

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2018

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

Dr Pradeep K Singh

COURSE CODE: 15B1WCI731

MAX. MARKS: 25

COURSE NAME: Mobile Computing

COURSE CREDITS: 3

MAX. TIME: 1:30 HRS

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

**Q.1. (a)** Identify some of the advantages and disadvantages of Wireless LANs ? [3 Marks]

**Q.1 (b)** There are number of applications of Wireless LANs from Medical to Personal and Commercial Usages. Point out the design goals that have to be taken into account for WLANs to ensure their commercial success. [3 Marks]

**Q.2 (a)** Differentiate between Infra red v/s Radio Transmission [2 Marks]

**Q.2 (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 200 m, and the power transmitted by the transmitter is 10dB, what is the received power considering free space propagation and omni-directional antennas at both end ? [2 Marks]

**Q.3** Show the system architecture of an infrastructure based IEEE 802.11 network and IEEE 802.11 Ad-Hoc Wireless LANs. Explain the role of Physical Layer in both the network architectures. [3 Marks]

**Q.4** 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 20MHz and OFDM symbol duration including cyclic prefix (guard interval for ISI mitigation) is 4  $\mu$ s. If code rate is  $\frac{3}{4}$  and 64 QAM is used, what is the data rate ? [4 Marks]

**Q.5** Show the diagram for Bluetooth Protocol Stack. Mention the role of Link Manager Protocol (LMP). [4 Marks]

**Q.6** How the security is embedding in Bluetooth Protocol ? Explain the Bluetooth security components and protocols with the help of suitable figure. State one line for each of the standard 802.15.1, 802.15.2, 802.15.3, 802.15.4 . [4 Marks]