Answer all the following questions :

Question No 1:   (20 Marks)

Q1.1) Draw the puls-sequnce of MRI instrument strating from RF-pulse to the echo pulse.

Q1.2) Breifly, explain why we use the sinc puls in MRI instrument as shown in in Fig. 1.2, and how can shift its frequency to match the slice frequency. Name the resulted signal.
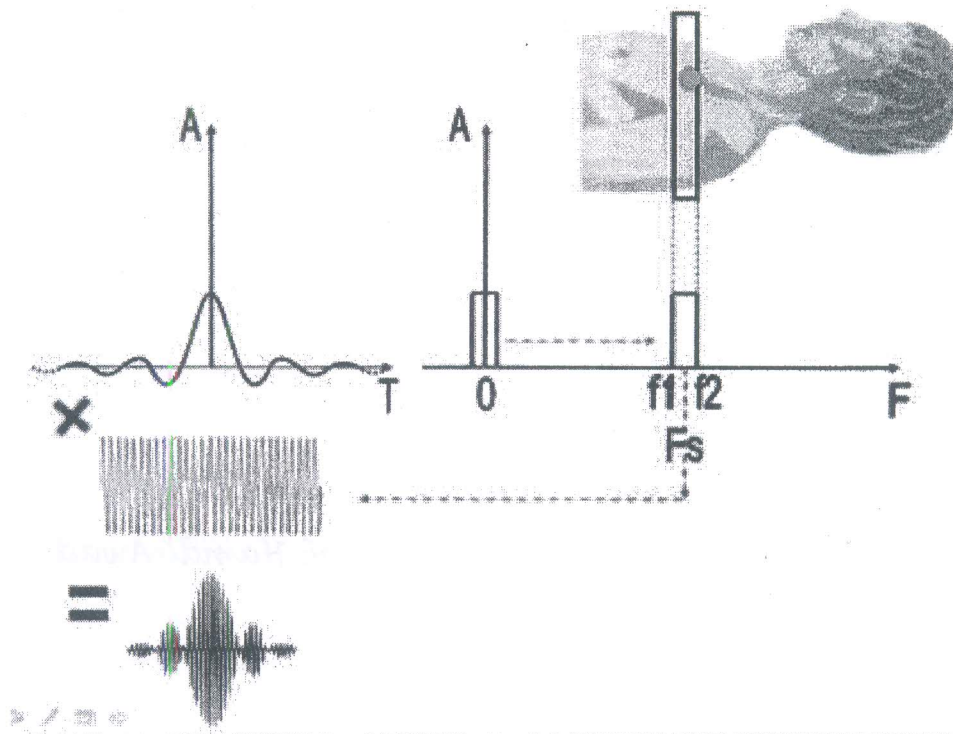

Fig. 1.2

Q1.3) Most magnets are of the superconducting type in MRI instruments, Explain the advantages of using thie type of magnets?

Question No 2: (20 Marks)

Q2.1) List the main componets of an ultrasound machine.

Q2.2) Put the missing names of the transducer prob in the Fig. 2.2?

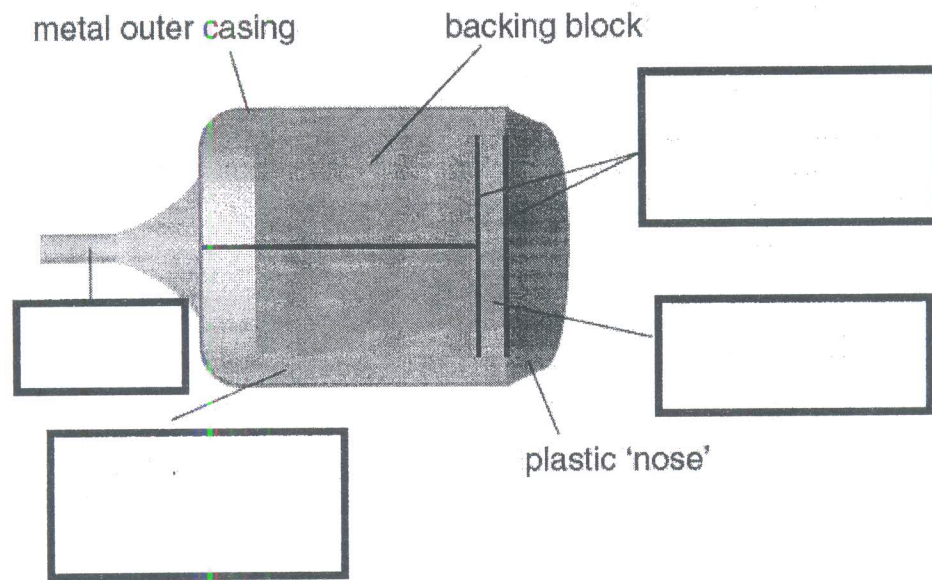metal outer casing   backing block

plastic 'nose'

Fig. 2.2

Q2.3) List three advantages of using ultrasound-based Biomedical Instruments?

