ROEVER ENGINEERING COLLEGE

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DEPARTMENT OF INFORMATION TECHNOLOGY

IT1452 – FUNDAMENTALS OF PERVASIVE COMPUTING

UNIT I   PERVASIVE ARCHITECTURE   9
Local area networks – Wireless LANS – Relationship of wireless, internet and ubiquitous computing –Pervasive computing and ubiquitous computing – Ambient computing – Pervasive web application Architecture – Requirements of computational infrastructure –   Failure management – Security –Performance – Dependability.

UNIT II   MOBILE DEVICE TECHNOLOGIES   9
Mobile computing devices characteristics – Adaptation – Data dissemination and management – Heterogeneity – Interoperability – Context awareness – Language localization issues – User interface design issues – Difference between UI design for mobile devices and conventional systems – Mobile agents – Mobile device technology overview – Windows CE – Symbian – J2ME – Pocket PC – BREW.

UNIT IIISENSOR NETWORKS AND RFID'S   9
Introduction to sensor networks – Sensor node architecture – Sensor network architecture – Types of sensor networks – Platforms for wireless sensor networks – Applications of wireless sensor networks –Introduction to RFID – Transponder and reader architecture – Types of tags and readers –Frequencies of operation – Application of RFID technologies.

UNIT IV   LOCAL AREA AND WIDE AREA WIRELESS TECHNOLOGIES 9
IEEE 802.11 technologies – Infrared technologies – Bluetooth networks (OBEX Protocol) – Personal area networks – Mobility management – Mobile IP – Establishing wide area wireless networks – Concept and structure of "Cell" – Call establishment and maintenance – Channel management – Frequency assignment techniques.

UNIT V   PROTOCOLS AND APPLICATIONS   9
Networking protocols – Packet switched protocols – Routing protocols for sensor networks – Data centric protocols – Hierarchical protocols – Location – Based protocols – Multimedia Messaging Service (MMS) protocols – Wireless Application Protocol (WAP) – Applications of pervasive computing – Retail – Healthcare – Sales force automation – Tracking applications.

                                                                                Total: 45

TEXT BOOK

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1. Adelstein,F&Gupta.S.K.S,"Fundamentals of Mobile&Pervasive Computing",Tata McGraw Hill, 2005

2. Ashoke Talukdar and Roopa Yavagal, "Mobile Computing", Tata McGraw Hill, 2005.

SUBJECT CODE: IT1452
SUBJECT NAME: FUNDAMENTALS OF PERVASIVE COMPUTING
UNIT-I   PERVASIVE ARCHITECTURE

<center>**PART –A**   **(1 MARK)**</center>

1. **A computer communication technology that provides a way to interconnect multiple computer across short distance is**
   a. LAN   b. MAN   c. WAN   d. Wireless network

2. **What is the standard for Ethernet**
   a. IEEE 802.1 b. IEEE 802.2 c. IEEE 802.3 d. IEEE 802.5

3. **What type of Ethernet is 10BASE 5**
   a. thick   b. thin   c. moderate   d. none of the above

4. **1000Mbps of LAN is known as**
   a. fast Ethernet b. gigabit Ethernet c. thick Ethernet d. thin Ethernet

5. **IEEE 802.5 is a standard for**
   a. Ethernet b. token bus c. wireless LAN d. token ring

6. **The total number of class of IP address are**
   a.1 to 127 b. 127 to 191 c.224 to 239 d. 192 to 223

7. **Which of the following are regarded as WAN**
   a. frame relay b. slip c. IEEE 802.5 D. x.25

8. **HTTP transfer data in**
   a.LAN   b. MAN c. WAN d. all the above

9. **A network is defined as**
   a.Set of points   b.An area of working c.Set of nodes or devices   d.None of the above

10. **If a network genarates only a minimum (less frequent)numbers of failure between the nodes it is called as**
    a.Reliable network b.Secured network c.Non secured network d.Local area network

11. **HIPERLAN is a standard used for**
    a.WLAN   b.LAN alone c.MAN alome   d.LAN and MAN

12. **DHCP stands for**
    a. Dynamic Host Control Protocol b. Dynamic Host Configuration Protocol.
    c. Dynamic Host Connect ion Protocol. d. None of the above.

13. **Protocol used to monitor and control network devices operates at :**
    a. Application layer b. Transport layer c. Network layer d. Data Link layer

14. **FTP does not use**
    a. Two transfer mode. b. Control connect ion to remote computer before file can be transferred c. User Datagram Protocol. d. Authorization of a user through login and password verification.

<center>2</center>

15. Kerberos is an encryption-based system that uses

a. Secret key encryption b. Public key encryption

c. Private key encryption d. Data key encryption

16. SMTP is a

a. Networking Protocol b. Protocol used for transferring message between end user &

Mail Server c. Protocol used for smart card message interchange d. Encryption Standard

17. HTML is a

a. Programming Language b. Scripting Language c. Web Browser d. Network Protocol

18. Mechanism to protect private networks from outside attack is

a.Firewall b. Antivirus c. Digital signature d. formatting

19. Which type of web document is run at the client site

a. Static **b.** Dynamic **c.** Active d**.** All of the above

20. The main function of a browser is to

a. compile HTML b. interpret HTML c. de-compile HTML d. interpret CGI program

Answers:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
a	c	a	b	d	c	c	c	c	a	A	b	a	a	b	b	c	a	b	c

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PART –B   **(2MARKS)**

</div>

21. Define pervasive computing. (AU-APR/MAY 2011)

- Everywhere, anywhere, always on, anytime Pervasive computing is the third wave of computing technologies to emerge since computers first appeared.
- Pervasive – all around us, Human Centered, Computers should adapt to the humans
- Computations enter our world, Better ways of Computer-Human interaction

22. What are the ways of pervasive computing approach?

- First Wave-Mainframe computing era: 1computer shared by many people, via workstations.
- Second Wave - Personal computing era: one computer used by one person, requiring a conscious interaction. Users largely bound to desktop.
- Third Wave–Pervasive (initially called ubiquitous) computing era: 1person, many computers.

