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B.Tech. DEGREE EXAMINATION, MAY 2023

Seventh Semester

18ECC301T - WIRELESS COMMUNICATION

(For the candidates admitted during the academic year 2018-2019 to 2021-2022)

Note:

i. **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40 minutes.

ii. **Part - B** and **Part - C** should be answered in answer booklet.

Time: 3 Hours **Max. Marks: 100**

Part - A (20 × 1 Marks = 20 Marks) — Marks | BL | CO

Answer **All** Questions

1. Why neighbouring stations are assigned different group of channels in cellular system? — 1 | 1 | 1
   (A) To minimize area (B) To minimize interference
   (C) To maximize throughput (D) To maximize capacity of each cell
2. A spectrum of 30 MHz is allocated to a cellular system which uses two 25 KHz simplex channels to provide full duplex voice channels. What is the number of channels available per cell for 4 cell reuse factor? — 1 | 3 | 1
   (A) 150 channels (B) 600 channels
   (C) 50 channels (D) 85 channels
3. The time over which a call can be maintained within a cell without handoff is called _____ — 1 | 1 | 1
   (A) Run time (B) Peak time
   (C) Dwell time (D) Cell time
4. What is the concept for accommodating a large number of users in a limited radio spectrum? — 1 | 2 | 1
   (A) Grade of service (B) Trunking
   (C) Multiplexing (D) Multitasking
5. Okumura model is applicable for distances of _____ — 1 | 1 | 2
   (A) 1 m to 10 m (B) 1 km to 100 km
   (C) 100 km to 1000 km (D) 10 km to 10000 km
6. The free space model predicts that received signal decays as a function of _____ — 1 | 1 | 2
   (A) Gain of transmitter antenna (B) T-R separation
   (C) Power of transmitter antenna (D) Effective aperture of the antenna
7. Which of the following considers the impact of rooftops and building? — 1 | 1 | 2
   (A) Okumura model (B) Hata model
   (C) Walfisch and Bertoni model (D) Longley- Rice model
8. Which distribution describes the shadowing effect? — 1 | 1 | 3
   (A) Log normal distribution (B) Nakagami distribution
   (C) Cauchy distribution (D) Rayleigh distribution
9. The Doppler shift for mobile moving with constant velocity, v is given by _____ — 1 | 2 | 3
   (A) $(v*\cos\theta)/\lambda$ (B) v/λ
   (C) $v*\cos\theta$ (D) $v*\lambda$

10.	Small scale variations of a mobile radio signal are directly related to _____ (A) Impulse response of mobile radio channel (B) Impulse response of base station (C) Frequency response of antenna (D) Frequency response of base station	1	1	2
11.	For a Rayleigh fading signal, mean and median differ by _____ (A) 2 dB (B) 10 dB (C) 0.55 dB (D) 100 dB	1	1	6
12.	For fast fading channel, the coherence time of the channel is smaller than _____ of transmitted signal. (A) Doppler spread (B) Bandwidth (C) Symbol period (D) Coherence bandwidth	1	1	6
13.	Equalization is used to compensate _____ (A) Peak signal to noise ratio (B) Intersymbol interference (C) Channel fading (D) Noises present in the signal	1	1	3
14.	In maximal ratio combining diversity technique, the output SNR is equal to _____ (A) Mean of all individual SNRs (B) Maximum of all SNRs (C) Sum of individual SNR (D) Minimum of all SNRs	1	1	4
15.	RAKE receiver uses separate _____ to provide the time shifted version of the signal. (A) IF receiver (B) Equalizer (C) Correlation receiver (D) Channel	1	1	4
16.	Large scale fading can be mitigated with the help of _____ (A) Modulation (B) Demodulation (C) Macroscopic diversity technique (D) Microscopic diversity technique	1	1	4
17.	The AMPS system uses a _____ cell reuse pattern. (A) One (B) Five (C) Three (D) Seven	1	1	5
18.	In OFDMA, what is the relationship between the subcarrier spacing f and symbol time t? (A) f=t (B) f=1/2t (C) f=1/t (D) f=2t	1	2	5
19.	What processing step combines multiple OFDM subcarriers into a single signal for transmission? (A) FFT (B) IFFT (C) RF combining (D) Channel mapping	1	1	5
20.	_____ carries digitally encoded user data. (A) Traffic channels (B) Control channels (C) Signalling channels (D) Forward channels	1	1	5

Part - B (5 × 4 Marks = 20 Marks)

Answer **any 5** Questions

		Marks	BL	CO
21.	Describe simplex, half duplex and full duplex communication system with block diagram.	4	2	1
22.	Describe the paging system with block diagram.	4	1	1
23.	Define Brewster angle. Calculate the Brewster angle for a wave impinging on ground having a permittivity of $\varepsilon_r = 4$.	4	3	2
24.	List out the factors in radio propagation channel which influences small scale fading.	4	2	5
25.	What is the necessity of equalization in communication receiver?	4	2	6
26.	Discuss the various interfaces used in GSM	4	1	5
27.	How voice modulation Process happen in AMPS systems?	4	2	5

Part - C (5 × 12 Marks = 60 Marks)

Answer **All** Questions

		Marks	BL	CO
28.	a. What is hand off? Explain in detail about hand-off strategies with block diagram. **(OR)** b. Explain in detail about basic antenna parameters.	12	2	1
29.	a. Derive the expression for the path loss in two ray ground reflection model. **(OR)** b. Explain the free space propagation model in detail with no obstacle in between the transmitter and receiver.	12	3	2
30.	a. Explain in detail about Parameters of mobile multipath channels **(OR)** b. Explain Impulse response model of multipath channel.	12	2	6
31.	a. Explain the principle and operation of RAKE receiver in a CDMA system with a neat block diagram. **(OR)** b. What do you meant by diversity? Discuss various diversity techniques in detail.	12	2	4
32.	a. Explain GSM system architecture and its frame format. **(OR)** b. Explain OFDM Transmitter and receiver with Block diagram.	12	1	5

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