Question No 3: (20 Marks)

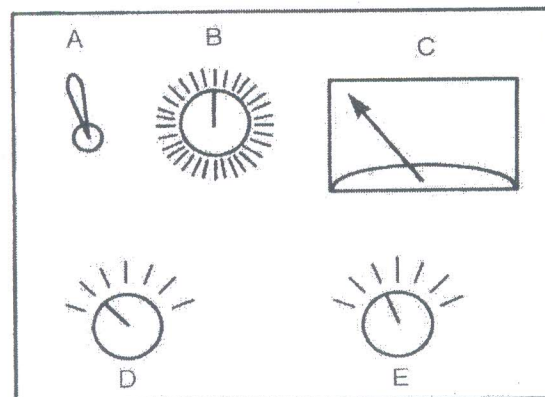**Q3.1)** Name the control unit items (A, B, C, D, and E) shown in Fig. 3.1 of the diathermy instrument?

Fig. 3.1

Q3.2) Complete the following

- Increasing the spacing will ------------- the depth of penetration, But will ----------- the current density

- In shortwave diathermy unit, the power output in the range (…….. to …… watts) that should provide energy to raise tissue temp to therapeutic range (….. to …… deg C).

- The type of SWD electrodes are ……………….. and …………………..

Q3.3) Fig. 3.3 shows an example of rapid depressurization valves, name these valves.

Fig. 3.3

Question No 4:   (10 Marks)
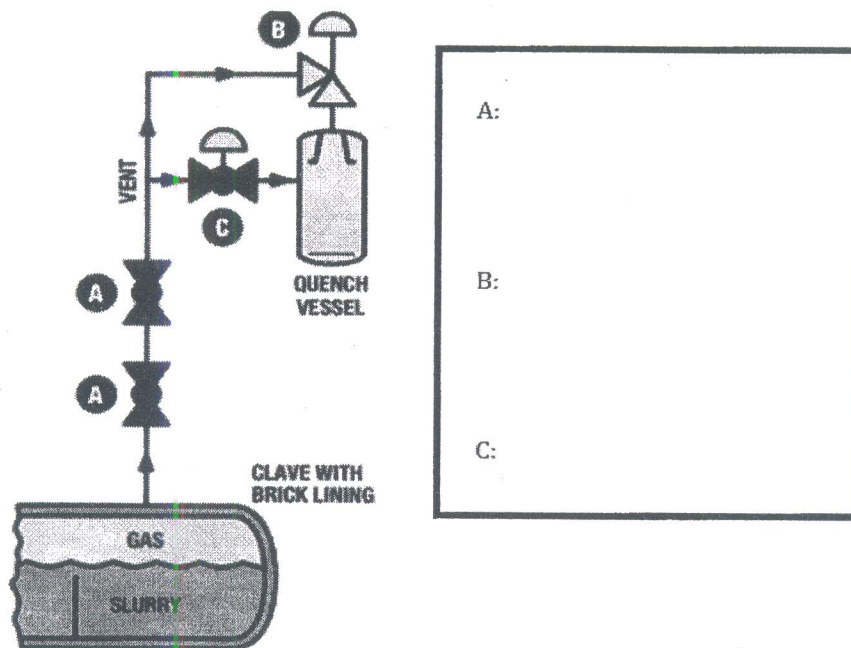
Q4.1) Breifly, explain the work procedure of a defibrillator instrument.

Question No 5:   (20 Marks)

Q5.1) In X-Ray instruments, if the X-Ray has low energy, what the problem may be arised in this case and how can be overcome.

Q5.2) Compared of X-Ray based instruments (e.g. CT-Scan):

- what the advantages of using electromagnetic-based instruments (e.g. MRI).
- Classfy the CT-Scan and MRI in the sense of the quilty of images.

Q5.3) Determine the maximum frequency of an X-Ray emission caused by an electron traveling with 7500 eV of Kinetic energy. (Blank Constant h= 4.14×10^{-15})

Q 5.4) An electron is accelerated across a 500 v potential. Find the minimum wave length X-Ray that could be emitted by the electron.

Achieved ILOS :

	Question No	Q1	Q2	Q3	Q4	Q5
Achieved ILOs	A- Knowledge & Understanding	A17	A6	A6	A17	A17
	B- Intellectual skills	B5	B6	B5	B6	B5
	C- Professional and practical skills	C3	C3	C3	C2	C12
	D- General and transferable skills	D7	D4	D7	D9	D4

Best wishes......Prof. Hamdi Awad

46) Which one of the routing protocols below does NOT use a distance vector algorithm to calculate a route to a given destination? (Select all that apply)

A. RIP   B. IPX RIP   C. IGRP   D. OSPF   E. IS-IS

47) Which of the following routing protocols are less likely prone to problems in non-contiguous networks? (Select all valid responses)

A. IGRP   B. ICMP   C. OSPF   D. RIP v1

E. RIP v2   F. EIGRP

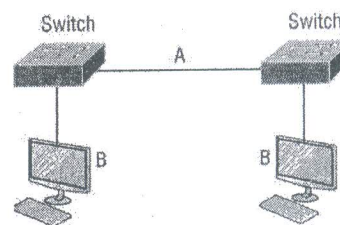48) In the Ethernet II frame shown here, what is the function of the section labeled "FCS"?