23. What is the aim of ubiquitous computing? (AUT-NOV/DEC 2012)

- The aim of ubiquitous computing is to design computing infrastructures in such a manner that they integrate seamlessly with the environment and become almost invisible.
- Present Everywhere Bringing mobile, wireless and sensor Ubiquitous computing (ubicomp) integrates computation into the environment, rather than having computers which are distinct objects

24. What are the principles of pervasive computing?

- Creation of environments saturated with computing and communication capability, yet gracefully integrated with human users.
- The purpose of a computer is to help you do something else.
- The best computer is a quiet, invisible servant. Technology should create calm.
- Calm technology: A technology that which informs but doesn't demand our focus/ attention
- Pervasive computing integrates computation into the environment, rather than having computers which are distinct objects**.**

25. Draw the ubiquitous computing vision.

26. Define ambient intelligence.

- The concept of ambient intelligence or Am I is a vision where humans are surrounded by computing and networking technology unobtrusively embedded in their surroundings.
- In order for Am I to become a reality a number of key technologies are required:
- A seamless mobile/fixed web-based communication infrastructure (interoperability, wired and wireless networks etc.)
- Dynamic and massively distributed device networks.
- Natural feeling human interfaces (intelligent agents, multi-modal interfaces, models of context awareness etc.)
- Dependability and security (self-testing and self repairing software, privacy ensuring technology et)

27. What are the other terms for pervasive computing?

- Ubiquitous computing.   Calm technology.   Things   that   think Everyware.
- Pervasive internet.   Ambiant intelligence. Proactive computing.
- Augmented reality.   Sentient Computing.   Urban Computing**.**

28. What is context adaptative computing?

- context adaptive system typically enables the user to maintain ascertain application (in different forms) while roaming between different wireless access technologies, locations, devices and even simultaneously executing everyday tasks like meetings, driving a caretc.

• For example a context adaptive and hence ubiquitous navigation system would offer navigation support in the situations *at home*, *indoor*, *outdoor*, and *in car*.

29. What are context-aware pervasive systems?

Context-aware pervasive systems (or aware systems, for short) refer to systems that can be aware of their physical (and virtual) environment or situation, and respond intelligently based on such awareness. It is among the most exciting trends in computing today, fueled by developments in pervasive computing, including new computers worn by users, embedded devices, sensors, and wireless networking technology

30. What is the future of pervasive computing? (AUT-NOV/DEC 2012)

• Our surrounding is the interface.   Using all senses intuitive

• Context-based knowledge handling.   Infinite bandwidth, convergence.

• Mobile/wireless full multimedia.   New materials.

• Wide adaption.   World-wide adaption.

31. Define scalability and availability.

Scalability:

• Given the ever-growing number of pervasive computing devices, scalability of pervasive computing applications is a very important issue.

• Large telecommunication companies expect millions of users to subscribe for some applications.

Availability

• It is of particular importance in the pervasive computing environment.

• Unlike PC users, most users of pervasive computing devices and applications will neither understand nor accept comments like 'server currently down for maintenance'.

32. Define secure pervasive access architecture.

All incoming requests originate from the device connectivity infrastructure.

This infrastructure may include different kinds of gateways that convert device specific requests to a canonical form, i.e. HTTP request that may carry information about the device type, the desired language and the desired reply content type, e.g. HTML,WML,or VoiceXML.

33. Mention the various type of wireless LANS. (AU-APR/MAY 2011), (AU-MAY/JUNE 2013)

1. Peer-to-Peer   2. Bridge   3. Wireless distribution system

34. What are the limitation of local area networks?

PART –C   (16 MARKS)

35. Compare the pervasive computing and mobile computing. (AUT-NOV/DEC 2012), (AU-MAY/JUNE 2013)

36. Short notes on ubiquitous computing.

37. Short notes on   a)Ambient intelligence   b) Context adaptative computing

c) Context-aware pervasive systems   d) Future of pervasive computing

38. **Explain about the Pervasive web application architecture. (AU-APR/MAY 2011), (AUT-NOV/DEC 2012), (AU-MAY/JUNE 2013)**

39. **Explain about the wireless LAN technologies in detail. (AUT-NOV/DEC 2012), (AU-MAY/JUNE 2013)**

40. **Explain about the secure pervasive access architecture and applications.** (AU-APR/MAY 2011), (AUT-NOV/DEC 2012)

UNIT-II   MOBILE DEVICE TECHNOLOGIES
                                PART –A   (1MARK)

41. **The frame size IS-136 cellular mobile standard is**
        a.30 msec   b.40 msecc.50 msecd.60 msec

42. **The carrier sigmal bit rate of the IS-95 standard is**
        a.9.6Kbs   b.10.6 Kbs   c.9.6 Mbps   d.19.6 kbps

43. **The term POTS refers to**
        a.Parllel old telephone service b.Pair of telephone set c.Plan old telephone service d.Plan old telegraph set

44. **A network capable of connection many subscribers through switches in a cellular system is called as**
        a.Amplifier   b.BTS   c.AuC   d.PSTN

45. **GSM stands for**
        a. General system for mobile   b. Global system for mobile
        c. Group system for mobile   d. Global system for specical mobile

46. **ETSI stands for**
        a.European Techinical Standards Institute b.Egypt Technical Standards of Institute
        c.European Telecommunication Standards Institute d.None of the above

47. **Consider the following statements**
        1. Call termination   2.Call establishment   3.maintain a call
        Give the correct sequence of them in an increasing order
        a.1-2-3   b.2-3-1   c.3-2-1   d.2-1-3

48. **Pointers are not used in**
        a.Blutooth   b.Wireless LAN   c.a and b   d.None of the above

49. **Health monitoring is an example for**
        a.Secrity service   b.Fun   c.Mobile office   d.Personal service

