Duration-3hrs Marks -80

N.B.

i) Question no.**1** is compulsory
ii) Solve any **three** from the remaining **five** questions

| | | | |
|---|---|---|---|
| 1 | A | How does OFDM provide high data rate? | 5 |
| | B | Microcell zone concept helps in improving capacity of a cellular system . Justify. | 5 |
| | C | What is software Defined Radio? | 5 |
| | D | Differentiate between Rayleigh and Rician distribution. | 5 |
| 2 | A | While designing a cellular system ,how are co-channel and adjacent channel interferences kept under control? What is the role of S/I ratio and Q in this? | 10 |
| | B | Draw neatly and explain the role played by various entities in the GSM architecture. | 10 |
| 3 | A | Describe the frequency and channel specifications of forward channels in CDMA1. | 10 |
| | B | Explain the Handoff and power control in 3G systems . | 10 |
| 4 | A | Give the main features of WCDMA and how are they different from CDMA 2000. | 10 |
| | B | Elaborate on the contribution of MIMO techniques in LTE. | 10 |
| 5 | A | Discuss the frames and slots in LTE. What is a Resource Block? | 10 |
| | B | Classify small scale fading based on Multipath Time Delay Spread and Doppler Spread. | 10 |
| 6 | | Write notes on:**[any two]** | 20 |

a)Indoor propagation Models b)RAKE Receiver c) Trunking & GOS

d)GSM authentication & securit

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Q. P. Code 26230

(3 Hours) Max Marks: 80

1. Question No. 1 is compulsory.
2. Out of remaining questions, attempt any three questions.
3. Assume suitable additional data if required.
4. Figures in brackets on the right hand side indicate full marks.

1. (A) Explain the working of Directional Couplers. (05)
   (B) Explain travelling wave tube as an amplifier. (05)
   (C) What is meant by RADAR range? (05)
   (D) Explain working of BARITT. (05)

2. (A) With a neat functional diagram explain the working principle of Cylindrical Magnetron. (10)
   (B) Radar operating at 1.5 GHz uses a peak pulse power of 2.5 MW and has a range of 100 nmi for objects whose radar cross section is 1 $m^2$. If the minimum receivable power of the receiver is $2x10^{-13}$ Watt, what is the smallest diameter of the antenna reflector could have assuming it to be a full paraboloid with $\eta$=0.65. (10)

3. (A) State various modes of Gunn diode and explain any one of them in detail. (10)
   (B) Explain Doppler Shift and its role in pulsed and CW RADAR. (10)

4. (A) Explain instrument landing system for aircraft navigation. (10)
   (B) Match a load impedance $Z_L$=60-j80 to a 50 Ω line using a double stub tuner. The stubs are open circuited and are spaced λ/8 apart. The match frequency is 2 GHz. (10)

5. (A) Discuss the various frequency bands and characteristics of microwaves. (10)
   (B) Write a short note on rectangular waveguide. (10)

6. (A) Give the working of Two Cavity Klystron. (10)
   (B) With block diagram explain the MTI radar system. Give its limitations. (10)

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**Q. P. Code: 27401**

**Time: 3 hours** **Marks: 80**

1. Q. 1 is compulsory. Solve any 3 questions from remaining 5.
2. Assume required data where ever necessary with proper justification.

Q.1 (a) What is the significance of modeling and coding in data compression? (20)
(b) What are the goals of cryptography? Explain any one in detail.
(c) List techniques used for lossless image compression.
(d) Solve the following
(i) $4^{-1} \bmod 55$
(ii) $3^{144} \bmod 13$
(iii) $6^{-1} \bmod 17$
(iv) Euler's toteint function $\Phi(49)$

Q.2 (a) What is 'frequency' and 'temporal' masking? Explain how it is used and implemented in MP3 audio compression. (10)
(b) Explain Diffie Hellman Key exchange with the help of an example. (10)

Q.3 (a)Explain standard JPEG with neat block diagram. What are advantages of JPEG 2000 over standard JPEG? Justify the use of is DCT in JPEG? (10)
(b)Explain RSA in detail and also discuss attacks on RSA. (10)

Q.4 (a)State following theorems with their applications in cryptography (10)
(i) Fermats' Theorem (ii) Euler's Theorem (iii) Chinese Remainder Theorem.
(b) Explain Hash and MAC functions with their role in cryptography. (10)

Q.5 (a) Consider the probabilities p(a)= 0.2 , p(b)=0.3, p(c) =0.1,p(d)=0.4 .Encode and decode the sequence 'abcad' using arithmetic coding technique. (10)
(b) What is Motion compensation and Motion Estimation in video compression? Explain how they are used in MPEG video compression with appropriate block diagram. (10)

Q.6 (a)Encode and decode the sequence 'abbacbbabbacc' using LZ78. Compare LZ77 and LZ78. (10)
(b) Write short notes**(Any two)** (10)
(i) μ Law and A Law Companding
(ii)Fire walls
(iii) Intruders and viruses

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**[Time: Three Hours]** **[ Marks:80]**

Please check whether you have got the right question paper.

N.B: 1) Question no. 1 is compulsory.
2) Attempt any three questions from remaining questions.
3) Figures to the right indicate full marks.

| | | |
|---|---|---|
| **1.** | (a) Define Fresnel Reflection. Numerical Aperture and V-number. | **5** |
| | (b) Differentiate APD and PIN code. | **5** |
| | (c) Define Splicing. Mention its types and limitations. | **5** |
| | (d) Define Four Wave Mixing (FWM). | **5** |
| **2.** | (a) Explain OTDR working principle in detail. Mention its limitation. | **10** |
| | (b) Discuss different types of Dispersion in optical fiber. | **5** |
| | (c) What is DWDM? Mention its advantages and disadvantages. | **5** |
| **3.** | (a) Explain in brief any two Fiber Fabrication Techniques. | **10** |
| | (b) Explain working principle of LASER source used in optical fiber communication. | **5** |
| | (c) Compare Circulator and Isolators. | **5** |
| **4.** | (a) Derive an expression for Link Power Budget Analysis of optical fiber. | **7** |
| | (b) Explain EDFA amplifier. Mention its advantages. | **8** |
| | (c) Explain Macro Bending loss. | **5** |
| **5.** | (a) Explain Optical Safety and Cross talk. | **10** |
| | (b) Derive an expression for Power Penalty with Impairment. | **10** |
| **6.** | Write short note on **any two:** | **20** |
| | (a) SONET / SDH | |
| | (b) OTDM | |
| | (c) Optical Access Network | |
| | (d) Wavelength Stabilization | |

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