



**Important Instructions to examiners:**

- 1) The answers should be examined by key words and not as word-to-word as given in the model answer scheme.
- 2) The model answer and the answer written by candidate may vary but the examiner may try to assess the understanding level of the candidate.
- 3) The language errors such as grammatical, spelling errors should not be given more Importance (Not applicable for subject English and Communication Skills.)
- 4) While assessing figures, examiner may give credit for principal components indicated in the figure. The figures drawn by candidate and model answer may vary. The examiner may give credit for any equivalent figure drawn.
- 5) Credits may be given step wise for numerical problems. In some cases, the assumed constant values may vary and there may be some difference in the candidate's answers and model answer.
- 6) In case of some questions credit may be given by judgement on part of examiner of relevant answer based on candidate's understanding.
- 7) For programming language papers, credit may be given to any other program based on equivalent concept.

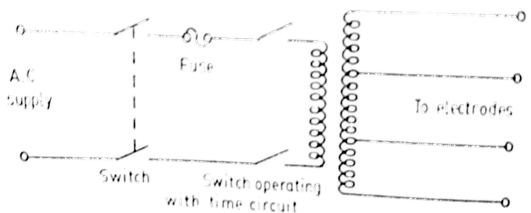
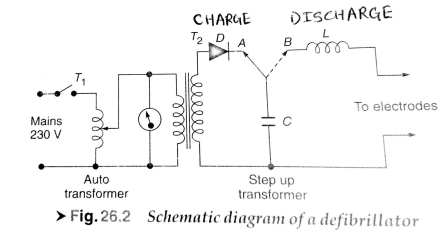
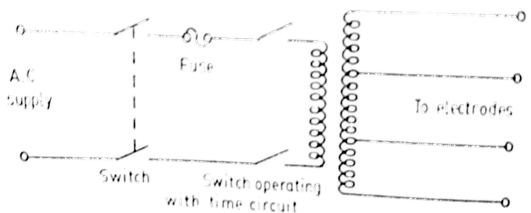
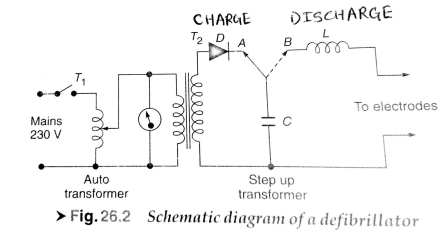
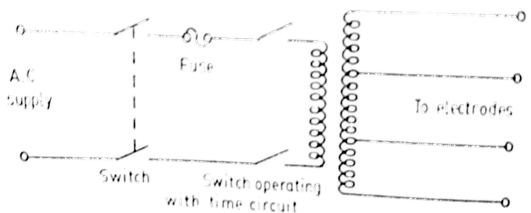
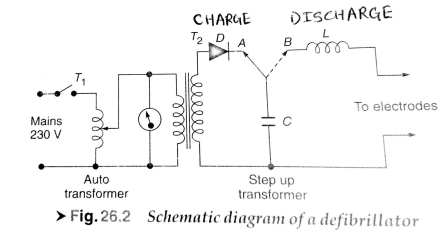


**SUMMER – 17 EXAMINATION**

**Model Answer**

Subject Code:

