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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT  
TEST -3 EXAMINATION- 2018

B.Tech. (CSE), 7<sup>th</sup> Semester

COURSE CODE: 15BIWCI731

MAX. MARKS: 35

COURSE NAME: Mobile Computing

COURSE CREDITS: 3

MAX. TIME: 2:00 Hrs

*Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.*

Q.1. Draw the Suitable diagram for the components and interface of Wireless Application Protocol (version 1.x) architecture. Show how the integration of WAP components is carried out in context to Fixed Network and Wireless Network. [5 Marks]

Q.2. What are the attributes/ factors which affects the efficiency of traditional TCP in mobile environment? List out the techniques identified as classical TCP improvements. Show the working of Indirect TCP with the help of suitable diagram. [5 Marks]

Q.3 Identify the advantages, disadvantages and mechanism involved in at least five classical enhancements to TCP approaches. [5 Marks]

Q.4 What is the basic purpose of DHCP? Name the entities of DHCP. How can DHCP be used for mobility and support of mobile IP? [5 Marks]

Q.5 Why is routing in multi-hop ad-hoc networks complicated, what are the special challenges ? Recall the distance vector and link state routing algorithms for fixed networks. Why are both difficult to use in multi-hop ad-hoc networks ? [5 Marks]

Q.6 List out the goals of mobile IP. One initial problem of an MN is how to find a foreign agent. How does the MN discover that it has moved ? Write the name of both the approaches used by Mobile IP for above mentioned issues. Explain one of them in details with each step involved and with the help of suitable diagram. [5 Marks]

**Q.7. (a)** OFDM uses a set of orthogonal sub-carriers for transmission of data. OFDM is used in WLANs. Consider an OFDM system that uses 52 sub-carriers out of which 48 are data sub-carriers and 4 are pilot sub carriers. System bandwidth is 40MHz and OFDM symbol duration including cyclic prefix (guard interval for ISI mitigation) is 8  $\mu$ s. If code rate is  $\frac{3}{4}$  and 64 QAM is used, what is the data rate ?

[3 Marks]

**(b)** Free space propagation model is used to predict the received signal strength when transmitter and receiver has clear unobstructed line of sight path between them. The free space power received by a receiver antenna separated from a transmitting antenna by a distance  $d$  is given by Friis free space equation  $P_r(d) = P_t G_t G_r \left(\frac{\lambda}{4\pi d}\right)^2$  when the system losses are neglected. If the transmitter and receiver in a WLAN operating at the 2.4 GHz are separated by a distance of 2000 m, and the power transmitted by the transmitter is 20dB, what is the received power considering free space propagation and omni-directional antennas at both end ?

[2 Marks]