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## Eighth Semester B.E. Degree Examination, Feb./Mar. 2022 Wireless Cellular and LTE 4G Broadband

Time: 3 hrs.

Max. Marks: 80

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. Explain the LTE network architecture. (08 Marks)  
 b. Explain the advantages and disadvantages of OFDM. (08 Marks)

OR

- 2 a. Explain the different techniques for mitigation of narrow band fading. (08 Marks)  
 b. Explain the following terms with respect to cellular system:  
 (i) Frequency Reuse      (ii) Sectoring      (iii) Handoff (08 Marks)

### Module-2

- 3 a. Explain FDMA and TDMA techniques. (08 Marks)  
 b. With a neat block diagram, explain OFDM communication system. (08 Marks)

OR

- 4 a. With a neat diagram, explain SC-FDMA uplink transmitter. (08 Marks)  
 b. Explain the terms Array Gain and Diversity Gain with respect to multiple antenna transmission. (08 Marks)

### Module-3

- 5 a. List the various Logical, Transport and Physical channels used in LTE. (08 Marks)  
 b. Explain the Radio Interface Protocol Stack of LTE. (08 Marks)

OR

- 6 a. Explain Type-1 frame structure of LTE. (08 Marks)  
 b. Explain Broadcast and Multicast channels. (08 Marks)

### Module-4

- 7 a. With a neat block diagram, explain the overview of uplink transport channel processing. (08 Marks)  
 b. Briefly explain H-ARQ on uplink. (08 Marks)

OR

- 8 a. Explain the different power control schemes used in LTE. (08 Marks)  
 b. Explain the Random Access Procedure in LTE. (08 Marks)

### Module-5

- 9 a. Explain the functions and services of PDCP sub layers for user plane and control plane. (08 Marks)  
 b. Explain mobility management over the SI interface. (08 Marks)

OR

- 10 a. Explain the RRC states and its functions. (08 Marks)  
 b. Explain the Intercell Interference Coordination in down link and up link. (08 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
 2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

# CBCS SCHEME

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**Eighth Semester B.E. Degree Examination, Feb./Mar. 2022**

## **Fibre Optics and Networks**

Time: 3 hrs.

Max. Marks: 80

**Note: Answer any FIVE full questions, choosing ONE full question from each module.**

### Module-1

- 1 a. Explain optical fibre transmission link with block diagram. (05 Marks)  
b. Discuss Ray theory for step Index and Graded Index fibres in optical fibres. (06 Marks)  
c. Explain briefly about optical fibres used in optical communication which usually referred as optical fibre materials. (05 Marks)

**OR**

- 2 a. List advantages and 2 disadvantages of optical fibre communication. (04 Marks)  
b. What are phase and group velocities? How are they related? (08 Marks)  
c. A graded Index fibre has a core with a parabolic refractive index profile which has a diameter of  $50\mu\text{m}$ . The fibre has a numerical aperture of 0.2. Estimate the total number of guided modes propagating in the fibre when operating at a wavelength of  $1\mu\text{m}$ . (04 Marks)

### Module-2

- 3 a. When the mean optical power launched into an 8km length of fibre is  $120\mu\text{W}$ , the mean optical power at the fibre output is  $3\mu\text{W}$ .  
Determine :  
i) The overall signal attenuation or loss in dB through the fibre assuming there are no connectors.  
ii) Signal attenuation per kilometer for the fibre  
iii) overall signal attenuation for a 10km optical link using the same fibre with splices at 1km interval, each giving an attenuation of 1dB  
iv) The numerical input/output power ratio in (iii) (10 Marks)  
b. Explain bending losses with relevant diagram and expressions. (06 Marks)

**OR**

- 4 a. Derive the expression for material dispersion. (08 Marks)  
b. Explain Electric – Orch Fusion splicing technique with a neat diagram. (08 Marks)

### Module-3

- 5 a. With a neat diagram, explain the high radiance surface emitting LED. (06 Marks)  
b. Explain Receiver sensitivity with relevant expressions. (05 Marks)  
c. Explain in brief photo-detector Noise. (05 Marks)

**OR**

- 6 a. With a neat figure of a LASER diode explain its characteristics; Also mention the condition for Lasing. (08 Marks)  
b. In detail provide the relevant explanation, diagram and expression for a reach through Avalanche photodiode. (08 Marks)

**Module-4**

- 7 a. Show the implementation of a typical WDM network containing various types of optical amplifiers with relevant diagram. (04 Marks)  
b. Write a note on optical isolators. (04 Marks)  
c. In detail, explain the working of EDFA with figure of all the 7 transitions. (08 Marks)

**OR**

- 8 a. Explain about Mach – Zender Interferometer with a neat diagram. (06 Marks)  
b. Explain optical Add/Drop multiplexer with diagram. (05 Marks)  
c. With a note on MEMS technology. (05 Marks)

**Module-5**

- 9 a. Briefly explain about the optical fibre evolution. (05 Marks)  
b. Explain ATM Frame format. (05 Marks)  
c. Write in detail about IP for optical networks and explain the different implementation schemes for IP over WDM/DWDM. (06 Marks)

**OR**

- 10 a. Elaborate on the overview of public telecommunication networks. (08 Marks)  
b. Explain with figure optical burst switching concepts. (08 Marks)

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