2.2 \times 10^{-19}$  joule are incident on it. Calculate
- i) the wavelength at which the photo-diode is operating
  - ii) the incident power required to obtain a photo-current of 2.0 mA.
- c) Explain the temperature effect on avalanche photo-gain.  
(2 + 4) + (3 + 3) + 3
9. a) Draw and explain GSM architecture.
- b) Discuss GPRS location management procedure.
- c) Explain how data transfer through GPRS network and routing occurs.  
4 + 5 + 6
10. a) Write down the three laws of Kepler governing the motion of the satellites.
- b) Find out the power received in the receiving antenna from a satellite. Discuss different methods to reduce the size of the receiving antennas. Discuss satellite antenna patterns and coverage zone.
- c) Discuss the advantage of using cassegrain antenna for large earth station antenna.  
4 + 7 + 4
11. Write short notes on any *three* of the following : 3 × 5
- a) UMTS architecture.
  - b) Role played by VLR, HLR and AUC during call setup.
  - c) Noise sources in optical fibre communication
  - d) Transponder and polarization hopping
  - e) Forward and reverse link in CDMA based IS-95 system.
-