Sub:	Advances In Computer Networks					Code:	**16SCS22**
Date:	12-05-2017	Duration:	90 mins	Max Marks: 50	**Sem:**	II	**Branch:** M.Tech(CSE)

Total marks: 50

|		Marks	OBE	
			CO	RBT
1.	Write short note on a) ARP b) DHCP. OR	[10]	CO2	L2
2.	What is source routing? With an example, explain three ways to handle header for source routing.	[10]	CO2	L4
3.	Write short note on a) Email b) WWW OR	[10]	CO6	L2
4.	What is network management? Explain SNMP in detail.	[10]	CO6	L4
5.	For the network given, show how distance-vector routing algorithm works for node A. (Refer Fig 1)	[10]	CO3	L3
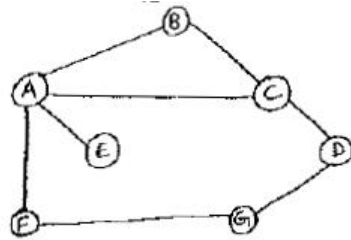
Fig 1

i) Obtain the initial distance stored at each node.(Global view)
ii) Initial routing table at node A.
iii) Final routing table at node A.
iv) Final distance stored at each node. (Global view).

OR

		Marks	OBE	
6.	What is distance-vector routing algorithm and where is it used? Explain the algorithm.	[10]	CO3	L2
7.	Explain DNS in detail. OR	[10]	CO6	L2
8.	With neat diagram, explain the structure and representation of MIB object names.	[10]	CO6	L4
9.	Explain the packet format for a type 1 OSPF link state advertisement. OR	[10]	CO3	L4
10	Explain in detail the forward search algorithm.	[10]	CO3	L2

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1a)	Write short note on a) ARP b) DHCP.
	ARP (Address Resolution Protocol)
	■ Map IP addresses into physical addresses
	■ Techniques
	■ encode physical address in host part of IP address
	■ table-based
	■ ARP (Address Resolution Protocol)
	■ table of IP to physical address bindings
	■ broadcast request if IP address not in table
	■ target machine responds with its physical address
	■ table entries are discarded if not refreshed
	2.5 Marks
	■ Explain ARP Packet Format

ARP Packet Format:

0	8	16	31
Hardware type = 1		ProtocolType = 0x0800	
HLen = 48	PLen = 32	Operation	
SourceHardwareAddr (bytes 0–3)			
SourceHardwareAddr (bytes 4–5)		SourceProtocolAddr (bytes 0–1)	
SourceProtocolAddr (bytes 2–3)		TargetHardwareAddr (bytes 0–1)	
TargetHardwareAddr (bytes 2–5)			
TargetProtocolAddr (bytes 0–3)			

2.5 Marks

b)	DHCP (Dynamic Host Configuration Protocol)
	■ Most host OS provide a way for system admin/user to manually configure IP needed by a host , but it has some drawbacks. Thus, automated configuration methods are required. Primary method uses a protocol - DHCP
	■ DHCP relies on DHCP server for providing configuration information to hosts
	■ There is at least one DHCP server for an administrative domain
	■ DHCP server maintains a pool of available addresses
	■ Explain the server discovery with diagram
	3 Marks

■ Draw DHCP Packet format-------------------------- 2 Marks

2.	What is source routing? With an example, explain three ways to handle header for source routing.
	Source routing: All the information about network topology that is required to switch a packet across the network is provided by the source host. – **1 Mark**
	One way to implement source routing – Assign a number to each output of each switch and to

	place that number in the header of the packet. Explain the switching function with this. Draw diagram. – **3 Marks** Explain three approaches to handle headers for source routing- Rotation, Stripping, Pointer with diagram –**5 Marks** Source routing can be used in both datagram and VC networks. Give eg. Source routes- strict / loose – **1 Mark**

