18ECC301T –Wireless Communication

Name		Unit No.	3
Designation / Department		Unit Title	Small Scale Fading

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.	**_____leads to time dispersion and frequency selective fading.**		1	3	1	
	A.	Doppler effect				
	B.	Multipath delay spread				
	C.	Phase delay spread				
	D.	Frequency delay spread				
	Ans.	B				
2.	**_____leads to frequency dispersion and time selective fading.**		1	3	1	
	A.	Doppler effect				
	B.	Multipath delay spread				
	C.	Phase delay spread				
	D.	Frequency delay spread				
	Ans.	A				

3.	**_____ small scale multipath measurement uses a wideband pulsed bistatic radar that transmits a repetitive pulse width.**		1	3	1	
	A.	Spread spectrum sliding correlator				
	B.	Frequency Domain				
	C.	Direct RF pulse				
	D.	Envelope detector				
	Ans.	C				
4.	**For fast fading channel, the coherence time of the channel is lesser than _____ of transmitted signal**		1	3	1	
	A.	Bandwidth				
	B.	Doppler spread				
	C.	Coherence bandwidth				
	D.	Symbol period				
	Ans.	D				
5.	**Flat fading is a type of_____ fading**		1	3	1	
	A.	Multipath time delay spread small scale				
	B.	Doppler spread small scale				
	C.	Multipath Doppler spread large scale				
	D.	Delay spread large scale				
	Ans.	A				
6.	**In slow fading channels, Doppler spread of the channel is much less than the _____of baseband signal**.		1	3	1	
	A.	Phase				
	B.	Bandwidth				
	C.	Coherent time				
	D.	Symbol period				
	Ans.	B				

7.	**The maximum excess delay of the multipath channel is given by____**		1	3	1	
	A.	N/Δτ				
	B.	2N/Δτ				
	C.	N Δτ				
	D.	N/2Δτ				
	Ans.	C				
8.	**The median value of r in Rayleigh distribution is**		2	3	1	
	A.	1.1 σ				
	B.	1.77 σ				
	C.	1.711 σ				
	D.	1.177 σ				
	Ans.	D				
9.	**Doppler spread leads to_____**		1	3	2	
	A.	Frequency dispersion and time selective fading				
	B.	Time dispersion and frequency selective fading				
	C.	Time dispersion and time selective fading				
	D.	Frequency dispersion and frequency selective fading				
	Ans.	A				
10.	**Multipath Delay Spread leads to _____**		1	3	2	
	A.	Frequency dispersion and time selective fading				
	B.	Time dispersion and frequency selective fading				
	C.	Time dispersion and time selective fading				
	D.	Frequency dispersion and frequency selective fading				
	Ans.	B				

11.	**The time between maximal correlations in sliding correlation process with slide factor γ , sequence length *l* and chip rate R_c is**		2	3	1, 2	
	A.	γlRc				
	B.	l/Rc				
	C.	γ/Rc				
	D.	$\gamma l/Rc$				
	Ans.	D				
12.	**The Direct RF pulse system uses _____ detector**		1	3	1	
	A.	Envelope				
	B.	Coherent				
	C.	Threshold				
	D.	Noise				
	Ans.	A				
13.	**If the frequency correlation is above 0.5 and with an RMS delay spread of 1.37µs ,the coherence bandwidth is_____**		3	3	3	
	A.	200 KHz				
	B	50 KHz				
	C.	53 KHz				
	D.	146 KHz				
	Ans.	D				
14.	**The envelope of sum of two quadrature Gaussian noise follows _____ distribution.**		1	3	1	
	A.	Nakagami				
	B.	Rayleigh				
	C.	Inverse Gaussian				
	D.	Gamma				
	Ans.	B				

15.	**The distribution present in small scale fading envelope of a non-fading signal component is _____.**		1	3	1	
	A.	Log normal				
	B.	Gaussian				
	C.	Ricean				
	D.	Rayleigh				
	Ans.	C				
16.	**When the dominant component fades away, the Ricean distribution degenerates to _____ distribution.**		1	3	2	
	A.	Gaussian				
	B.	Rayleigh				
	C.	Log normal				
	D.	Gamma				
	Ans.	B				
17.	**If the symbol period of the transmitted signal is greater than the coherence time of the channel, the type of fading is _____.**		1	3	1, 2	
	A.	Fast fading				
	B.	Frequency non selective fading				
	C.	Slow fading				
	D.	Frequency selective fading				
	Ans.	A				
18.	**If the symbol period of the transmitted signal is lesser than the coherence time of the channel, the type of fading is _____.**		1	3	1, 2	
	A.	Fast fading				
	B.	Frequency non selective fading				
	C.	Slow fading				
	D.	Frequency selective fading				

	Ans.	C				
19.	**Power delay profile is represented as plots of _____ with respect to fixed time delay reference**		1	3	2	
	A.	Relative received power				
	B.	Frequency				
	C.	Transmitted power				
	D.	Relative power				
	Ans.	A				
20.	**Which of the following is not a multipath channel parameter that can be determined from power delay profile**		1	3	3	
	A.	Mean excess delay				
	B.	RMS delay spread				
	C.	Excess delay spread				
	D.	Spreading factor				
	Ans.	D				
21.	**Time resolution $\Delta\tau$ of the multipath component of spread spectrum system with sliding correlator is given by**		2	3	1	
	A.	2 Tc				
	B.	Tc/2				
	C.	2 Rc				
	D.	Rc				
	Ans.	A				
22	**Which of the following is not a type of small scale fading**		1	3	2	
	A.	time selective fading				
	B.	frequency selective fading				
	C.	path loss				

