

Subject: WIRELESS AND MOBILE COMMUNICATIONS

Time: 3 Hours

Max. Marks: 100

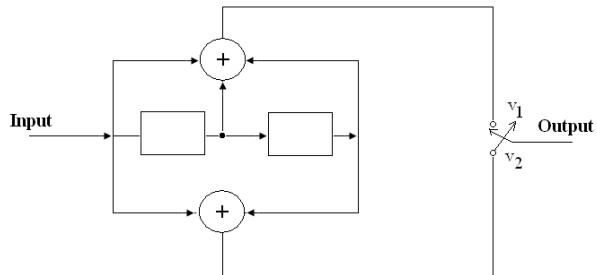
DECEMBER 2010

NOTE: There are 9 Questions in all.

- Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.
- The answer sheet for the Q.1 will be collected by the invigilator after half an hour of the commencement of the examination.
- Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.
- Any required data not explicitly given, may be suitably assumed and stated.

Q.1 Choose the correct or the best alternative in the following: (2×10)

- a. _____ is a first generation cellular phone system.
- (A) AMPS (B) D-AMPS
(C) GSM (D) IS-95
- b. _____ connects the base stations with the wired telephone network (PSTN).
- (A) Transmitter (B) Cell phones
(C) MSC (D) CDMA
- c. _____ occurs when a user begins moving towards another cell and the phone automatically associates with the base station of that cell.
- (A) Roaming (B) handoff
(C) Hunting (D) Multiplexing
- d. Frequency reuse factor in CDMA is
- (A) 1 (B) Less than 1
(C) Greater than 1 (D) zero
- e. GSM uses _____ for multiplexing.
- (A) CDMA (B) TDMA and FDMA
(C) FDMA (D) CSMA
- f. Convolutional encoder as shown in the Fig.1 has code rate
- (A) $\frac{1}{3}$ (B) $\frac{1}{2}$
(C) $\frac{2}{3}$ (D) 1



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- g. In the _____ random access method, stations do not sense the medium.
- (A) ALOHA (B) CSMA/CD
(C) CSMA/CA (D) CSMA
- h. The signal from a satellite is aimed at a specific area called the _____.
- (A) period (B) footprint
(C) orbit (D) uplink
- i. IEEE 802.15 standard correspond to _____.
- (A) Wi-Fi (B) Blue tooth
(C) WMAN (D) Ethernet
- j. A _____ is a computerised centre that is responsible for connecting calls, recording call information and billing.
- (A) base station (B) cell
(C) MSC (D) mobile station
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**Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.**

- Q.2** a. With a simplified system infrastructure diagram for a cellular system, bring out the salient features of a cellular system. (6)
- b. If a total of 33 MHz bandwidth is allocated to a particular cellular telephone system that uses two 25 KHz simplex channels to provide full duplex voice channels, compute the number of simultaneous calls that can be supported per cell if a system uses
(i) FDMA (ii) TDMA with 8 way time multiplexing
Assume that additional bandwidth is reserved for the control channels. (6)
- c. Define discrete random variables and its expected value. (4)
- Q.3** a. How is free space propagation different from land propagation? Explain with the help of path loss schematics. (8)
- b. What causes intersymbol interference and how can you reduce intersymbol interference in the wireless communication system? (4)
- c. Bring out the concept of an interleaver. (4)
- Q.4** a. Explain the following terms:
- (i) Frequency reuse.
(ii) Cell splitting and sectoring. (3+6)

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- b. How does slotted ALOHA improve the throughput as compared to pure ALOHA? (7)
- Q.5** a. What do you mean by spread spectrum? Discuss the concept of DSSS with diagram. (4+4)
- b. 16 QAM is used to transmit a binary sequence, if the baud rate is 1200 Hz, how many bits can be transmitted in one second? (4)
- c. Describe the specific advantages and disadvantages of static channel over dynamic allocation strategies? (4)
- Q.6** a. What is handoff and how it can be initiated? Explain hard and soft handoffs with schematic illustrations. (2+3+3)
- b. How the call setup in a satellite system differs from a cellular system? Explain with a diagram. (8)
- Q.7** a. Explain GSM architecture with a block schematic. (8)
- b. Discuss the function of various logical channels in IS-95. (8)
- Q.8** a. What are the differences between cellular and adhoc networks? (4)
- b. On what factors routing in a MANET is dependent? Explain dynamic source routing. (1+6)
- c. Draw and explain the general architecture of a fixed sensor node. (5)
- Q.9** a. Discuss bluetooth system architecture with a schematic diagram. (8)
- b. Explain the basic functions of smart antenna with a diagram. (8)