

Total No. of Questions : **08**

Roll No. : 0701.....

B.Tech EIGHTH SEMESTER EXAMINATION JUNE-2025

(Branch : Elx. & Communication Engineering)

EC-8341 (EL-IV) ADVANCE COMMUNICATION SYSTEM

Time : Three Hours

Maximum Marks : 70

Min. Pass Marks : 22

Note : Attempt any five questions. Each question carries equal marks.

- 1(a) What do you understand by stochastic models for speech? Explain in detail.
- (b) Explain the procedure for converting speech signal in to digital signal ready for transmission.
- 2(a) What is parity check? Explain. What is meant by low density parity check codes?
- (b) What is Trellis codes? Explain the trellis coded modulation with suitable diagram.
- 3(a) What do you understand by adaptive modulation? Explain with suitable examples.
- (b) What is meant by inter carrier interference? Also discuss about solutions to avoid it.
- 4(a) What is MIMO systems? Discuss about advantages and disadvantages of MIMO systems.
- (b) Explain the working of OFDM transceiver with suitable diagram.
- 5(a) List and explain various logical channels with reference to GSM.
- (b) Discuss about the spectrum and air interface used in CDMA 2000.
- 6(a) What do you understand by circuit switched data transfer? Explain with suitable diagram.
- (b) What is meant by time delay spread? Discuss about its impact on signal transmission.
- 7(a) What is WCDMA? Explain the multiplexing technique used in WCDMA.
- (b) What is meant by WLL system? Discuss about the spectrum used for WLL system.
- 8 Explain the following terms (**any two**) :
 - (i) Smart antenna system
 - (ii) Handoff Technique
 - (iii) Multiuser detection in CDMA

B.Tech EIGHTH SEMESTER EXAMINATION JUNE-2025*(Branch : Elx. & Communication Engineering)***EC-8351 (EL-V) FIBER OPTIC COMMUNICATION**

Time : Three Hours

Maximum Marks : 70

Min. Pass Marks : 22

Note : Attempt any five questions. Each question carries equal marks. All parts of a question must be attempted at the same place.

- 1(a) Draw the block diagram of fiber optic communication system and explain the function of each block clearly. Draw the basic structure of fiber optic cable.
- (b) If the core layer of an optical fiber is made from silica with refractive index 1.45 and if the refractive index of the cladding layer is 1% less than that of the core, calculate :-
 - (i) Cladding layer refractive index
 - (ii) Critical angle
 - (iii) NA.
- 2(a) Explain the structure of single mode and multimode step index and graded index fiber and compare SIMM and GIMM.
- (b) Calculate the refractive indices of the core and cladding materials of an optical fiber whose $NA = 0.35$ and $\Delta = 0.01$.
- 3(a) Write down the steps of LED operation and explain the working of ELED giving suitable diagram.
- (b) Explain the working of a LASER diode as optical source giving suitable diagram and write down the types of LASER.
- 4(a) Discuss the working of a PN Photo diode and P-I-N Photo diode giving suitable diagram and V-I Characteristics.
- (b) Calculate the maximum 3 dB bandwidth for a silicon P-I-N photodiode with a $25 \mu\text{m}$ depletion layer width and with a carrier velocity of 3×10^4 m/s.
- 5(a) Explain WDM giving suitable diagram and discuss types of WDM giving suitable diagram.
- (b) Explain the working of EDFA giving suitable diagram and discuss its advantages, disadvantages and applications.
- 6(a) Discuss the basic element of an optical Link design with suitable example.
- (b) Explain Burst mode receiver giving suitable diagram and compare its operation with analog receivers.
- 7(a) Discuss material dispersion and wave guide dispersion in optical fibers giving suitable expressions. Also discuss core and cladding losses.
- (b) Discuss the various fabrication techniques of optical fibers with the help of neat diagrams.
- 8 Write short notes on **any two** :
 - (i) OTDR
 - (ii) MEMS Technology
 - (iii) BER Calculation
 - (iii) APD
 - (v) Raman amplifier

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B.Tech EIGHTH SEMESTER EXAMINATION JUNE-2025

(Branch : *Elx. & Communication Engineering*)

EC-8331 (OEL-III) NANO ELECTRONICS

Time : Three Hours

Maximum Marks : 70

Min. Pass Marks : 22

Note : Attempt any five questions. Each question carries equal marks.

- 1(a) Discuss “top down” and “bottom up” approaches of nanotechnology. **07**
(b) Derive one-dimensional time-independent Schrodinger wave equation. **07**
- 2(a) Explain density of states at nano-scale energy bands. **07**
(b) Write properties of Hermitian operator. **07**
- 3 What is Coulomb-blockade effect? Explain working of a single electronic transistor (SET) with applications. **14**
- 4 Explain Kronig-Penney (K-P) model. Draw and discuss the band structure of K-P model. **14**
- 5(a) Discuss concepts of quantum wells, wires and dots. **07**
(b) Explain “quantum particle reflection and tunnelling” across a step potential barrier. **07**
- 6(a) Explain how conduction takes place in ionic crystals. **07**
(b) Write a short note on BN nano tubes. **07**
- 7(a) Explain chemical vapour deposition (CVD) technique for obtaining nano material. **07**
(b) Describe the sol-gel synthesis method of preparation of nano material. **07**
- 8 Write short notes on **any two** : **14**
(i) Semiconductor hetero-structures
(ii) Classical and semi classical nano transport system
(iii) Carbon nano tubes