**17672**

Q. No.	Sub Q.N	Answer	Marking Scheme														
Q.1	A)	<b>Attempt any THREE:</b>	<b>12</b>														
	a)	<p><b>Define pacemaker. Write down need of pacemaker.</b></p> <p><b>Ans :</b></p> <p><b>Pacemaker :</b></p> <p>SA node is a natural pacemaker which generates the pulses for the working of the heart. Whenever SA node fails to generate the pulse or if the pulse generated is not proper in that case we use instrument is known as pacemaker.</p> <p><b>Need:</b></p> <p>When the heart's natural pacemaker is defective, the heartbeat may be too fast, too slow or irregular. Rhythm problems also can occur because of a blockage of heart's electrical pathways. The pacemaker's pulse generator sends electrical impulses to the heart to help it pump properly.</p>	<b>02</b>  <b>02</b>														
	b)	<p><b>Differentiate between A.C &amp; D.C defibrillator.(Any 4 points)</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%; text-align: center;">A.C defibrillator</th> <th style="width: 50%; text-align: center;">D.C defibrillator</th> </tr> </thead> <tbody> <tr> <td>1. It is not commonly used.</td> <td>1. It is commonly used.</td> </tr> <tr> <td>2. It produce undesirable side effect.</td> <td>2. It does not produce undesirable side effect.</td> </tr> <tr> <td>3.</td> <td>3.</td> </tr> <tr> <td style="text-align: center;">  </td> <td style="text-align: center;">  <p style="text-align: center;">➤ Fig.26.2 Schematic diagram of a defibrillator</p> </td> </tr> <tr> <td>4. Capacitor is not used.</td> <td>4. Capacitor is used.</td> </tr> <tr> <td>5. At transformer secondary side diode is not used.</td> <td>5. At transformer secondary side diode is used.</td> </tr> </tbody> </table>	A.C defibrillator	D.C defibrillator	1. It is not commonly used.	1. It is commonly used.	2. It produce undesirable side effect.	2. It does not produce undesirable side effect.	3.	3.		 <p style="text-align: center;">➤ Fig.26.2 Schematic diagram of a defibrillator</p>	4. Capacitor is not used.	4. Capacitor is used.	5. At transformer secondary side diode is not used.	5. At transformer secondary side diode is used.	<b>04</b>
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	c)	<p><b>Write down the application of suction apparatus.</b></p> <p><b>Ans : (any four)</b></p> <ol style="list-style-type: none"> <li>1. Suction may be used to clear the airway of blood, saliva, vomit, or other secretions so that a patient may breathe.</li> <li>2. Suctioning can prevent pulmonary aspiration, which can lead to lung infections.</li> <li>3. In pulmonary hygiene, suction is used to remove fluids from the airways, to facilitate breathing and prevent growth of microorganisms.</li> <li>4. In surgery suction can be used to remove blood from the area being operated on to allow surgeons to view and work on the area.</li> <li>5. Suction may also be used to remove blood that has built up within the skull after an intracranial hemorrhage.</li> </ol>	<b>04</b>														

d) Draw a neat labelled block diagram of bedside monitor.

Ans.:-

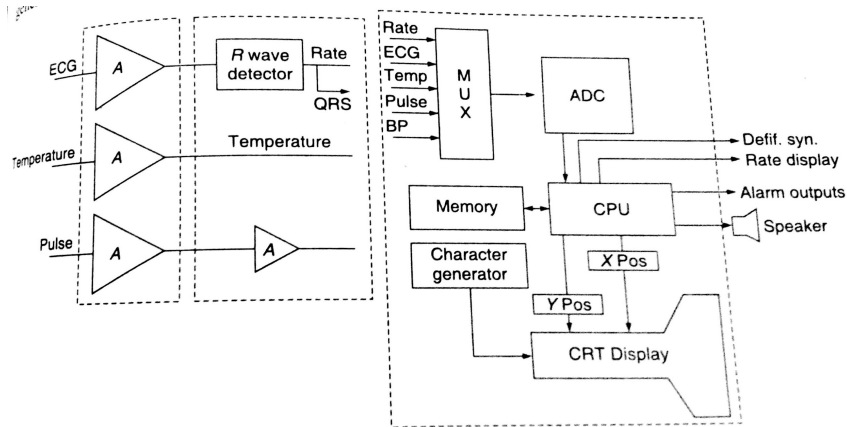


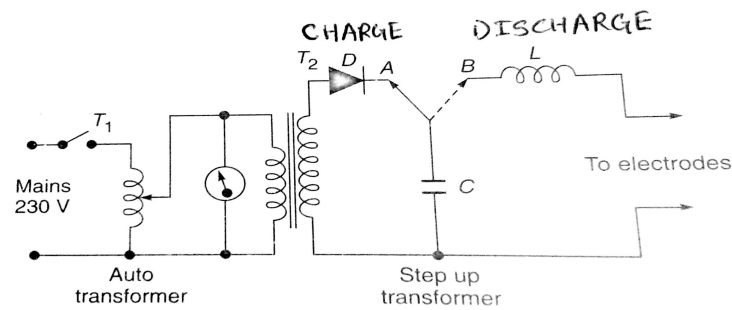
Figure 5.42 Block diagram of a typical bed side monitoring system.

04

(B) Attempt any ONE:

a) Draw the circuit diagram of D.C Defibrillator. State the function of each block

Ans.:-



► Fig.26.2 Schematic diagram of a defibrillator

06

03

CHARGING CIRCUIT:

A variable auto transformer T1 forms the primary of a high voltage transformer T2. The output voltage of the transformer is rectified by a diode rectifier and is connected to a vacuum type high voltage change over switch.