50. **EIR is meant for**
        a.User identification   b.Device identification c.Protection of user data   d.None of the above

51. **Half duplex channel in GSM is a**
        a.Traffic channel   b.Control channel   c.Dedicated channel   d.broadcast channel

52. **SDCCH is**
        a.Mobility Management   b.Call Management c.Resource Management d.None of the

53. **Each subscriber is assigned with a code in mobile communication in the**
      a.FDMA   b.TDMA   c.CDMA   d.SDMA

54. **Some carrier frequency is used with non overlapping time slots in**
      a.CDMA   b.FDMA   c.TDMA   d,None of the above

55. **SPADE is an example for**
      a.FAMA-FDMA   b.FAMA-TDMA   c.DAMA-FDMA   d.TDMA

56. **In Direct to Home broadcast system the frequency range in c bound is,**
      a.3.4 to 4.2GHz   b.7.5 to 8.2GHz   c.2100 to 2128MHz   d.112.2 to 12.9 GHz

57. **Direct video broadcasting was formulated by**
      a.Egyptian Telecommunication Standard b.Japanese Telecommunication Standard
      c.European Telecommunication standards Institute d.None of the above

58. **The IEEE802.11 standard supports**
      a.WLAN   b.Ad-hoc   c.WLAN and Ad-hoc   d.MAN

59. **DAB is**
      a.Digital radio system b.Analog radio system c.Having spectrum efficiency d. none of these

60. **IEEE 802.11 standrd for covers the following layers in its functionality when copied to OSI reference model**
      a.Network and transport layer   b.Physical and data link layer
      c.Physical layer and network layer   d.Network layer session layer

Answers:

41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
b	A	c	c	c	c	b	a	b	a	b	b	c	c	c	a	c	c	a	b

PART –A   **(1 MARK)**

61. Define mobile computing.
- Distributed systems with a network to communicate between different machines.
- Wireless communication is needed to enable mobility of communicating devices.
- Provides information anytime anywhere or, more generally, computing anytime and anywhere.
- Deals with limitations of mobile computing Devices

62. What are the characteristics of mobile computing devices? (AU-APR/MAY 2011), (AUT-NOV/DEC 2012)
- Adaptation   Data dissemination and Management
- Heterogeneity   Interoperability   Context awareness

63. What are the key constraints of mobile computing?
- unpredictable variation in network quality
- lowered trust and robustness of mobile elements

- limitations on local resources imposed by weight and size constraints.
- concern for battery power consumption

64. What are the features mobile computing?

•*Mobile networking*, including Mobile IP, ad hoc protocols, and techniques for improving TCP

•performance in wireless networks

•*Mobile information access*, including disconnected operation, bandwidth-adaptive file access, and selective control of data consistency

•*Support for adaptative applications*, including transcoding by proxies and adaptive resource

•management

•*System-level energy saving techniques*, such as energy-aware adaptation, variable-speed processor scheduling, and energy-sensitive memory management

•*Location sensitivity*, including location sensing and location-aware system behavior

65. Define adaptation.

•Humans have evolved to be on the top of the food chain.

•It is only because of our ability to adapt that we can be found from Arctic regions to the Sahara Desert.

•The vision of mobile computing is to be able to roam seamlessly with your computing devices while continuing to perform computing and communication tasks uninterrupted.

•Many technological advances at various fronts such as security, privacy, resource allocation, charging, and billing have to be made to make this feasible.

66. Give an Example Adaptation?

•Consider a scenario in which you move from one converge area of an access point to another while a video streaming application is running on your computer.

•To continue receiving the video stream packets now should be routed automatically through the new access point.

•In an Internet Protocal (IP)-based network this may involve the mobile client obtaining a new address.

•The underlying system has to take many actions automatically to ensure continued connectivity, in this case uninterrupted viewing of the video stream**.**

67. Why adaptation need?

•**Transparency**

•Access transparency   Location transparency   Failure transparency

•**Constraints of Mobile computing Environment**

•more resources-poor   less secure and reliable

•Mobile connectivity can be highly variable

- **Application aware adaptation and application-transparent Adaptation**
- **Mechanisms of adaptation**
    - •Adapting Functionality   Adapting data

68. Where we use adaptation?

 • **In distributed Applications (CS), adaptation can be performed**

•At client   At Server   At both

- Adaptation can also be performed at intermediate software entity called proxy.
- *Adapting to the hardware/software capabilities of the mobile device* – in the proxy and/or at the server
- *Adapting to the connectivity of the mobile device* – at the server and/or at the client
- *Adapting to the resource availability at the mobile device* – *at the client.*
- Data adaptation
- Transcoding: converting data objects from one representation to another
- Dynamically adapt to the availability of bandwidth and capabilities of the end device.
- If the end device is not capable of handling full motion video, a transcoding proxy may convert it to a form that can be displayed on the end device

69. Define data dissemination.

- Timely and accurate information (data) is essential for performing various day to day task.
- Push mode(publish subscribe): -information is explicitly pushed(radio and TV);
- we subscribe to a stock ticket and whenever the information is updated it'll be sent to os
- Advantages of push mode:
- Broad casting frequently requested data items (hot data items) conserves bandwidth.
- Highly scalable- same bandwidth is consumed for all the mobile devices.
- Eliminates Energy consumption – no need of uplink request to data server.
- Pull Mode (on demand): we send an explicit query every time we need particular information.

70. Define context awareness.

•*Context* has its origin in the Latin verb *contexere,* meaning "to weave together."

•Two Categories:

•*enumeration-based* - context is defined in terms of its various categorizations,

•*Role-based* - context is defined in terms of its role in context-aware computing.

71. Define enumeration-based.

- *Computing context* includes network connectivity, communication costs, communication bandwidth, and local resources, such as printers, displays, and workstations.
- *User context* includes user profiles, location, and people in the vicinity of the user.

- *Physical context* includes lighting and noise levels, traffic conditions, and temperature.
- *Temporal context* includes time of day, week, month, and season of the year.
- *Context history* is the recording of computing, user, and physical con-text across a time span.