3.	Write short note on a) Email b) WWW
	a) Email
	   ➤ It is one of the most widely used and popular applications.
	   ➤ Mail delivery differs fundamentally from other uses of networks.
	   ➤ To handle delayed delivery mail systems use a technique called **spooling. – 2 Marks**
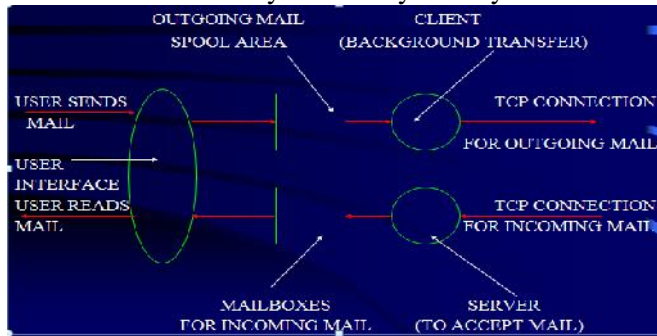	
	Explain the figure -- 3 Marks
	b)WWW
	   ■ World Wide Web(WWW)
	   ■ The primary protocol used to transfer a Web page from a server to a Web browser.
	   ■ Web pages: the Web consists of a large set of documents that are accessible over the Internet.
	   ■ Each Web page is classified as a hypermedia document.
	  * Suffix media: indicate that a document can contain items other than text.
	  * Prefix hyper: a document can contain selectable links that refer to other, related documents.
	   ■ Web browser consists of an application that a user invokes to access and display a Web page.
	   ■ Web server obtain a copy of the specified page, response the client's request.
	   ■ HyperText Markup Language(HTML)
	  * Tags: give guidelines for display. Some tags come in pairs that apply to all items between the pair.
	  * For example: <center> ……</center>
	   ■ Uniform Resource Locator(URL)
	  * Each Web page is assigned a unique name(URL).
	  * A URL follows http scheme has the following form:
	http:// hostname [:port] / path [; parameters] [? query]
	   ■ HTTP?
	  The protocol used for communication between a browser and a Web server or between intermediate machines and Web servers.

4.	What is network management? Explain SNMP in detail. Network management – define (2 Marks) In addition to protocols that provide network level services and application programs that use those services, a sub system is needed that allows a manager to configure a network, control routing, debug problems and identify situations in which computers violate policies. Such activities are referred as network management.

SNMP (8 Marks)
- Network management protocols specify communication between the network management client and a network management server program that executes at the host or the router
- The protocol needs to be flexible and compatible to changes.
- Does not define a large set of commands.
- Uses the *fetch and store* paradigm
- Taking a conceptual view of SNMP it contains only 2 commands
- Example if you want to reboot:
  Declare a data item that gives the time until the next reboot and allows the manager to assign a value to the item like 0
- Looking at the managers point of view SNMP remains hidden
- SNMP software comes with a GUI interface that displays diagrams of network connectivity and uses the point and click interaction technique
- figure 30.6 in the book shows the fetch and store commands
- Get request – fetch
- Set request – store
- Response   – provides a reply.

5.

For the network given, show how distance-vector routing algorithm works for node A. (Refer Fig 1)
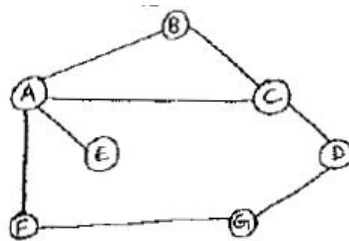
Fig 1

i) Obtain the initial distance stored at each node.(Global view)

ii) Initial routing table at node A.

iii) Final routing table at node A.

iv) Final distance stored at each node. (Global view).

i)

Information Stored at Node	Distance to Reach Node						
	A	B	C	D	E	F	G
A	0	1	1	∞	1	1	∞
B	1	0	1	∞	∞	∞	∞
C	1	1	0	1	∞	∞	∞
D	∞	∞	1	0	∞	∞	1
E	1	∞	∞	∞	0	∞	∞
F	1	∞	∞	∞	∞	0	1
G	∞	∞	∞	1	∞	1	0

3 Marks

ii)

Destination	Cost	NextHop
B	1	B
C	1	C
D	∞	—
E	1	E
F	1	F
G	∞	—

2 Marks

iii)

Destination	Cost	NextHop
B	1	B
C	1	C
D	2	C
E	1	E
F	1	F
G	2	F

2 Marks

iv)

Information Stored at Node	Distance to Reach Node						
	A	B	C	D	E	F	G
A	0	1	1	2	1	1	2
B	1	0	1	2	2	2	3
C	1	1	0	1	2	2	2
D	2	2	1	0	3	2	1
E	1	2	2	3	0	2	3
F	1	2	2	2	2	0	1
G	2	3	2	1	3	1	0

3 Marks

| 6. | What is distance-vector routing algorithm and where is it used? Explain the algorithm.

■ Each node constructs a one dimensional array (a vector) containing the "distances" (costs) to all other nodes and distributes that vector to its immediate neighbors

■ Starting assumption is that each node knows the cost of the link to each of its directly connected neighbors

■ Intra domain routing protocol

-- **3 Marks**

Explain the process of building routing table by routers with tables. -------------- **4 Marks**

Explain the scenario when a node detects a link failure with count to infinity problem.

List the solutions for count to infinity

-- **3 Marks** |
|---|---|
| 7. | Explain DNS in detail.

