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# B.TECH. DEGREE EXAMINATION, MAY 2018

### Eighth Semester

Electronics and Communication Engineering

EC 010 801 – WIRELESS COMMUNICATION (EC)

(New Scheme – 2010 Admission onwards)

[Regular/Supplementary]

Time : Three Hours

Maximum : 100 Marks

### Part A

*Answer all questions briefly.*

*Each question carries 3 marks.*

1. How the capacity of cellular communication can be improved with cell splitting?

2. What is small scale fading?

3. State the advantages of CDMA compared to FDMA.

4. List the services offered by GSM.

5. How power control is done in CDMA system?

(5 × 3 = 15 marks)

### Part B

*Answer all questions.*

*Each question carries 5 marks.*

6. Explain cell sectoring. How it helps in improving the performance.

7. What are the effects of multipath propagation? Explain delay spread.

8. Explain how synchronisation is achieved in TDMA networks.

9. Describe how GSM achieves localisation of users.

10. Explain the principle of CDMA using Direct Sequence Spread Spectrum.

(5 × 5 = 25 marks)

### Part C

*Answer all questions.*

*Each full question carries 12 marks.*

11. (a) Describe the elements of cellular systems and explain how a call is made between users.

   (b) Explain the merits and demerits of cellular systems with small cells.

(8 + 4 = 12 marks)

*Or*

**Turn over**

12. (a) Explain the micro cell concept. How it brings improvement in cellular communication.

    (b) What is meant by grade of service? If a channel is occupied for 30 minutes during an hour, what is the traffic intensity in Erlang?

    (7 + 5 = 12 marks)

13. Explain the diversity techniques for mobile wireless radio system. When they are becoming desirable?

*Or*

14. Derive the expression for impulse response of a multipath channel.

15. Explain (i) Fast Frequency hopped spread spectrum systems ; (ii) Slow frequency hopped spread spectrum systems ; and (iii) Synchronisation in spread systems.

    (4 + 4 + 4 = 12 marks)

*Or*

16. Explain TDMA in detail. Discuss the closed loop and open loop synchronisation and frame efficiency.

17. Explain "Hand-off" operation in mobile communication. What are the methods used to decrease the probability of rejecting call request?

*Or*

18. With the help of pictorial representation, describe the different GSM logical channel structures highlighting functionalities.

19. Explain how PN sequences are generated? Explain the Maximum length sequence and Gold sequence.

*Or*

20. In a CDMA, two different senders A and B are sending data $A_d$ = 101 and $B_d$ = 100 with a key $A_k$ = 010100100010110011 and $B_k$ = 000110101000010111.

    Show the waveforms for the following :

    (i) Coding and spreading of data from Sender A.

    (ii) Coding and spreading of data from Sender B.

    (iii) Reconstruction of A's data.

    (iv) Reconstruction of B's data.

    [5 × 12 = 60 marks]

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# B.TECH. DEGREE EXAMINATION, MAY 2018

## Eighth Semester

Branch : Electronics and Communication Engineering

EC 010 802—COMMUNICATION NETWORKS (EC)

(New Scheme—2010 Admission onwards)

[Regular/Supplementary]

Time : Three Hours

Maximum : 100 Marks

### Part A

*Answer all questions.*

*Each question carries 3 marks.*

1. What is cell switching ?

2. State the functions performed by a bridge.

3. Define an IP address? Give example.

4. What are switched virtual circuits in ATM networks ?

5. State the uses of firewalls.

(5 × 3 = 15 marks)

### Part B

*Answer all questions.*

*Each question carries 5 marks.*

6. What is network topology ? Explain with diagrammatic illustration any two network topologies.

7. Explain the working of slotted ALOHA protocol.

8. What is subnetting ? Explain with an example.

9. Which channels are used in ATM networks to convey signaling messages ? Discuss.

10. Explain Symmetrie encryption with an example.

(5 × 6 = 25 marks)

**Turn over**

## Part C

*Answer* **all** *questions.*
*Each full question carries 12 marks.*

11. Explain with diagrammatic illustration open systems interconnection (OSI) network architecture.

*Or*

12. Explain circuit switching and packet switching with example and diagrammatic illustration.

13. Discuss the working of the following channel access methods with an example :

    (a)  CSMA / CD.                                                                     (6 marks)

    (b)  Token Passing.                                                                  (6 marks)

*Or*

14. Discuss the functions performed by the following interconnecting devices with an example and diagrammatic illustration :

    (a)  Transparent Bridges.                                                            (6 marks)

    (b)  Source Routing Bridges.                                                         (6 marks)

15. What is routing ? Explain link state routing algorithm with an example.

*Or*

16. Discuss how the following protocols work :

    (a)  Classless Inter-Domain Routing.                                                 (6 marks)

    (b)  Border Gateway Protocol.                                                        (6 marks)

17. Explain with diagrammatic illustration asynchronous transfer mode (ATM) protocol reference model.

*Or*

18. Explain internetworking with ATM with an example.

19. (a)  Distinguish between symmetric-key and asymmetric-key crypto systems.            (4 marks)

    (b)  How asymmetric-key crypto systems work ? Explain with an example and diagrammatic illustration.