72. *What are the five applications of context types?*

- five W's of context can form the core of different context types used by an application
- *Who (social context).*
- *What (functional context).*
- *Where (location context).*
- *When (temporal context).*
- *Why (motivating context).*
- In addition
  - user's emotional state *(emotional context)*
  - Information about the environment, such as room temperature and illumination level *(environmental context)*

73. Define heterogeneity.

•The basic premise of pervasive computing—everything connected—guarantees heterogeneity at all levels: infrastructure, hardware, software, and people.

•All kinds of devices must be supported.

•Perhaps in some specific application scenarios it is possible to restrict the kinds of devices that are supported but, in general, the environment must anticipate the existence of a wide variety of devices.

•If we consider devices used by the user to interact with the system, they can range from standard ones

•such as laptops, PDAs, and phones, to emerging ones such as those embedded in clothing and eyeglasses.

•The variety of available devices has several implications. One is the kind of input-output devices:

74. Define agents.

•software system which acts "intelligently"on your behalf convenient metaphor

•situated in an environment and exhibit behaviour which can be viewed as:

•pro-active, autonomous, communicative, persistent, mobile, benevolent, adaptive/learning,

Collaborative, reactive, deliberative, ...

75. What is a mobile agent? (AU-APR/MAY 2011), (AU-MAY/JUNE 2013)

A mobile agent is an object capable of autonomously migrating from one host to another in a distributed system to perform actions on behalf of its creator.

76. What are the applications of mobile agent. (AUT-NOV/DEC 2012)

- •WWW Information retrieval
- •Electronic Marketplace   Distributed Data Mining
- Mobile Computing
- Others – Network Management, Distributed Database Access
- A Calendar Management System
- a 'calendar server' maintaining users' calendars
- agents for scheduling meetings using patterns:
- Global File Access System--agent-based remote file access system
- Web Index Search Service
- Built above the file access system. Agents are used for
- Searching a user's web-page directory.
- Distributed Collaboration

77. What are the mobile device technology

Hardware

•Battery Displays Memory Processors Interfaces Keyboards

Software

•Operating systems   Java for Pervasive devices   Browsers

78. What is WINDOWS CE?

- Windows CE is an embedded operating system developed by Microsoft.
- Previous versions (1.0 and 2.0) of the Windows CE user interface were similar to the Windows user interface.
- The current version (3.0, which is used in the Pocket PC) is now better optimized for ease of use.
- Windows CE is available for 32-bit CPUs such as x86, SH3/4, ARM/StrongARM, PowerPC, and MIPS.
- Windows CE 3.0 offers real-time support, a smart card subsystem for PC/SC compliant readers.

79. What is JAVA 2 MICRO EDITION?

- Java 2 Micro Edition is targeted for pervasive computing devices without real-time requirements.
- Typically these devices are characterized by:
- ƒ small amount of available memory (128-512 kB)
- ƒ limited energy (battery-operated), connected to a network
- ƒ Restricted graphical display capabilities.
- These devices range from smart cards to phones and set-top boxes.
- To cover this broad range of devices, there are several device configurations and technologies.

80. What is Connected device configuration (CDC) ?

It is based on the personal Java technology and has the byte codes and core APIs of standard Java. It is targeted at devices like screen phones and set-top boxes with more than 512 kB ROM, more than 256 kB RAM, and connection to a network. The main difference to standard Java libraries is the restricted user interface library.

81. What is connected, limited device configuration (CLDC)?

Addresses the geographical user interface, data storage, messaging (e.g. email, SMS), security, and wireless networking for devices with 128-512 kB RAM, such as mobile phones and TV sets.

PART –B   (2 MARKS)

82. Explain the Characteristics of mobile computing devices? (AUT-NOV/DEC 2012), (AU-MAY/JUNE 2013)

83. Discuss the various issues of user interface design. (AUT-NOV/DEC 2012)

84. Explain the characteristics of BREW. List its adv&dis. (AUT-NOV/DEC 2012)

85. Explain about the Data dissemination and management. (AU-APR/MAY 2011)

86. Define Mobile agents. Explain about the Agent architecture – telescript.

87. Explain about the Mobile device technology.

88. Explain about the WINDOWS CE architecture and packet PC. List its advantages. (AUT-NOV/DEC 2012), (AU-MAY/JUNE 2013)

89. Explain about the JAVA 2 MICRO EDITIONS. (AU-APR/MAY 2011)

UNIT-IIISENSOR NETWORKS AND RFID'S

PART –A   (1 MARK)

90. The radius of micro cells is in the range of

   a.20-22km   b.0.1-1kmc.0.5-1km   d.10-20km

91. The cocept of dividing a cellular region in 3 or 6 parts with respect to an angle is known as

   a.Cell spliting   b.Cell sectoring   c.Umbrella pattern   c.Hand-off technique

92. Which one of the following cellular mobile was the first U.S celllular mobile standard? a.USDC b.AMPS c.DECT d,PDC

93. An example for two way communication is

   a.Simplex system b.Full duplex system c.Half duplex system d.Television communication

94. If the signal is periodic then it satisfies the

   a. Norton theorem   b.superposition principle   c.BIBO system   d. MIMO system

95. Consider the following statements

   a. **Refraction of a wave can be considered as bending**

   b. **Reflection cannot be considered as bouncing**

   c. **Diffraction of a wave can be considered as scattering**

    d. **Interference cannot be considered as collding**

    e. **Which of these statements are correct**

        a.1 and 3 b.1 and 2   c.2 and 3   d.1 and 4

96. **Consider the following statements in sky wave propagation during day time the layers of ionosphere are. Which of the statement are correct?**

        1.F,E 2.F   3.D 4.E

97. **Consider the following statements. In need for modulation the**

    1. Wavelength is related to power

    2. Wavelength is related with height of antenna

    3. Wavelength is equal to the ratio of distance power

    4. Wavelength of the signal does not matter

    Which of these statements are correct?

