18ECC301T –WIRELESS COMMUNICATION

Name	DR.SANDEEP KUMAR P	Unit No.	1
Designation / Department	ASSISTANT PROFESSOR/ECE	Unit Title	INTRODUCTION TO WIRELESS COMMUNICATION SYSTEM

Notations

M - Marks
CO - Course Learning Outcome
BL - Bloom's Level (1. Remembering | 2. Understanding | 3. Applying | 4. Analysing | 5. Evaluating | 6. Creating)
PI - Performance Indicator Code

Note

1. Refer appendix / attachment for Bloom's Taxonomy action verbs
2. Refer appendix / attachment for a model Performance Indicator
3. For each unit / CO, write 20 MCQs (10 questions in Level 1 & 2; 6 or 7 questions in Level 3; 3 or 4 questions in Level 4)
4. Both higher order cognitive skills 'Evaluate' and 'Create' are difficult to assess in time-limited examinations, and hence no questions may not be set up in Levels 5 & 6.
5. Fill up the table of CO / Bloom's Level distribution given at the end of this document.

Q. No.	MCQ		M	CO	BL	PI
1.	During the handoff process in the cellular system, the margin (Threshold) is given by			1	1	
	A.	Δ = Pr(HANDOFF) – Pr (MAX. USABLE)				
	B.	Δ = Pr(HANDOFF) – Pr (MIN. USABLE)				
	C.	Δ = Pr(SAR OF THE MOBILE) – Pr (MIN. USABLE)				
	D.	Δ = Pr(CELL) – Pr (BASE STATION)				
	Ans.	B				
2.	For a best cellular communication system, Handoff must be performed			1	1	
	A.	successfully & as infrequently as possible				
	B.	successfully & as frequently as possible				
	C.	With more power emission				

	D.	With the same frequencies of mobile and base station				
	Ans.	A				
3.	Smallest of the handover type			1	1	
	A.	Intra-cell-Intra BSC Handover				
	B.	Inter-cell-Intra BSC Handover				
	C.	Inter-cell-Inter BSC Handover				
	D.	Inter MSC Handover				
	Ans.	A				
4.	From the users point of view, the most preferred handoff classification is			1	1	
	A.	Soft Handoff				
	B.	Hard Handoff				
	C.	Intra-cell-Intra BSC Handover				
	D.	Inter-cell-Intra BSC Handover				
	Ans.	A				
5.	While locating a co-channel cell, a RF site engineer will do the following mapping after moving ‘i’ cells along any particular direction			1	1	
	A.	Turn 90 deg counter clockwise & move j cells				
	B.	Turn 60 deg clockwise & move j cells				
	C.	Turn 60 deg counter clockwise & Move j cells				
	D.	Move j cells and Turn 60 deg counter clockwise				

	Ans.	C				
6.	Erlang C system's Probability depends upon the			1	1	
	A.	Blocked Calls				
	B.	Blocked calls and delay				
	C.	Only the delay calls				
	D.	Erlang B				
	Ans.	B				
7.	In a trunked radio system (TRS) each user is allocated a channel on a			1	1	
	A.	per frequency basis				
	B.	per channel basis				
	C.	per base station basis				
	D.	per call basis				
	Ans.	D				
8.	With respect to Erlangs, Maximum Load represents			1	1	
	A.	Unity				
	B.	Infinity				
	C.	Zero				
	D.	Negative				
	Ans.	A				
9.	Resultant of imperfect receiver filters			1	1	
	A.	Adjacent channel interference				
	B.	Co channel interference				

	C.	Network interference				
	D.	Stop band interference				
	Ans.	A				
10.	Co-channel interference relation depends on			1	1	
	A.	Radius of cell				
	B.	Transmitted power				
	C.	Received power				
	D.	Frequency of mobile user				
	Ans.	A				
11.	The width of the Guard band is addressed by			1	1	
	A.	how sharp the transceiver filter roll off factor is				
	B.	how sharp the transmitter filter roll off factor is				
	C.	how sharp the receiver filter roll off factor is				
	D.	how sharp the mobile station roll off factor is				
	Ans.	C				
12.	Antenna are not placed near to each other, otherwise _____ interference get increased.			1	1	
	A.	adjacent channel				
	B.	co-channel				
	C.	constructive				
	D.	destructive				
	Ans.	A				
13.	Cell splitting_____ the transmitted power.			1	1	
	A.	reduces				