Ethernet_II

Preamble 7 bytes	SFD 1 byte	Destination 6 bytes	Source 6 bytes	Type 2 bytes	Data and Pad 46 – 1500 bytes	FCS 4 bytes

A. Allows the receiving devices to lock the incoming bit stream.   B. Error detection

C. Identifies the upper-layer protocol   D. Identifies the transmitting device

49) Which of the following statements describe the characteristic of link state routing protocols? (Choose all that apply.)

A. The exchange of an advertisement is triggered by a change in the network.

B. All routers exchange routing tables with each other in a multipoint network.

C. Packets are routed based upon the shortest path to the destination.

D. Paths are chosen depending on the cost efficiency factor.

E. Every router in an OSPF area is capable of representing the entire network topology.

F. Only the designated router in an OSPF area can represent the entire network topology.

50) In EIGRP, what kind of route information is stored in RAM and maintained by way of hello packets and update packets? (Select two answer choices)

A. Neighbor Table   B. SRF Table   C. RTP Table   D. Topology Table

E. Query Table   F. Dual Table

51) In the following diagram, identify the cable types required for connections A and B.

A. A= crossover, B= crossover

B. A= crossover, B= straight-through

C. A= straight-through, B= straight-through

D. A= straight-through, B= crossover

52) What is the maximum number of hops OSPF allows before it deems a network unreachable?

A. 15   B. 16   C. 99   D. 255   E. Unlimited

53) A routing table contains static, RIP, and IGRP routes destined to the same network will it take?

A. The RIP route   B. The static route   C. The IGRP route

D. All three with a round robin load balancing technique.

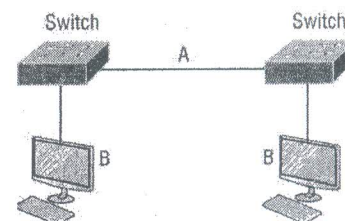54) Which of the following Application layer protocols sets up a secure session that's similar to Telnet?

6

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54) Which of the following Application layer protocols sets up a secure session that's similar to Telnet?

A. FTP   B. SSH   C. DNS   D. DHCP

55) What are the different characteristics of distance vector and link state routing protocols?

A. Distance vector protocols send the entire routing table to directly connected neighbors.

B. Distance vector protocols are responsible for sending updates to all networks listed in the routing table.

C. Link state protocols are responsible for sending the entire routing table to the whole network.

D. Link state protocols send updates regarding their own links status to all other routers on the network.

E. None of the above

56) Which of the following are characteristics of OSPF areas?

A. Hierarchical OSPF networks need to be in one area

B. Multiple OSPF areas must connect to area 0

C. Single area OSPF networks must be configured in area 1

D. Areas can be assigned any number from 0 to 63535

E. Area 0 is called the backbone area

F. Each OSPF area need to be configured with a loopback interface

57) Which class of IP address provides a maximum of only 254 host addresses per network ID?

A. Class A   B. Class B   C. Class C   D. Class D   E. Class E

58) By default, how often does a router running IGRP send its complete routing table to its neighbors?

A. Every 5 minutes   B. Every 90 seconds

C. Every 60 seconds   D. Every 30 seconds

59) Which of the following statements are correct in regard to classless routing protocols? (Select two)

A. Dis-contiguous subnets are not allowed.   B. Variable length subnet masks are allowed.

C. RIP v1 is a classless routing protocol.   D. IGRP supports classless routing within the

same autonomous system.   E. RIP v2 supports classless routing.

60) The following illustration shows a data structure header. What protocol is this header from?

16-Bit Source Port			16-Bit Destination Port	
32-Bit Sequence Number				
32-Bit Acknowledgement Number				
4-Bit Header Length	Reserved	Flags	16-Bit Window Size	
16-bit TCP Checksum			16-bit Urgent Pointer	
Options				
Data				

A. IP   B. ICMP   C. TCP   D. UDP   E. ARP   F. RARP

3) Distance vector Vs Link state routing protocols
4) Dynamic Routing Vs Static Routing

B) Complete the following sentences: (5 Marks)
1) The IP address 192.168.1.3   belongs to   Class ………… Default Mask: ……………………………
   Network: …………………………………………………….   Broadcast: ………………………………………………………
   Hosts: …………………………………………………………….   through   ………………………………………………………
2) The IP address 1.12.100.31   belongs to   Class ………… Default Mask: ……………………………
   Network: …………………………………………………….   Broadcast: ………………………………………………………
   Hosts: …………………………………………………………….   through   ………………………………………………………
3) The IP address 172.30.77.5   belongs to   Class ………… Default Mask: ……………………………
   Network: …………………………………………………….   Broadcast: ………………………………………………………
   Hosts: …………………………………………………………….   through   ………………………………………………………

Question [5] (10 Marks)

A) What are the advantages and disadvantages of Static routing protocols?   (3 Marks)
B) What are the advantages and disadvantages of distance vector routing protocols?   (3 Marks)
C) Compare between classful and classless routing protocols.   (2 Marks)
D) Draw the block diagram of the carrier sense multiple access with collision detection.   (2 Marks)

Good Luck