    a.1 and 4   b.2 and 4   c.2 alone   d.3 alone

98. **Consider the following statements for 100 % modulation**

    1. Modulation index=0.5   2. Modulation index=0.2

    3. Modulation index=1   4. Modulation index=1.5

    Which of above statements are correct?

    a.1   b.2 and 4   c.1 and 2   d.3

99. **Consider the following statements.**

    The modulation techniques suitable for cellular mobile communication are

    1. ASK and FSK   2.MSK and ASk

    3. MSK and QPSK   4.ASK and BPSK

    Which of these statements are correct?

    a.4   b.3   c.1and 3   d.2

100. **Consider the following statements are correct The spread spectrum technique has**

    a. Higest security   b. No jamming problem

    c. Used in military application   d. Sents the message in same frequency

    Which of these statements are correct?

    a.1 and 4   b.1,2 and 3 c.2,3 and 4   d.1,3 and 4

101. **Consider the following cellular operations**

    1. Mobile unit initialization 2.Pagging   3.Mobile originated   4.Base receiver station.

    The increasing order of them is

    A.4-1-2-3   b.2-4-1-3   c.1-2-3-4   d.1-3-2-4

102. **Consider the following functions of   a cellular mobile system**

    1. Monitoring for a storage signal   2.Request for connection

    3. Paging function   4.On going call   5.Call acceptance 6.Hand-off function

    The correct sequence of increasing order of the above is

    A.1-2-3-5-4-6   b.1-3-2-5-4-6   c.2-3-5-4-6-1   d.1-5-3-2-4-6

103. **Voice transmissiion will slowly become inaudible if the distance is**

    a.>60km   b.<60km   c.>30km   d.<30km

104. **For inteconnecting many subscribers through switches the system used is**

a.BTS   b.PSTN   c.CR   d.None of the above

105. The subsystem of GSM are

   1. Radio subsystem 2.Wired system 3.Network and switching subsystem

   4.Operation system. Which of the above is correct?

   a.1,2 and 3   b.1,3 and 4   c.1,2 and 4   d.2,3 and 4

106. The home location and visitor location register are used in

   a.Networking and switching subsystem   b.Radio subsystem

   c.Operation and maintenance centre   d.Authentication centre

107. In GSM mobility management is monitored by

   a.Traffic channels   b.Half duplex channel c.Full duplex channel d.Control channel

108. The call management consists of the following entities

   1. Call control   **2.Short message services**

   3. Supplementary service   **4.Traffic channels**

   Which of the above is correct?

   a.1,2 and 3   b.1,2 and 4   c.2.3 and 4   d.1,3 and 4

109. The GSM cellular mobile standard has following 'access type' and spacing between channel

   a.FDMA, 55MHz   b.TDMA, 25MHz   c.FDMA, 25MHz   d.TDMA, 45MHz

Answers:

90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109
b	b	b	b	b	d	a	c	c	c	b	d	a	d	b	b	a	d	a	d

PART –B   (2 MARKS)

110. What is sensor?

   Sensor = an electronic device that receives and responds to stimuli. Today sensors are available to detect: Chemicals, radiation levels, light, seismic activity, motion, Audio, video.

111. What is wireless sensor network? (AU-MAY/JUNE 2013)

   An autonomous, ad hoc system consisting of a collective of networked sensor nodes designed to intercommunicate via wireless radio. a wireless sensor network (wsn) is a wireless network consisting of spatially distributed autonomous devices using sensors to cooperatively monitor physical or environmental conditions, such as temperature, sound, vibration, pressure, motion or pollutants, at different locations.

112. What are the applications of wireless sensor node?

   • Industrial and civilian application areas,

   • Industrial process monitoring and control, machine health monitoring,

   • Environment and habitat monitoring, healthcare applications,

   • Home automation, and traffic control.

113. What are the characteristics of a sensor network?

   • Limited power they can harvest or store

   • Ability to withstand harsh environmental conditions

- Ability to cope with node failures, Mobility of nodes, Dynamic network topology, Communication failures
- Heterogeneity of nodes, Large scale of deployment, Unattended operation
- Node capacity is scalable, only limited by bandwidth of gateway node.

114. What are the properties of sensor network? (AUT-NOV/DEC 2012), (AU-MAY/JUNE 2013)

- Limited capacity of
a) Battery (Lifetime: day - 10 years)
b) Processing capabilities (10MHz)
c) Transmission range (5 - 20 meters)
d) Data rates: Bit/s - KB/s
e) Transmission methods: 802.11 (WiFi), Bluetooth – short distance, other applications, Zig Bee – for sensor network

115. What is sensor node?

Small computers, extremely basic in terms of their interfaces and their components

A sensor node, also known as a 'mote', is a node in a wireless sensor network that is capable of performing some processing, gathering sensory information and communicating with other connected nodes in the network.

116. What are the types of sensor? (AU-APR/MAY 2011)

Sensors are classified into three categories.

•Passive, Omni Directional Sensors: Passive sensors sense the data without actually manipulating the environment by active probing.

•Passive, narrow-beam sensors: These sensors are passive but they have well-defined notion of direction of measurement. Typical example is 'camera'.

•Active Sensors: These groups of sensors actively probe the environment, for example, a sonar or radar sensor or some type of seismic sensor, which generate shock waves by small explosions.