	B.	increases				
	C.	enlarge				
	D.	put up				
	Ans.	A				
14.	Identify the channel to be used for a transmission of device power level from mobile station to base station			1	1	
	A.	Forward Control Channel				
	B.	Reverse Control Channel				
	C.	Forward Voice Channel				
	D.	Reverse Voice Channel				
	Ans.	B				
15.	The data rate in 3G standard is			1	1	
	A.	144bps – 2Kbps				
	B.	144Kbps – 2Gbps				
	C.	144Kbps – 2Mbps				
	D.	144Mbps – 2Gbps				
	Ans.	C				
16.	In the case of Handoff scenario, If the Threshold power is high then			1	1	
	A.	Unnecessary Handovers will be present				
	B.	Unnecessary Handovers will be present without burdening Mobile switching Centre				
	C.	Unnecessary Handovers will be present with a load of burden on Mobile switching Centre				
	D.	Unnecessary Handovers will not be present				
	Ans.	C				

17.	In the Case of Cell Splitting with a Radius of R/4, the Transmitted Power is reduced by _____ dB with newer cell. Assume 'n' is the path loss exponent.			1	1	
	A.	3n				
	B.	6n				
	C.	4n				
	D.	2n				
	Ans.	B				
18.	In Borrowing Strategy,_____ supervises the borrowing of channel from neighbouring cells.			1	1	
	A.	Mobile Switching Centre				
	B.	Base Station				
	C.	Mobile Station				
	D.	Cell				
	Ans.	A				
19.	Cell dragging is a practical handoff problem which arises due to the _____			1	1	
	A.	High speed mobile systems				
	B.	Pedestrian users				
	C.	Stationary users				
	D.	Base stations having same frequency				
	Ans.	B				
20.	Adjacent channel interference can be minimized through _____			1	1	
	A.	Changing frequency of base stations				
	B.	Careful filtering and channel assignments				

	C.	Increasing number of base stations				
	D.	Increasing number of control channels				
	Ans.	B				
21.	Which of the following priority handoff method decrease the probability of forced termination of a call due to lack of available channels?			1	4	
	A.	Queuing				
	B.	Guard channel				
	C.	Cell dragging				
	D.	Near far effect				
	Ans.	A				
22.	Soft handoff is also known as _____			1	1	
	A.	Partial Handoff				
	B.	Make before Make				
	C.	Break before make				
	D.	Make before break				
	Ans.	D				
23.	If the handoff threshold is too large, apart from unnecessary handoffs			1	2	
	A.	Mobile switching centre gets less load				
	B.	Mobile switching centre gets over loaded				
	C.	Mobile switching centre channels gets exhausted				
	D.	Base station gets optimally loaded				
	Ans.	B				
24.	Increase in capacity, with the degradation in _____ efficiency is caused by cell sectoring.			1	2	
	A.	antenna				

	B.	transmission				
	C.	trunking				
	D.	radiation				
	Ans.	C				
25.	In hexagonal shaped type of cell with 6 vertices ,how many antennas are needed for edge excitation			1	2	
	A.	1				
	B.	6				
	C.	3				
	D.	2				
	Ans.	C				
26.	What is the distance between two co channel base stations?			1	2	
	A.	3N				
	B.	R 3N				
	C.	3RN				
	D.	3 N				
	Ans.	B				
27.	What is the Co-Channel reuse value for a cluster size of 12?			1	2	
	A.	3				
	B.	4.58				
	C.	6				
	D.	6.24				
	Ans.	C				
28.	What is the Co-Channel reuse value for a cluster size of 7?			1	2	
	A.	3				
	B.	4.58				
	C.	6				