	D.	fast fading				
	Ans.	C				
23	**For a Rayleigh fading signal, mean and median differ by _____**		2	3	1	
	A.	2dB				
	B.	10dB				
	C.	100dB				
	D.	0.55dB				
	Ans.	D				
24	**Consider an L=2 component multipath wireless with components arriving at 0μs, 1μs and respective powers of components as 0dB, 0dB respectively. What is the rms delay spread of the wireless channel?**		3	3	3	
	A.	0.85μs				
	B.	1.15μs				
	C.	0.95μs				
	D.	0,5μs				
	Ans.	D				
25	**_____ parameter describe the time dispersive nature of the channel**		1	3	2	
	A.	Delay spread and Coherence bandwidth				
	B.	Doppler spread and Coherence bandwidth				
	C.	Doppler spread and Coherence Time				
	D.	Delay spread and Coherence Time				
	Ans.	A				
26	**If coherence bandwidth is lesser than the bandwidth of the signal, _____ fading occurs.**		1	3	2	
	A.	Flat				

	B.	Frequency selective				
	C.	Fast fading				
	D.	Time selective				
	Ans.	B				
	.					
27	**_____fading channels are also called wideband channels.**		1	3	1	
	A.	Flat				
	B.	Frequency selective				
	C.	Fast fading				
	D.	Time selective				
	Ans.	B				
28	**The time duration when the channel is stable is _____**		1	3	2	
	A.	Propagation Time				
	B.	Coherence Time				
	C.	Transmission Time				
	D.	Symbol Time				
	Ans.	B				
29	The observed time scale on the oscilloscope using a sliding correlator is related to the actual propagation time scale by		1	3	1	
	A.	Observed Time x slide factor				
	B.	Observed Time /slide factor				
	C.	slide factor / Observed Time				
	D.	slide factor x Observed Time				
	Ans.	B				
30	**In the Ricean distribution if K= -∞_____**		1	3	2	

	A.	Amplitude of dominant path decreases				
	B.	Power of noise decreases				
	C.	Amplitude of dominant path increases				
	D.	Power of signal increases.				
	Ans.	A				
31	.	**The time delay bin width of wireless channel having maximum excess delay of 100µs and 64 multipath bins**	2	3	3	
	A.	1.5 µs				
	B.	1.2 µs				
	C.	1.00 µs				
	D.	1.7 µs				
	Ans.	A				
32	**The _____give rise to the statistics similar to Rayleigh PDF.**		2	3	2	
	A.	Ricean distribution with rice factor(k)=0				
	B.	Ricean distribution with rice factor(k)=1				
	C.	Nakagami-m distribution with m=1/2				
	D.	Nakagami-m distribution with m=1				
	Ans.	A				
33	**Consider an L=5 component multipath wireless with components arriving at 0µs, 2µs, 3µs,6µs, 8µs and respective powers of components as -10dB, -20dB, 0dB, -10dB and -20dB respectively. What are the Maximum and RMS delay spread of the wireless channel?**		3	3	3, 4	
	A.	8µs, 1.299µs				
	B.	6µs, 3.032µs				
	C.	6µs, 1.299µs				
	D.	8µs, 3.032µs				
		A				

	Ans.					
34	**Coherent time with a Doppler spread f_m be approximated to**		2	3	1	
	A.	$0.423/f_m$				
	B.	$0.23/f_m$				
	C.	$0.323/f_m$				
	D.	$0.523/f_m$				
	Ans.	A				
35	**As_____ and the dominant path decreases in amplitude, the Ricean distribution degenerates to a Rayleigh distribution.**		2	3	2	
	A.	A -> 0 and K-> 0				
	B.	A-> 0 and K-> ∞				
	C.	A-> 0 and K-> -∞				
	D.	A-> 0				
	Ans.	C				
36	**Consider a mobile user moving with a velocity of 500kmph at carrier frequency 128MHz and an angle of 25°. Doppler shift frequency is**		3	3	3, 4	
	A.	59				
	B.	59.71				
	C.	53.71				
	D.	59				
	Ans.	C				
37	**If time correlation function is above 0.5 ,the coherence time for a frequency of 1900MHz and velocity of 50m/s is**		3	3	3, 4	
	A.	565 μs				
	B.	56 μs				

	C.	65 µs				
	D.	665 µs				
	Ans.	A				
38	**Flat fading channel condition is_____**		2	3	2	
	A.	Ts>> σ τ				
	B.	1/ Ts<< Bc				
	C.	2 Ts >> Bc				
	D.	Ts<< σ τ				
	Ans.	A				
39	**Coherence Time T_C is proportional to**		1	3	2	
	A.	Doppler Spread Bandwidth B_D				
	B.	1/ Doppler Spread Bandwidth B_D				
	C.	2 Doppler Spread Bandwidth B_D				
	D.	0.5 Doppler Spread Bandwidth B_D				
	Ans.	B				
40	**Given a transmitter which radiates a signal of carrier frequency of 1850 MHz. For a vehicle moving at 60Kmph,the Doppler shift frequency is _____**		3	3	3, 4	
	A.	100.84				
	B.	102.84				
	C.	84				
	D.	100				
	Ans.	B				