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B.E./B. TECH. DEGREE END SEMESTER EXAMINATIONS, APRIL/MAY'2011

INFORMATION TECHNOLOGY

VI SEMESTER (REGULATIONS 2008)

IT9352 – WIRELESS NETWORKS

Time: Three hours **Maximum**: 100 marks

Answer ALL questions.

PART A – (10X2 = 20 marks)

1. What limits the range of wireless LAN ?
2. Why does ITU-R only regulate lower frequencies (up to some hundred GHz) and not higher frequencies (in the THz range) ?
3. When can MACA fail in case of hidden/exposed terminal?
4. How much of the original GSM network does GPRS need?
5. Name the different multiplexing scheme used in GSM and state their purpose.
6. What is meant by triple-play service? Do WiMAX support this?
7. How is roaming on layer 2 achieved?
8. Why are special protocols for the support of micro mobility on the network layer needed?
9. Can the problems using TCP be solved by replacing TCP with UDP? Justify.
10. How can a user access the features of mobile phones via web browser?

PART B - (5X16 = 80 marks)

11. Pretend your company won a license to build a cellular system in India (the application cost for the license was only Rs.25,000). Your license is to cover 140 square km. Assume a base station costs Rs.25 lac, and mobile telephone switching office (MTSO) costs Rs.75 lac. An extra

Rs.25 lac is needed to advertise and start the business. You have convinced the bank to loan you Rs.300 lac, with the idea that in four year you will have earned Rs.500 lac in gross billing revenues, and will have paid off the loan.

(i) How many base stations (i.e. cell site) will you be able to install for Rs.300 lac? **(04)**

(ii) Assuming the earth is flat and the subscribers are uniformly distributed on the ground, what assumption can you make about the coverage area of each of your cell site? What is the major radius of each of your cells assuming a hexagonal mosaic? **(04)**

(iii) Assume that the average customer will pay Rs.2000 per month over a period of four years. Assume that on the first day you turn your system on, you have a certain number of customer which remains fixed through the year. On the first day of each new year, the number of customer using your system doubles and then remains fixed for the rest of that year. What is the minimum number of customers you must have on the first day of service in order to have earned Rs.5000 lac in gross billing revenues by the end of the 4^{th} year of operation? **(04)**

(iv) For your answer in (iii), how many users per square km are needed on the first day of service in order reach the Rs.5000 lac mark after the 4^{th} year? **(04)**

12. (a)(i) Present the overview of IEEE802.11 system and protocol architecture. **(08)**

(ii) Explain the synchronization and power management in IEEE802.11 infrastructure network. **(08)**

Or

(b) (i) Explain the DSDV and DSR ad-hoc routing algorithms. **(08)**

(ii) Draw and explain the WiMAX architecture proposed by WiMAX forum. **(08)**

13. (a) (i) What is the goal of GPRS? Explain the network and protocol architecture of GPRS. **(10)**

(ii) What is meant by PDP context? State it's importance. **(06)**

Or

(b)(i) If a GSM uses a frame structure where each frame consists of eight time slots, and each time slot contain 156.25 bits, and data is transmitted at 270.833 kbps in the channel, find

I. The time duration of a bit **(02)**

II. The duration of a slot **(02)**

III. The time duration of a frame **(02)**

IV. How long must a user occupying a single time slot wait between two successive transmission. **(02)**

(ii) If a normal GSM time slot consists of six trailing bits, 8.25 guard bits, 26 training bits, and two traffic bursts of 58 bits of data, find the frame efficiency. **(08)**

14. (a) Explain the following types of TCP used in mobile transport layer:

i. Indirect TCP, ii. Snooping TCP, iii. Mobile TCP, and iv. Transaction-oriented TCP

Compare the advantages and drawbacks of each.

Or

(b) (i) Explain the problem called "triangular routing". With schematic explain how optimization can be carried out for this. **(10)**

(ii) With suitable diagram explain the IP micro-mobility support in Cellular IP network. **(06)**

15. (a) (i) Present and explain the components and interface of the WAP 1.x architecture. **(12)**

(ii) Elaborate the scenario of fixed and wireless network for the integration of different components of WAP. **(04)**

Or

(b) (i) Draw a WTA logical architecture and explain each components. **(08)**

(ii) With flow diagram explain the voice message delivery in WTA. **(08)**
