



Name :

Roll No. :

Invigilator's Signature :

CS/B.Tech (ECE)/SEP. SUPPLE/SEM-8/EC-802/2012

2012

ADVANCED COMMUNICATION SYSTEM

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 : $10 \times 1 = 10$

- i) In a GSM network, MTSO stands for
 - a) main terminal switching order
 - b) matrix terminal system office
 - c) mobile telephone switching office
 - d) mobile terminal system & others.
- ii) In mobile communication a control channel is used from a land station to mobile station. It is called
 - a) FDCC
 - b) FVC
 - c) RECC
 - d) RVC.



- iii) Near far problem occurs in
- a) TDMA
 - b) FDMA
 - c) CDMA
 - d) CSMA.
- iv) For the hexagonal cell geometry of seven cell cluster the co-channel reuse ratio $Q = D/R$ is
- a) 3
 - b) 4.58
 - c) 5.2
 - d) 6.
- v) The frequency of SAT (Supervisory Audio Tone) is
- a) 12 kHz
 - b) 3 kHz
 - c) 6 kHz
 - d) 10.4 kHz.
- vi) The term 'single mode' and 'multi mode' are best desired as
- a) the number of fibres placed into fibre optic cable
 - b) the number of voice channels each fibre can support
 - c) the number of wavelengths each fibre can support
 - d) the index number.
- vii) A step index fibre in air has a numerical aperture of 0.16, core refractive index 1.45 and core diameter 60 μm . The normalized frequency for the fibre is
- a) 60.28
 - b) 62.26
 - c) 64.2
 - d) 63.42.

viii) Gain of Erbium Doped Fibre Amplifier (EDFA) depends on

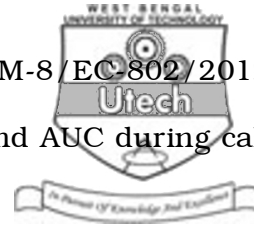


- a) pump power
 - b) both pump power & fibre length
 - c) signal power
 - d) none of these.
- ix) When the size of density fluctuation is less than $1/10$ of the operating wavelength of light then it is known as
- a) Mie scattering
 - b) Rayleigh scattering
 - c) Stimulated Brillouin scattering
 - d) Stimulated Raman scattering.
- x) The core diameter of single mode fibre is
- a) 3-5 microns
 - b) 8-10 microns
 - c) 12-15 microns
 - d) 1-6 microns.

- GROUP – B**

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

- $$3 + 2$$



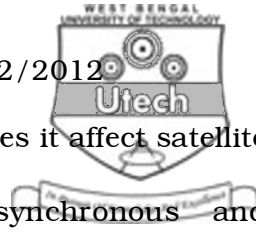
4. Explain the function of HLR, VLR, OMC and AUC during call set up.
5. What is perturbation ? How does it effect satellite communication ? 1 + 4
6. Describe the following methods in a typical call flow for GSM standard : 2 + 3
 - a) Location update
 - b) Call origination.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7.
 - a) Discuss the direct and indirect band gap semi-conductor.
 - b) Draw the injection current *vs* emitted power curve of LED and LASER. Why LASER is more suitable in long haul optical communication ?
 - c) Draw suitable driver circuit for analogue modulation of LED.
 - d) The radiative and non-radiative recombination lifetime of the minority carriers in the active region of a double hetero-junction LED are 60 ns and 100 ns respectively. determine
 - i) the total carrier recombination lifetime and
 - ii) the power internally generated within the device when peak emission wavelength is 0.87 μm at a drive current of 40 mA. 4 + 4 + 2 + 5



8. a) What is orbital perturbation ? How does it affect satellite communication ? What are geosynchronous and geostationary orbits ? What is sub-satellite point ?

b) Derive the expression for orbital velocity of a satellite.

10 + 5

9. a) Write Kepler's laws of planetary motion. What do you mean by parking of a satellite ?

b) Why is uplink frequency greater than downlink frequency in satellite communication ? What are the advantages of cassegrain field ?

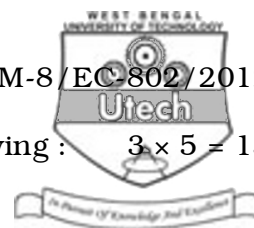
8 + 7

10. a) Explain the methods which are applied to reduce the interference in cellular communication system.

b) Explain frequency reuse.

c) Determine the distance from the nearest co-channel for a cell of radius 0.64 km and a co-channel reuse factor of 12.

6 + 4 + 5



11. Write short notes on any *three* of the following : $3 \times 5 = 15$

- a) Chromatic dispersion
- b) Avalanche photodiode
- c) Software defined radio
- d) Bluetooth
- e) 3G over 2G wireless network.

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