	D.	6.24				
	Ans.	B				
29.	If a group of 100 users made 30 calls in one hour, and each call had an average call duration(holding time) of 5 minutes, then the traffic intensity is			1	3	
	A.	2.5 Erlangs				
	B.	3 Erlangs				
	C.	5 Erlangs				
	D.	7.5 Erlangs				
	Ans.	A				
30.	The channel allocations for the cell sites are designed so that 2 out of 100 calls will be blocked due to channel occupancy during the busiest hour. Then the Grade of Service of non-blocking is			1	3	
	A.	98%				
	B.	2%				
	C.	200%				
	D.	50%				
	Ans.	A				
31.	What is the Frequency Reuse Distance for a cluster size of 7 with a cell radius 2 Kms?			1	3	
	A.	9.16 Kms				
	B.	4.52 Kms				
	C.	3.52 Kms				
	D.	11.09 Kms				
	Ans.	A				
32.	A spectrum of 25 MHz is allocated to a cellular system which uses two 25 KHz simplex channels to provide full duplex			1	3	

	voice channels. What is the number of channels available per cell for 4 cell reuse factor?					
	A.	150 channels				
	B.	125 channels				
	C.	1000 channels				
	D.	250 channels				
	Ans.	B				
33.	Assume each user of a single base station mobile radio system averages three calls per hour, each call lasting on average of 5 minutes. What will be the traffic intensity of each user?			1	3	
	A.	0.25 Erlang				
	B.	0.15 Erlang				
	C.	0.6 Erlang				
	D.	1 Erlang				
	Ans.	A				
34.	What is the cluster Size for i=4 and j=3 ?			1	3	
	A.	37				
	B.	19				
	C.	49				
	D.	7				
	Ans.	A				
35.	How many users can be supported for 0.5% blocking probability for 5 number of trunked channels in a BCC system? If that each user generates 0.1 Erlangs of traffic.			1	3	
	A.	11				
	B.	12				
	C.	10				
	D.	9				

	Ans.	A				
36.	A 30MHz bandwidth is allocated to a particular FDD cellular telephone system which uses two 30KHz simplex channels to provide full duplex voice and control channels .So what will be the total available channels in the system?			1	3	
	A.	500 Channels				
	B.	1000 Channels				
	C.	660 Channels				
	D.	1320 Channels				
	Ans.	A				
37.	A Signal to Interference ratio of 18.66 dB with 6 co channels in the first tier of the system and with a path exponent value of 4.What will be the Co -Channel reuse ratio ?			1	3	
	A.	3				
	B.	4.58				
	C.	6				
	D.	6.24				
	Ans.	B				
38.	What will be the total no of users if each user generates 0.1Erlang and the total offered traffic is 3.96?			1	3	
	A.	40				
	B.	4				
	C.	0.4				
	D.	11				
	Ans.	A				
39.	The worst-case signal to interference ratio for a cluster size of 7 and path loss exponent of 4 is			1	4	
	A.	Less than 18 dB and more than 7 dB				
	B.	More than 18 dB				

	C.	Less than 7 dB				
	D.	More than 28 dB				
	Ans.	A				
40.	I am a cellular coverage technique and I use different antenna heights and Tx power levels to provide large and small cell coverage. Identify me.			1	4	
	A.	Umbrella Cells				
	B.	Cell Splitting				
	C.	Sectoring				
	D.	Microcell Zone Concept				
	Ans.	A				

Course Outcome and Bloom's Level Distribution to the questions

Question No.	Course Outcome Distribution						BL Distribution					
	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5	CLO-6	L1	L2	L3	L4	L5	L6
1	✓						✓					
2	✓						✓					
3	✓						✓					
4	✓						✓					
5	✓						✓					
6	✓						✓					
7	✓						✓					
8	✓						✓					
9	✓						✓					
10	✓						✓					
11	✓						✓					
12	✓						✓					
13	✓						✓					
14	✓						✓					
15	✓						✓					
16	✓						✓					
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18	✓						✓					
19	✓						✓					
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31	✓								✓			
32	✓								✓			
33	✓								✓			
34	✓								✓			
35	✓								✓			
36	✓								✓			
37	✓								✓			
38	✓								✓			
39	✓									✓		
40	✓									✓		
Total							22	6	10	2		
%												