In position A, the switch is connected to one end of an oil filled 16 micro fared capacitor. in this position the capacitor charges to voltage set by positioning of the auto transformer

DISCHARGING CIRCUIT :

When the shock is to be delivered to the patient, a foot switch or a push button mounted on a handle of the electrode is operated

The high voltage switch changes over to position B and the capacitor is discharged across the heart through the electrodes.

In a defibrillator .an enormous voltage approximately 4000v is initially applied to the patient.

b) Draw the schematic diagram of Heart lung bypass machine and explain in detail.  
Ans.:-

(any relevant diagram should be consider)

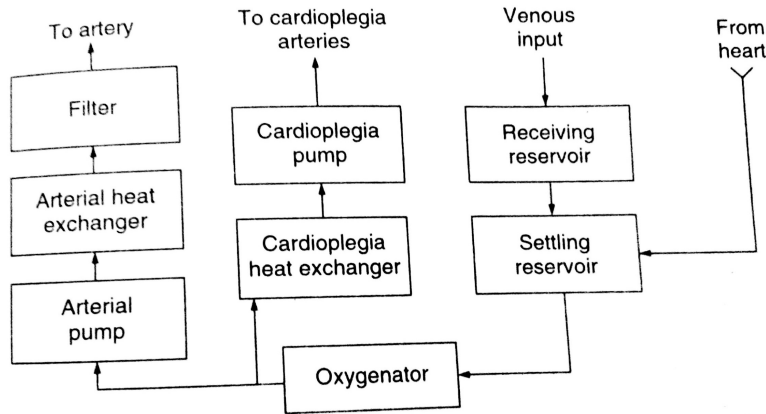


Figure 10.28 Heart lung machine (cardiopulmonary bypass).

During open heart surgery for installation of a valve prosthesis or correction of a congenital mal formation the heart cannot maintain the circulation. It is then necessary to provide extra- corporeal circulation with a special machine called heart lung machine. Usually two cannulas are inserted in to the right side of the heart to collect the returning venous blood as shown in fig. Using heart lung machine extracorporeal circulation can be possible and in which the lungs and heart are replaced by the **OXIGENERATOR** and **BLOOD PUMP** respectively. The collected venous blood is directed in to a receiving reservoir of heart lung machine by gravity drainage. The accumulated blood in the operating field is also collected and passed in to the receiving reservoir by suction devices. From here the blood is passed in to the setting reservoir or dabbling chamber and then it is passed in to oxygenator. In the oxygenator the blood is exposed to an atmosphere rich in oxygen. From oxygenator a pump raises the pressure of the blood to the mean arterial pressure from which it flows in to an arterial heat exchanger. Arterial heat exchanger is necessary during hypothermic or low temperature operation which is followed for two reasons the first is to reduce body metabolism and therefore to reduce oxygen consumption during the operation. And secondly the brain damage due to oxygen starvation is reduced. In the heat exchanger the blood is maintained at the human body temperature. From the heat exchanger the blood passes through a filter to prevent the possibility of partials or bubbles returning to the body. Systematic circulation is maintained by returning the arterial oxygenated blood to a major artery.

03

03

Q2

Attempt any Four of the following

16

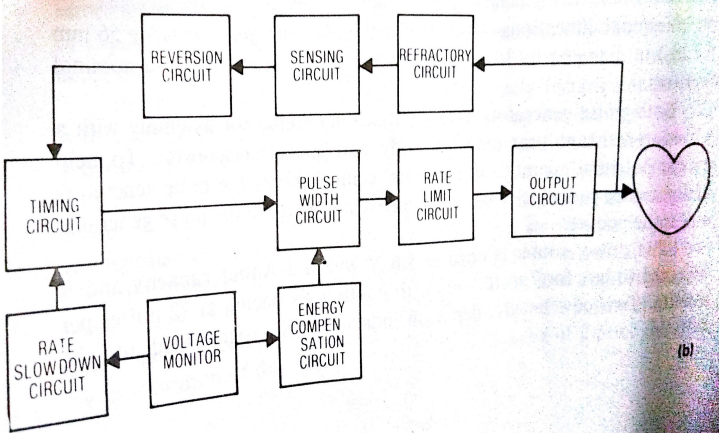
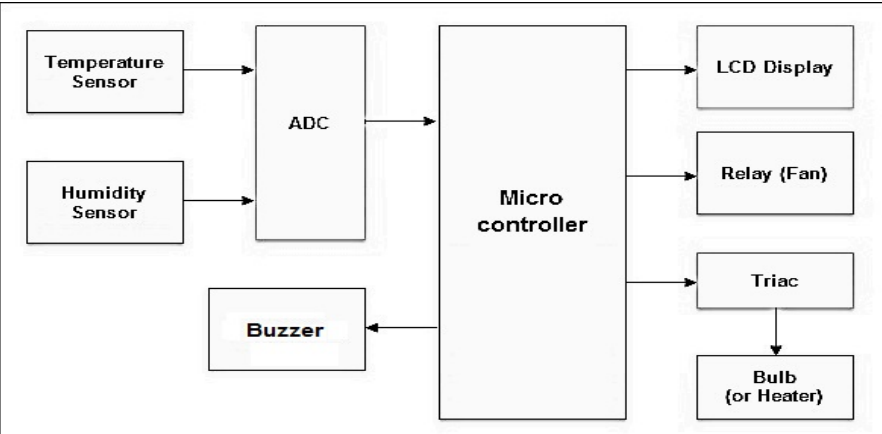
a) State different types of pacemaker. Draw block diagram of any one.

