SIGMA

IT WORKBENCH FOR COMPUTER HARDWARE AND NETWORKING - ITWBENCH100

This trainer has been designed with a view to provide practical and experimental knowledge of Computer Hardware and Networking fundamentals and Protocols.

SPECIFICATIONS

(1) Hardware

Following Hardware is assembled on Bench frame of size - 36 Inch x 24 Inch

1. The bench comprises with Computer Hardware Training System - 2 Nos.
2. The different circuit boards of PC/AT Computer are exposed on a PCB.
3. LAN Training System with Wireless LAN as well to study Peer to Peer, STAR, RING and Bus Topology.
4. Protocols: CSMA /CD, CSMA /CA, Stop N Wait, Go back to N, Selective repeat, Sliding Window, Token Bus, Token Ring.
5. Colored representation of data in transmission & reception.
6. Data transmission speed: 10/100 Mbps.
7. Smart managed 3 Layer and 2 Layer Switch.
8. Media converter
9. POE Switch
10. Wi-Fi LAN card
11. IP Camera
12. Energy meter

13. LED tube light
14. Voltmeter and Ammeter fitted on Bench.
15. Networking Fundamentals Teaching Simulation Software
16. DSO 50MHz 4 Channel , 1GSa/Sec , more than 20 Mpt memory
17. DMM : 4 1/2 Digit with LCD Display
18. Networking Fundamentals Teaching Simulation Software
19. MCB provided with AC supply for safety purpose

2. Accessories

1. Ethernet Cable   : 5 No
2. HDMI Cable   : 1 No
3. Jumper wires   : 30 Nos.
4. Software and Driver CD   : 1 No.
5. Practical Manual - Printed + Soft Copy   : 1 No.
6. E-Books for Hardware abd Networking   : 10 Nos. in PDF Format
7. Mp4 Video Class for IOT Subject   : 40 Nos

3. Cabinet and PCB

The complete circuit diagram is screen printed on component side of the PCB with circuit and Parts at the same place. The PCB with components on front side is fitted in Heavy duty WorkBench. It works on 230 V AC Supply. There are Caster wheel (with locking mechanism) at the legs of WorkBench for easy movement.

EXPERIMENTS

A. Experiments for Computer Hardware

1. To identify different parts of computer like motherboard, SMPS, Hard disk, RAM, CD Drive, Web Cam
2. To understand Wi-Fi LAN card

B. Hardware Experiments for Networking

3. To understand Cable designs in Networking
4. To install LAN and demonstrate client-server and peer to peer mode of configuration.
5. To install and configure Web server.
6. To install and configure FTP Server
7. To Study of DNS, SMTP & POP3. To determine local host address.
8. To Ping to a host using its NetBIOS name. To add IP addresses/host name mappings to the local host file.
9. To Configure DNS service on Windows 2003 server.
10. To use Domain Name Service to resolve hostnames into IP addresses.
11. To interact with an Email server using SMTP and POP3 protocols commands.
12. To install and configure Telnet server and make Telnet communication.

13. To install and configure Proxy server.
14. To install and configure DHCP server.
15. To study of IP Addresses subnetting and CIDR
16. To study and implement Peer to Peer Network
17. To study and implement Client- Server Network
18. To study and implement Star Topology using RJ45 Connector
19. To study and implement Ring Tpology using Db9
20. To study and implement Bus Topology by using end terminator -
    (compatible on Windows XP)
21. To network two computers using Wireless IEEE 802.3 protocol using Wifi Cards
22. To network two computers using Managed layer 2 ethernet switch
23. To network two computers using Managed layer 3 ethernet switch
24. To study and implement Media convertor
25. To study and implement Power over switch (POE)
26. To study and implement PoE Adaptor

C.   Software Experiments for Networking
27. To study and implement Ethernet LAN protocol and Study the performance of CSMA/CD
    (carrier sense multiple access with collision detection) Protocol through simulation
28. To study and implement Wireless LAN Protocol and study the performance network with
    CSMA/CA protocol and compare with CSAMA/CD protocol
29. To study and implement Go back N and Selective repeat protocols
30. To study and implement performance of token bus protocols through simulation
31. To study and implement token ring protocols through simulation
32. To study and implement following Prototcols
    CSMA/CD,
    CSMA/CA,
    Stop N Wait,
    Go back to N,
    Selective repeat,
    Sliding Window,
    Token Bus,
33. To study and implement Addressing in TCP/IP
34. To study and implement Ping command
35. To study and implement Socket programming
36. To study and implement Distance vector routing algorithm
37. To study and implement Link state routing/Dijkistra's algorithm
38. To study and implement Data Encryption and decryption
39. To study and implement Subnet calculation using software
40. To study and implement CRC Technique using software Software window

41. Network & protocol analysis

    Indication of packet serial number, file name, file size, file number, receiver name, receiver IP address, total packets, packet length, time out, protocol, topology, receiver, MAC address, port number, file send start time, file sent completion time, transmission time data rate(Mbps), percentage error.

42. Graphical Analysis of LAN performance with various parameters and protocols

D.   Other Experiments for Networking

43. To understand use DSO for Networking waveform mweasrements.

44. To understand and use Digital Multimeter for Networking voltage mweasrements.

45. To understand Media converter Theory and make it operative

46. To understand POE Switch Theory and make it operative

47. To understand IP Camera Theory and make it operative

48. To understand Energy meter Theory and use it to measure energy

49. To understand LED tube light and connect it to LAN

50. To understand Digital Voltmeter and Ammeter and use them to measure Voltages and Currents