                                                                                         (8 marks)

*Or*

20. What is pretty good privacy (PGP) ? How PGP works ? Explain with an example.

                                                           (5 × 12 = 60 marks)

G 1344

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# B.TECH. DEGREE EXAMINATION, MAY 2018

## Eighth Semester

Branch : Electronics and Communication Engineering

### EC 010 803—LIGHT WAVE COMMUNICATION (EC)

(New Scheme—2010 Admission onwards)

[Regular/Supplementary]

Time : Three Hours

Maximum : 100 Marks

### Part A

*Answer all questions.*

*Each question carries 4 marks.*

1. What is total internal reflection and explain its importance for optical communication.

2. Derive an expression for maximum acceptance angle of a fiber.

3. Describe the three types of fiber misalignment which may contribute to insertion loss at an optical fiber joint.

4. Write notes on bending loss and scattering loss in optical fibers..

5. Explain why a direct band gap semiconductor is preferred to an indirect band gap semiconductor for fabricating light sources ?

6. Discuss the principles of operation of laser diodes. Define threshold current.

7. What is the function of an optical amplifier ? What are the advantages and drawbacks of an optical amplifier

8. Explain the term amplified spontaneous emission (ASE) noise present in erbium doped fiber amplifier and describe its impact on the optical output signal.

9. Write notes on wavelength routing networks

10. Differentiate link power budget and rise time budget.

(10 × 4 = 40 marks)

Turn over

## Part B

*Answer* **all** *questions.*
*Each full question carries 12 marks.*

11. (a) Compare step index single mode fiber with graded index and step index multimode fibers in terms of optical characteristics.

    (b) Calculate the number of modes in a graded index fiber with a parabolic index profile operating at 1330 nm. The axial refractive index of the fiber is $n_1 = 1.49$ and that the core-cladding interface is $n_2 = 1.47$. The core diameter of the fiber is 50 µm. How many modes will be supported by a corresponding step index fiber at this wavelength ?

    (7 + 5 = 12 marks)

*Or*

12. (a) Give the significance of numerical aperture of optical fiber. State and derive the relation between NA and refractive index of core and the relative refractive index ?

    (b) A graded index fiber has a core with a parabolic refractive index profile which has a diameter of 50 µm. The fiber has a numerical aperture of 0.2. Estimate the total number of guided modes propagating in the fiber when it is operating at a wavelength of 1 µm.

    (6 + 6 = 12 marks)

13. What is the difference between dispersion and distortion ? Explain the different dispersion mechanisms present in optical fibers.

*Or*

14. Explain different splicing techniques used in the fiber optic systems. Discuss the advantages and drawbacks of fusion splicing technique.

15. (a) Draw and explain the different LED structures based on double Hetero structure configuration

    (b) Derive an expression for internal quantum efficiency and internally generated Optical power for LED.

    (7 + 5 = 12 marks)

*Or*

16. (a) Explain the structure and principle of working of APD.

    (b) Compare the performance parameters of PIN and APD.

    (8 + 4 = 12 marks)

17. Show the structure of an erbium doped fiber amplifier (EDFA) and explain the function of each component. Explain how stimulated emission occurs in an EDFA.

Or

18. (a) Explain the principle of operation of a Semiconductor laser amplifier

(b) Explain the principle of operation of a mach-Zender interferometer.

(5 + 7 = 12 marks)

19. Explain Link power budgeting and Rise- Time Budgeting of a fiber optic point -to - point link. What is the role of system margin in link power budgeting.