Ans

There are following types of pacemaker:(any 2 types should be considered)

- 1) External pacemaker
- 2) Internal pacemaker
- 3) Asynchronous pacemaker
- 4) Synchronous pacemaker

02

		 <p style="text-align: center;"><b>Block diagram of Internal pacemaker</b> ( any relevant diagram of any one type should be considered)</p>	<b>02</b>
	<p><b>b)</b> Draw the block diagram of baby incubator.</p> <p><b>Ans.:-</b></p>		<b>4</b>
	<p><b>c)</b> List any four technical specifications of suction apparatus.</p> <p><b>Ans.:-</b></p> <ol style="list-style-type: none"> <li>1. Power Supply-230V 50Hz.</li> <li>2. Rating of Motor- continuous</li> <li>3. Suction Bottle Capacity- 2 x 2000 ml minimum (with safety valve)</li> <li>4. Gauge- 0 to760 mm Hg</li> <li>5. Pump- Oil lubricates rotary pump</li> <li>6. Suction Tubing- ID 7 mm, 5m long and non-collapsible.</li> <li>7. Vacuum capacity: 18 litres/mim</li> <li>8. Maximum depression: -75kPa (-563mmHg)</li> <li>9. Working temperature range: +5 to +40°C.</li> </ol>		<b>4</b>
	<p><b>d)</b> Explain the need of central monitor.</p> <p><b>Ans.:-</b></p> <p><b>Need of Central monitor:</b> Central monitoring is the process of acquiring &amp; recording the physiological parameter of different patients simultaneously on a single monitor at central station. In ICU the no. of critical patient is always high monitoring the physiological parameter for each patient is done by using bedside monitor but in some cases to reduce the manpower require delivering care.</p>		<b>4</b>