117. What are the applications of wireless sensor network?

- Area monitoring, Environmental monitoring
- Industrial Monitoring, Water/Wastewater Monitoring
- Vehicle Detection, Greenhouse Monitoring

118. Define RFID?

RFID (Radio Frequency Identification) is a technology that enables the electronic and wireless labeling and identification of objects, humans and animals RFID technologies are grouped under the more generic Automatic identification (Auto ID) technologies

119. What is RFID?

•Radio Frequency Identification, Uses radio waves for identification

•New frontier in the field of information technology

•One form of Automatic Identification

•Provides unique identification of an object (pallets, cases, items, animals, humans)

120. What are the important components of an RFID system? (AU-APR/MAY 2011)

Important components of an RFID system are:

- An RFID reader (also called transceiver) with an antenna and a transceiver,
- A transponder (Also called a tag) that includes an antenna and a chip) Middleware

121. What are the applications of RFID?

- Mobil Speed pass systems, Automobile Immobilizer systems
- Fast-lane and E-Z pass road toll system, Passports
- Animal Identification, Humans, Supply chain management

122. What are the principles of RFID system components?

•Tag (Transponder) -   Chip, Antenna
- Reader (Interrogator, Transceiver)
- RF Module (Transmitter and Receiver)
- Control Unit, Antenna, Several Interfaces (RS 232, RS 485, etc.)
- Host Computer, Middleware and Data processing subsystem

123. What are the types of tags? (AUT-NOV/DEC 2012)

- Passive, Semi-passive, Active

124. What is tag?

Made up of three parts Chip with memory that holds the intended information
Antenna, which is used to transmit information or in passive tags, to harvest
power Packaging, which encases the chip and the antenna?
Memory configuration
- Read-only (RO), Write-once-read-many (WORM), Read-write (R/W)

125. What is RFID reader?

- Antenna, Transceiver, Microprocessor/decoder, Network interface.

126. Why choose RFID technology?

- Durability, Convenience, Security, Flexibility, Declining cost.

PART –C   (16 MARKS)

127. Explain the wireless sensor network architecture& applications (AU-APR/MAY 2011)

128. Explain the types of sensor networks. (AU-MAY/JUNE 2013)

129. Explain the sensor node architecture.

130. Explain about the hardware sensor node? and types

131. Explain about the architecture of RFID technology. List its limitation(AU-APR/MAY 2011), (AUT-NOV/DEC 2012)

132. Explain about the RFID principal system component and tag types? (AU-APR/MAY 2011)

133. Explain the applications of the following. (AU-MAY/JUNE 2013)

1.wireless sensor networks.

2.RFID.

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UNIT-IV   LOCAL AREA AND WIDE AREA WIRELESS TECHNOLOGIES
PART –A   (1 MARK)

134. Which of the following architecture uses CSMA/CD access method? a. ARCnet b. Ethernet c.both d. none

135. What is the downloading speed in 3G

a.3 Kb/s   b.3 Mb/s c.30 Kb/s   d.30 Mb/s

136. What is the frequency range for SHF?

a. 30 GHz   b.300 GHz c.3 MHz   d. 30 MHz

137. A dipole is

a. bi-directional radiation pattern   b.omni-directional radiation pattern , c. both   d. none

138. Which one of the following is a packet data transmission?

a. GSM   b. CDMA   c. IMT d GPRS

139. PIN stands for

a. Personal Information Number,   b. Personal Identity Number

c. Personal Information Network   d both b and c

140. Which one of the following is ad-hoc network?

a.Bluetooth b. optical-fiber c. LAN   d. both a and b

141.   Many LAN's are interlinked to form a

a.WAN , b.MAN, c.Network, d.Wireless link

142. When two or more networks are interconnected by internetworking devices if forms

a.LAN , b.MAN ,c.Intranetwork   d.Internetwork

143. The HIPERLAN and IEE802.11 are standards of

a. WAP   , b.WLAN , c.LAN, d.MAN

144. Multicarriermultisymbol and Multirate transmission principles belongs to the technique

a.FDM   , b.OFDM, c.GMSK   d.PSK

145. The maximum throughput of HIPERLAN-2 and IEEE802.11 standards are

a.32Mbps, 1.1Mbps, b.34Mbps, 1.2Mbps,C.32 Mbps, 1.2Mbps, d.62Mbps, 1.4Mbps

146. Frequency used in IEEE802.11 standard is

a.3.4 GHz, b.2.4 GHz, c.1.4 GHz, d.5.4 GHz

147. The error control mechanism in HIPERLAN-2 is supported by the layer

a.Physical layer, b.Network layer, c.Data link layer, d.None of the above

148. A demerit in WLAN is

a.High current draw and shorter battrey

life b.Used in office premices

c.Low current draw and shorter batter life

d.Used for 15 to 150 meters for size is possible with

149. High integratd circuts and miniature size is possible with

a.Bluetooth techcology, b.WLAN, c.Bluetooth and WLAN, d.None of the above

150. What is the max data capacity of STP?

a. 10 mbps   b. 100 mbps   c. 1000 mbps   d. 10000 mbps

151. Network cable lies on _____ layer

a. Application   b. Network   c. Physical   d. none

a. Circuit switched   b. Packet switched   c. both a and c

152. 34. The _____ portion of LAN management software restricts access, records user activities and audit data etc.

a. Configuration management   b. Security management

c. Performance management   d. both a & b

153. What is the max cable length of STP?

a. 100 ft   b. 200 ft   c. 100 m   d. 200 m

Answers:

134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153
b	c	d	c	d	b	a	b	a	d	c	b	b	a	d	a	c	c	a	d

PART –B   (2MARKS)

154. What is IEEE802.11 WLAN? (AU-MAY/JUNE 2013)

•The most famous family of WLANs

•Specifies the physical and MAC layer requirement of WLAN for short range communication- few m to 100 m

•Simple and robust – offers time bounded and asynchronous services

•Support of Power Management, Handling Hidden nodes

•Ability to operate world wide, 2.4 GHz ISM band is used

•Data rates-, 1 Mbit/s –mandatory, 2 Mbit/s – optional

155. What is the IEEE 802.11- System Architecture?

•Infrastructure based, Adhoc

156. What are the Components of IEEE802.11?

•STA- Station/Terminal, AP – Access Point

•BSS – STA and AP in same radio coverage is Basic Service Set

•Distribution System- Two BSSs connected

•ESS – Extended Service Set Portal- internetworking unit to other LANs

157. What is IEEE 802.11-Infrastructure?

•Stations can select an AP and associate with it.