Or

20. Discuss the principle, components and applications of wave length division multiplexing(WDM).

[5 × 12 = 60 marks]

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# B.TECH. DEGREE EXAMINATION, MAY 2018
## Eighth Semester
Branch : Electronics and Communication Engineering

EC 010 804 L03—SECURE COMMUNICATION (Elective III) [EC]

(New Scheme—2010 Admission onwards)

[Regular/Supplementary]

Time : Three Hours                                                    Maximum : 100 Marks

## Part A

*Answer* **all** *questions.*

*Each question carries 3 marks.*

1. List the advantages of an arithmetic over GF $(2^n)$ compared to arithmetic over GF $(p)$.

2. Briefly define Caesar cipher.

3. Explain active and passive attack with example.

4. What are the requirements of public key cryptography ?

5. What is a honeypot ?

$(5 \times 3 = 15 \text{ marks})$

## Part B

*Answer* **all** *questions.*

*Each question carries 5 marks.*

6. Determine the gcd (16072, 24120) using Euclidean algorithm.

7. Discuss about symmetric cipher model in brief.

8. Differentiate between Data Encryption Standard and Advanced Encryption standard.

9. Explain RSA algorithm with suitable example in detail.

10. Briefly describe the differences between statistical anomaly detection and rule based intrusion detection.

$(5 \times 5 = 25 \text{ marks})$

**Turn over**

## Part C

*Answer all questions.*

*Each full question carries 12 marks.*

11. Explain extended Euclidean algorithm, find the **multiplicative inverse** of :

    (i)   1234 mod 4321.

    (ii)  24140 mod 40902.

Or

12. (a)  Determine the multiplicative inverse of $x^3 + x + 1$ in GF $(2^4)$ with $m(x) = x^4 + x + 1$.

                                                   (6 marks)

    (b)  Create a table for addition and multiplication for GF $(2^4)$ using $(x^4 + x^3 + 1)$ as the modulus.

                                                   (6 marks)

13. Explain in detail about security attack and security **services**.

Or

14. Write short notes on :

    (i)   Mono alphabetic cipher.                            (4 marks)

    (ii)  Play fair cipher.                                   (4 marks)

    (iii)  Hill and Poly alphabetic cipher.                    (4 marks)

15. With a neat block diagram, explain DES algorithm **in detail**.

Or

16. Describe AES substitute byte, shift row, mux column **and key round** transformations.

17. Illustrate with an example, Explain public key **cryptosystem with its** applications.

Or

18. Briefly explain in detail about the key management.

19. Explain in detail about intrusion detection **technique**.

Or

20. Write short note on :

    (i)   Password protection.                                 (6 marks)

    (ii)  Password selection strategies.                       (6 marks)

                                                        (5 × 12 = 60 marks)

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# B.TECH. DEGREE EXAMINATION, MAY 2018

### Eighth Semester

Branch : Electronics and Communication Engineering

EC 010 805 G02—E-LEARNING (ELECTIVE IV) (EC)

(New Scheme—2010 Admission onwards)

[Regular/Supplementary]

Time : Three Hours                          Maximum : 100 Marks

### Part A

*Answer all questions.*
*Each question carries 3 marks.*

1. Present an outline of Web based training.

2. Outline the role played by call centres to e-learning.

3. Define knowledge sharing.

4. What is multi-channel learning ?

5. Present an outline of the future of e-learning.

(5 × 3 = 15 marks)

### Part B

*Answer all questions.*
*Each full question carries 5 marks.*

6. Appraise the barriers to e-learning.

7. Explain the role played by interactive television to e-learning.

8. Outline with an example the need for dynamic content.

9. What is a virtual University ? Discuss.

10. Outline the bottlenecks faced by educational institutions in using e-learning environments.

(5 × 5 = 25 marks)

### Part C

*Answer all questions.*
*Each question carries 12 marks.*

11.   a.   How e-learning can be used for distance education ? Discuss.

(6marks)

     b.   What is a virtual class room ? How a virtual class room differs from a traditional class room ?

(6marks)

*Or*

**Turn over**

a. Appraise the planning activities required for developing an e-learning course.

(6 marks)

b. Highlight the expertise required by the human resources who are involved in design and development of an e-learning course.

(6 marks)

A training program that's as simple and interactive as possible has to be organized for the faculty members of the colleges affiliated to Mahatma Gandhi University. Mahatma Gandhi University is the nodal centre where the trainer delivers the lectures. Faculty members must be able to interact with the trainer in the nodal centre from a conference hall in their college. Appraise with a diagram the infrastructure required to successfully conduct the training program.

*Or*

a. Outline with an example how discussion forums promote learning.

(6 marks)

b. Present an outline of audio streaming and video streaming.

(6 marks)

a. Outline why the analysis and design stages of e-content development are essential to ensure course effectiveness learners' motivation and participation.

(4 marks)

b. Explain with an example how e-content promotes self-learning and remote teaching through Information and Communication Technology.

(8 marks)

*Or*

Appraise the stages in knowledge acquisition and creation for e-learning.

What is teaching-learning process ? Outline the types of interactions in the teaching-learning process.

*Or*

Explain blended learning and co-operative learning with an example.

Appraise the guidelines to be followed for enhancing quality of e-learning.

*Or*

Appraise with an example any two assessment methods for e-learning.

[5 × 12 = 60 marks]