DNS (Domain Name System) – provides name to address mapping for the Internet.

-Has 2 conceptually independent aspects:1) name syntax and rules for delegating authority over names 2) Implementation of Distributed computing system

-Uses a hierarchichal naming scheme- domain names-> sequence of sub names separated by a delimiter

-Eg: cs.purdue.edu ->> explain

-Top level domains: - Include points on ICANN , Domain name registrar----------------------**3** |

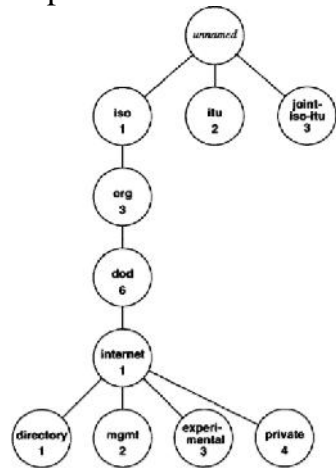|	

	-Mapping domain names to addresses – Explain with figure -------------------**4 Marks**
	-Domain name resolution
	  --top down
	  --two ways to use DNS ------------**3 Marks**
	  --Recursive and Iterative resolution

8.	With neat diagram, explain the structure and representation of MIB object names. structure and representation of MIB object names. - Names for MIB variables are taken from the object identifier namespace administered by ISO & ITU. - Object Identifier provides a namespace in which all possible objects can be designated. The namespace includes variables used in network management and names for arbitrary objects. - Object Identifier namespace is absolute(global) and hierarchical - The name of an object in the hierarchy is a sequence of numeric labels, separated with periods to identify an individual component, on the nodes along a path from the node to the object. - Example: The name 1.3.6.1.2 denotes the node mgmt Figure 30.4 Part of the hierarchical object identifier namespace used to name MIB variables. An object's name consists of the numeric labels along a path from the root to the object. - MIB groups variables into categories. - The categories are the subtrees of the MIB node of the object identifier namespace (Fig 2). - Examples: - Refer to Fig 2.
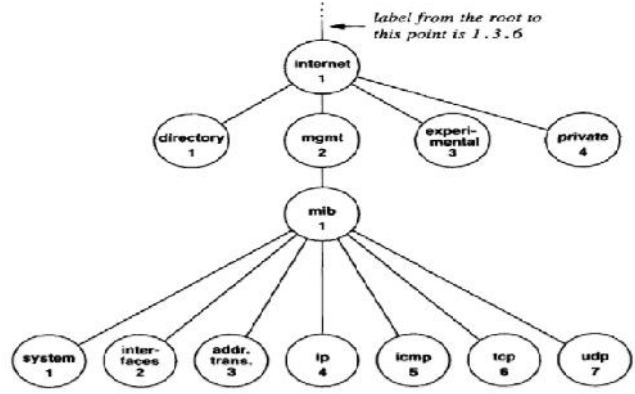
Figure 30.5 Part of the object identifier namespace under the IAB *mib* node. Each subtree corresponds to one of the categories of MIB variables.

fig 2

- MIB standards do not dictate the implementation, instead provides a uniform and virtual interface to access data.

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9. Explain the packet format for a type 1 OSPF link state advertisement.

packet format for a type 1 OSPF link state advertisement

LS Age		Options	Type = 1
Link-state ID			
Advertising router			
LS sequence number			
LS checksum		Length	
0	Flags	0	Number of links
Link ID			
Link data			
Link type	Num_TOS	Metric	
Optional TOS information			
More links			

- **6 Marks**

Explain the fields - **4 Marks**

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10. Explain in detail the forward search algorithm.

forward search algorithm – **7 Marks**

- Initialize the **Confirmed** list with an entry for myself; this entry has a cost of 0
- For the node just added to the **Confirmed** list in the previous step, call it node **Next**, select its LSP
- For each neighbor (Neighbor) of **Next**, calculate the cost (Cost) to reach this Neighbor as the sum of the cost from myself to Next and from Next to Neighbor
  - If Neighbor is currently on neither the **Confirmed** nor the **Tentative** list, then add (Neighbor, Cost, Nexthop) to the **Tentative** list, where

Nexthop is the direction I go to reach Next

- If Neighbor is currently on the **Tentative** list, and the Cost is less than the currently listed cost for the Neighbor, then replace the current entry with (Neighbor, Cost, Nexthop) where Nexthop is the direction I go to reach Next

- If the **Tentative** list is empty, stop. Otherwise, pick the entry from the **Tentative** list with the lowest cost, move it to the **Confirmed** list, and return to Step 2.

Example of buiding a routing table for any node – **3 Marks**