•The APs support roaming(changing APs)

•The DS handles data transfer between the different APs.

•Provide synchronization within BSS.

•Support power management. Control medium access to support time bounded services.

158. What is IEEE 802.11-Adhoc? (AU-APR/MAY 2011)

•A BSS comprises a group of stations having the same frequency.

•Does not specify special nodes for routing, forwarding of data or exchange of topology information.

159. What is Bluetooth- 802.15.1?

Standard for wireless communications (WLAN) based on a radio system designed for short-range cheap communications devices suitable to substitute for cables for printers, faxes, joysticks, mice, keyboards, and so on.

The devices can also be used for communications between portable computers, act as bridges between other networks, or serve as nodes of ad hoc network

160. What is the operation of Bluetooth- 802.15.1? (AU-NOV/DEC 2012)

•When a Bluetooth device is powered on, it may try to operate as one of the slave devices of an already running master device.

•It then starts listening for a master's inquiry for new devices and responds to it.

•Bluetooth predefines several types of connection, each with a different combination of available bandwidth, error protection, and quality of service.

•Once a connection is established, the devices can optionally authenticate each other and then communicate. Devices not engaged in transmissions can enter one of several power and bandwidth-saving modes or tear down the connection.

161. Define Bluetooth- 802.15.1-Protocol?

•Bluetooth defines not only a radio interface, but a whole communication stack that allows devices to find each other and advertise the services they offer.

•The link manager layer handles the type of link configuration, authentication, and security, quality of service (QoS), power consumption, and transmission scheduling.

•The Logical Link Control Adaptation Protocol (L2CAP) layer supplies connection-oriented and connectionless services to the upper level

162. Obex Object And Protocol

This section is dedicated to the model of OBEX objects and the OBEX session protocol. The section is intended to be read with the IrOBEX specification.

163. What is the Mobile IP Reverse Tunneling?

•Problem with mobile, Firewalls

•TTL(Time-To-Live), Reverse tunnel, Problem,Q

164. What are the Mobile IP optimizations?

•Triangular Routing, Solution, Additional Message(Optimized Mobile IP)

•Optimized Mobile IP(Example)

165. What are Mobile IP encapsulation techniques?

•IP-IN-IP Encapsulation, Minimal encapsulation, Generic routing encapsulation

166. What are the Mobile IP registrations?

•Registration procedure, Fa-Coa(Registration), Cl-Coa(Registration)

•Registration request/replay message, Registration replay code field

167. What is the Mobile IP agent discovery?

•Agent advertisement, Agent advertisement message, Agent solicitation

168. What is the Mobile IP network integration?

•Agent discover, Registration, Tunneling, Encapsulation

169. What is the Mobile IP requirement? (AU-MAY/JUNE 2013)

•Compatibility, Transparency, Scalability, Efficiency, Security

170. What is Piconet?

171. Why is the cell established with small size? (AU-NOV/DEC 2012)

    PART –C   (16 MARKS)

172. Explain about the IEEE 802.11- System Architecture? (AU-APR/MAY 2011), (AU-NOV/DEC 2012)

173. Explain the features of infrared technologies in detail. (AU-NOV/DEC 2012), (AU-MAY/JUNE 2013)

174. Discuss the techniques used for assigning the frequency. (AU-NOV/DEC 2012), (AU-MAY/JUNE 2013)

175. Explain how the call is established and maintained in cellular system. (AU-NOV/DEC 2012), (AU-MAY/JUNE 2013)

176. Explain about the IEEE 802.11-Infrastructure?

177. Explain about the operation of Bluetooth- 802.15.1and protocols? (AU-APR/MAY 2011), (AU-MAY/JUNE 2013)

178. Explain about the Mobile IP? (AU-APR/MAY 2011)

179. Explain about the Mobile IP agent discovery? (AU-APR/MAY 2011)

UNIT-V   PROTOCOLS AND APPLICATION
                                  PART –A   (1 MARK)

180. Connectivity is a concept related to

a Transmitting information, either by computer or by phone

b The interconnections within a computer

c Using computer networks to link people and resources

d Being in an active session with your computer

181. One of the most dramatic changes in connectivity and communications in the past five years or so has been _____.

a mobile or wireless telephones b public and private discussion c satellite uplinks d running programs on remote computers

182. The four basic elements of any communication system include

a peer-to-peer, videoconferencing, online photo-conferencing, net optical

b sending and receiving devices, communication channel, connection device, and data transmission specifications

c telephone lines, coaxial cables, fiber-optics cables, and communication channel

d software, hardware, communication channel, network

183. These communication devices originate as well as accept messages in the form of data, information, and/or instructions.

a i-drives   b.sending and receiving devices   c. key chain drives d.optical drives

184. The transmission medium that carries the message is referred to as the

a send and receive device   b communication channel

c protocol   d gateways

185. Data is transmitted using light through a _____ cable.

a twisted pair   b fiber-optic   c coaxial   d microwave

186. Which physical connection is the fastest?

a twisted pair   b coaxial cable   c fiber-optics   d microwaves

187. Which of the following connection methods would not be used to connect devices between two different offices?

a twisted pairs   b fiber-optics   c coaxial cables   d   infrared

188. Most Web-enabled devices follow a standard known as

a FireWire   b Bluetooth   c TCP/IP   d Wi-FI

189. This wireless standard is widely used to connect computers to each other and to the Internet.

a 802.11   b RJ45 c Blueband   d Broadband

190. Bluetooth is a type of radio wave information transmission system that is good for about

a 30 feet   b 30 yards   c 30 miles   d 300 miles

191. A term relating to sending data to a satellite is

a uplink   b downlink   c modulate   d demodulate

192. A credit card-sized expansion board that is inserted into portable computers that connects the PC to the telephone wall jack is called what?

