UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2018

Course: Wireless and Adhoc Networks **Semester: VII**
Programme: B.Tech CSE- IT Infra **Course Code:CSIB342**
Time: 03 hrs. **Max. Marks: 100**
Instructions:

SECTION A

S. No.		Marks	CO
Q 1	What is hidden terminal problem?	**4**	**CO1**
Q 2	List the applications of ad hoc network	**4**	**CO5**
Q 3	Differentiate between Wireless and Wired Transmission.	**4**	**CO4**
Q 4	When the modulation percentage is 75%, an AM transmitter radiates 10KW Power. How much of this is carrier Power?	**4**	**CO2**
Q 5	What is Direct Sequence Spread Spectrum (DSSS)?	**4**	**CO3**
	SECTION B		
Q 6	Describe the various issues for integrating MANET'S to internet in detail. Explain the solutions for it.	**10**	**CO4**
Q 7	Explain Nyquist's theorem and Shanon's theorem in reference to the constraints that determine the maximum rate of data transmission through a channel.	**10**	**CO1**
Q 8	(i) How can we enhance cellular network capacity? (ii) A cellular system uses frequency spectrum 1900 MHz to 1940 MHz for uplink channels and 1960 MHz to 2000 MHz for downlink channels respectively. Each channel takes 200 KHz and can be shared by 8 users. Each user needs one uplink and one downlink channel. How many users can be supported without frequency reuse in this cellular system?	**10**	**CO3**
Q 9 A	What types of topologies can be used in an 802.11 wireless network? What are the network services that are required in 802.11 wireless networks?	**10**	**CO4**
	OR		
Q 9 B	If a cellular operator is allocated 12.5 MHz for each simplex band and if B_t is 12.5 MHz, B_{guard} is 10khz and B_c is 30khz, then find the number of channels available in a FDMA system.	**10**	**CO4**
	SECTION-C		
Q 10	What is the difference between multiple access and Multiplexing? What are the multiple access techniques available for wireless communication? Briefly explain them with proper block diagram.	**20**	**CO5**
Q 11	(i) What role does the routing protocol play in the provisioning of QoS guarantees	**20**	**CO3**

(A)	for ad hoc wireless networks? (ii) What is Frequency Hopping Spread Spectrum (FHSS)?		**CO4**
	OR		
Q 11 (B)	A particular cellular system has the following characteristics: cluster size = 7, uniform cell size (circular cells), user density = 100 users/sq. Km, allocated frequency spectrum = 1050-1099 MHz, bit rate required per user = 10 Kbps uplink and 10 Kbps downlink, and modulation code rate = 1 bps/Hz. If the available spectrum is divided into 100 channels and TDMA is employed within each channel then, i. What is the bandwidth and data rate per channel? ii. How many time slots are needed in a TDMA frame to support the required number of users? iii. If the TDMA frame is 10ms, how long is each user slot in the frame? iv. How many bits are transmitted in each time slot?	**20**	**CO3** **CO4**

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Name of Examination (Please tick, symbol is given)	:	MID		END	⊟	SUPPLE	
Name of the School (Please tick, symbol is given)	:	SOE		SOCS	⊟	SOP	
Programme	:	B.Tech CSE- Specialization in IT Infrastructure					
Semester	:	VII					
Name of the Course	:	Wireless and Adhoc Networks					
Course Code	:	CSIB 342					
Name of Question Paper Setter	:	Vivek Shahare					
Employee Code	:	40001819					
Mobile & Extension	:	9096312208					

Note: Please mention additional Stationery to be provided, during examination such as Table/Graph Sheet etc. else mention "NOT APPLICABLE":

FOR SRE DEPARTMENT

Date of Examination	:	
Time of Examination	:	
No. of Copies (for Print)	:	

Note: - Pl. start your question paper from next page

Model Question Paper (Blank) is on next page

Name: Enrolment No:	UPES

Course: **Wireless and Adhoc Networks**   Semester: **VII**
Programme: **B.Tech CSE- IT Infra**   Course Code:**CSIB342**
Time: **03 hrs.**   Max. Marks: **100**
Instructions:

SECTION A

S. No.		Marks	CO
Q 1	What is Exposed terminal problem?	**4**	**CO4**
Q 2	What is wireless network? Explain the various types.	**4**	**CO1**
Q 3	When the modulation percentage is 75%, an AM transmitter radiates 10KW Power. How much of this is carrier Power?	**4**	**CO2**
Q 4	What are the steps involve in Early fit reservation (EFR) in reference to Bandwidth slot allocation strategies.	**4**	**CO5**
Q 5	Differentiate between Wireless and Wired Transmission.	**4**	**CO1**

SECTION B

Q 6	In a communication channel, the bandwidth is 10 MHz and SNR is 100. (i) Determine the channel capacity. (ii) If SNR drops to 10, how much bandwidth is needed to achieve the same channel capacity as in (i)	**10**	**CO1**
Q 7	Explain Multiple Access with Collision Avoidance (MACA) along with the solution.	**10**	**CO4**
Q 8	(i) Consider an area of 1800 square Km covered by a cellular network. If each user requires 15 KHz for communication, and the total available spectrum is 45 MHz, how many users can be supported without frequency reuse? (ii) If cells of area 18 square Km are used, how many users can be supported with cluster sizes of 3 and 7?	**10**	**CO4**
Q 9 (A)	Describe the analog and digital modulation techniques.	**10**	**CO2**

OR

Q 9 (B)	What are the multiple access techniques available for wireless communication?	**10**	**CO2**

SECTION-C

Q 10	What is Spread Spectrum? Explain various spreading techniques.	**20**	**CO3**
Q 11 (A)	(i) What are the design goals for wireless LAN? (ii) If a normal GSM timeslot consists of 6 trailing bits, 8.25 guard bits, 26 training bits, and 2 traffic bursts of 58 bits of data, find the frame efficiency.	**20**	**CO4** **CO5**

OR

Q 11 (B)	(i) Describe the four components of an 802.11 wireless network?	**20**	**CO4** **CO5**

(ii) A particular cellular system has the following characteristics: cluster size = 7, uniform cell size (circular cells), user density = 100 users/sq. Km, allocated frequency spectrum = 900-949 MHz, bit rate required per user = 10 Kbps uplink and 10 Kbps downlink, and modulation code rate = 1 bps/Hz.

Calculate the following for the above system if FDMA/FDD is used:
a. How much bandwidth is available per cell using FDD?
b. How many users per cell can be supported using FDMA?
c. What is the cell area?
d. What is the cell radius assuming circular cells?