a Internal modem   b External modem   c PC Card modem   d Wireless modem

193. Standard telephone lines and conventional modems provide what is called

a Bluetooth service   b dial-up service   c wireless service   d WiFI service

194. Special high-speed lines used by large corporations to support digital communications are known as

a satellite/air connection service lines   b cable modems

c digital subscriber lines   d   T1, T2, T3 and T4 lines

195. The rules for exchanging data between computers are called

a interconnections   b synchronous packages

c protocols   d   data transmission synchronization

196. Each computer on the Internet has a unique numeric address called a(n)

a domain address   b protocol address   c IP address   d   Web address

197. _____ is the process of breaking down information sent or transmitted across the Internet into small parts called packets.

a protocol   b bandwidth   c reformatting   d identification

198. Two or more computers connected so that they can communicate with each other and share information is called a

a satellite   b protocol   c broadcast   d network

199. Any device that is connected to a network is called a

a. client   b. Node   c. Server   d. Manager

Answers:

180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199
b	c	a	d	d	a	c	c	d	d	a	c	b	b	d	a	c	a	a	d

PART –B
(2MARKS)

200. What is the Classification of routing Protocols In Sensor Networks. (AU-MAY/JUNE 2013)

•Flat Routing - Query based, Hierarchical - clustering based, Location – Position based

201. What are the types of Flat Routing Protocols?

•Flooding & Gossiping

•SPIN- Sensor Protocols for Information via Negotiation

•Directed Diffusion, Rumor Routing, Energy Aware Routing

202. What are the types of Hierarchical Routing Protocols? (AU-APR/MAY 2011), (AU-MAY/JUNE 2013)

•LEACH: Low Energy Aware Clustering Hierarchy

•PEGASIS: Power-Efficient Gathering in Sensor Information Systems

•Max-Min Length Energy constrained protocol (LSU)

•Threshold-sensitive Energy Efficient Protocols (TEEN and APTEEN)

203. What are the types of Location Based Routing Protocols?

•ASCENT-Adaptive Self-Configuring Sensor Networks Topologies

•GEAR-Geographic and Energy Aware Routing

204. Define Clustering Hierarchy.

•Adaptive, self-configuring cluster formation.

•Localized control for data transfers.

•Low-energy medium access.

•Application-specific data aggregation.

205. Define LEACH.

•LEACH randomly selects few sensor nodes as the cluster heads

•Cluster Heads rotate so that nodes take turns being cluster heads in

•order to distribute the load across all the nodes

206. Write the Benefits of LEACH- Clustering.

•Clustering can be done to achieve   Data Aggregation

•Energy Conservation   Load Balancing

•Bandwidth Utilization   Localization

207. Define LEACH- Main Idea.

•In LEACH, the cluster head aggregates the data collected from its cluster and sends it to the base station

•This is done to reduce the number of transmissions the cluster head has to make in order to transmit data to the Base Station

•LEACH uses TDMA/CDMA MAC layer to reduce the inter-cluster and intracluster

•Data is collected periodically

•This protocol is appropriate in the sensor networks which continuously gather data

•Latency is unavoidable due to the aggregation done by the cluster head

208. Define Wireless Application Protocol.

Deliver Internet content and enhanced services to mobile device sand users (mobile phones, PDAs)independence from wireless network standards open for everyone to participate, protocol specifications will be proposed to standardization bodies applications should scale well beyond current transport media and device types and should also be applicable to future developments

209. Define World Wide Web and mobility

•Protocol (HTTP) and language (HTML) of the Web have not been designed for mobile applications and mobile devices, thus creating many problems!

•Typical transfer sizes, HTTP request: 100-350 byte responses avg. <10 kbyte, header 160 byte, GIF 4.1kByte, JPEG 12.8 kbyte, HTML 5.6 kbyte, but also many large files that cannot be ignored

•The Web is no file system, Web pages are not simple files to download static and dynamic content, interaction with servers via forms, content transformation, push technologies etc.

•Many hyperlinks, automatic loading and reloading, redirecting. a single click might have big consequences!

210. Define WAP Gateway.

•Performs two main tasks, Protocol conversion: Protocol intermediary.

•Content encoding: binary encoded inorder to minimize the data transfer.

211. Define Wireless Datagram Protocol.

Protocol of the transport layer within the WAP architecture uses directly transports mechanisms of different network technologies offers a common interface for higher layer protocols allows for transparent communication using different transport technologies (GSM (SMS, CSD, USSD, GPRS, ...), IS-136, TETRA,DECT, PHS, IS-95, ...) Goals of WDP.

212. Write the Pervasive computing Applications.

•Retail, Airline check-in and booking, Sales force automation

•Healthcare, Tracking, Car information systems

213. Write the Retail applications.

•How pervasive computing devices (PDA, WAP phones) enable exciting new ways of conducting business.

•Faster and cheaper ways to bring good stop the consumer.

•Today, the consumer can select from large varieties of products, and can just buy them from stores, catalogs, and virtual shopping malls on the Internet.

214. Define MMS.

To send an MMS message via a menu driven interface, please see the help section titled "Web Menu Interface". This section describes how to send an MMS message programmatically via URL parameters.

215. Why the conventional networking protocols can't be used in wireless networks? (AU-NOV/DEC 2012)

216. What are the limitations of WAP? (AU-NOV/DEC 2012)

<div align="center">PART –C   (16 MARKS)</div>

217. Discuss about routing protocols used for sensor networks. (AU-NOV/DEC 2012), (AU-MAY/JUNE 2013)

218. Explain the sales force automation and tracking applications pervasive computing. (AU-NOV/DEC 2012), (AU-MAY/JUNE 2013)

219. Explain about the Hierarchical and Location Based Routing Protocols.

220. Explain about the wireless application protocol- WAP. (AU-APR/MAY 2011), (AU-NOV/DEC 2012), (AU-MAY/JUNE 2013)

221. Explain about the World Wide Web and mobility

222. Explain about the MMS. (AU-APR/MAY 2011), (AU-NOV/DEC 2012)