	e)	<p><b>Describe the need of baby incubator.</b>  <b>Ans.:-</b>  <b>Need:</b>            1. To provide controlled environment for new born or premature babies, who needs special care.            2. To monitor different aspects of children’s environment in order to create ideal conditions for survival.            3. To regulate oxygen temperature and humidity level to protect infant from pollutants and infections.</p>	<b>4</b>										
	f)	<p><b>Differentiate between internal and external pacemaker.</b>  <b>Ans.:-</b>  <b>(any two point)</b></p> <table border="1" style="width: 100%; border-collapse: collapse; margin-left: 40px;"> <thead> <tr> <th style="width: 50%; text-align: center;">Internal pacemaker</th> <th style="width: 50%; text-align: center;">External pacemaker</th> </tr> </thead> <tbody> <tr> <td>1. Internal pacemakers are used in long-term pacing cases.</td> <td>1. External pacemakers used in short time pacing cases.</td> </tr> <tr> <td>2. These types of pacemakers are used when there is permanent damage to the heart.</td> <td>2. These types of pacemakers are used when the heart block presents as an emergency.</td> </tr> <tr> <td>3. Internal pacemakers are implanted beneath the skin along with its electros.</td> <td>3. External pacemaker is applied externally on the surface of body by using metal electrodes.</td> </tr> <tr> <td>4. Internal pacemakers are small in size.</td> <td>4. External pacemakers are large in size.</td> </tr> </tbody> </table>	Internal pacemaker	External pacemaker	1. Internal pacemakers are used in long-term pacing cases.	1. External pacemakers used in short time pacing cases.	2. These types of pacemakers are used when there is permanent damage to the heart.	2. These types of pacemakers are used when the heart block presents as an emergency.	3. Internal pacemakers are implanted beneath the skin along with its electros.	3. External pacemaker is applied externally on the surface of body by using metal electrodes.	4. Internal pacemakers are small in size.	4. External pacemakers are large in size.	<b>04</b>
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<b>Q3</b>		<b>Attempt any Four</b>	<b>16</b>										
	a)	<p><b>Differentiate between endocardial &amp; myocardial leads.</b>  <b>Ans.:-</b>  <b>( any two points)</b></p> <table border="1" style="width: 100%; border-collapse: collapse; margin-left: 40px;"> <thead> <tr> <th style="width: 50%; text-align: center;">Endocardial pacemaker leads</th> <th style="width: 50%; text-align: center;">Myocardial pacemaker leads.</th> </tr> </thead> <tbody> <tr> <td>1. This is connected to inner side of heart chamber.</td> <td>1. This is connected to outer wall of heart muscle.</td> </tr> <tr> <td>2. This is used in external pacemaker.</td> <td>2. This is used in internal pacemaker.</td> </tr> <tr> <td>3. The endocardial lead is inserted into the inside of the heart via a vein, usually in the chest area.</td> <td>3. This type of lead is most often used when other cardiac surgery is being performed and there is already access to the heart.</td> </tr> <tr> <td>4.Example : Porous tip electrode</td> <td>4. Example: Steroid eluting electrode.</td> </tr> </tbody> </table>	Endocardial pacemaker leads	Myocardial pacemaker leads.	1. This is connected to inner side of heart chamber.	1. This is connected to outer wall of heart muscle.	2. This is used in external pacemaker.	2. This is used in internal pacemaker.	3. The endocardial lead is inserted into the inside of the heart via a vein, usually in the chest area.	3. This type of lead is most often used when other cardiac surgery is being performed and there is already access to the heart.	4.Example : Porous tip electrode	4. Example: Steroid eluting electrode.	<b>04</b>
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b) Write down steps for trouble shooting of defibrillator.

Ans.:-

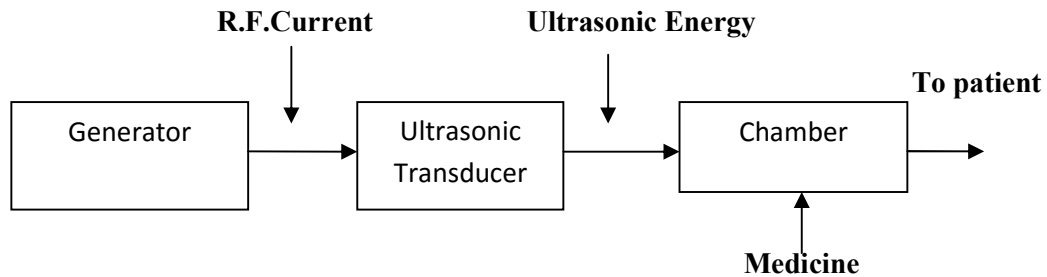
(any two steps should be consider)

Fault	Cause	Action
Unit is not getting switched on.	No supply Fuse blown	Check and provide proper supply Replace fuse
Capacitor is not discharging.	Improper electrode placement Discharge button may be faulty	Connect electrode properly Check for discharge buttons on electrode, replace if necessary
Keys are not functioning.	Keys may be broken or faulty Connection cable may be faulty	Replace the keys Check and replace the connection cable
LCD contrast is not varying.	Check the contrast varying knob Display may be faulty	Replace if faulty Change the display
ECG trace not available.	ECG cable may not be attached or loosely attached Synchronous mode may not be active	Connect ECG cable properly , replace if necessary Check the settings. Select synchronous mode
ECG printout is too dark.	Incorrect settings Faulty printing assembly	Check the settings and select proper contrast and brightness. Check and replace if necessary.

04

c) Draw block diagram of nebulizer and explain its working.

Ans.:-



(any relevant diagram should be considered)

Nebulizer is an instrument which is used in drug delivery. When therapy requires that water or some types of medications be suspended in the air as an aerosol, a device called nebulizer is used. In this device water or medication is picked up by a high velocity jet of oxygen or some other gas and thrown against one or more baffles or other surface. To brake the substance into controllable sized droplates or particles which are then applied to the patients via respirator.

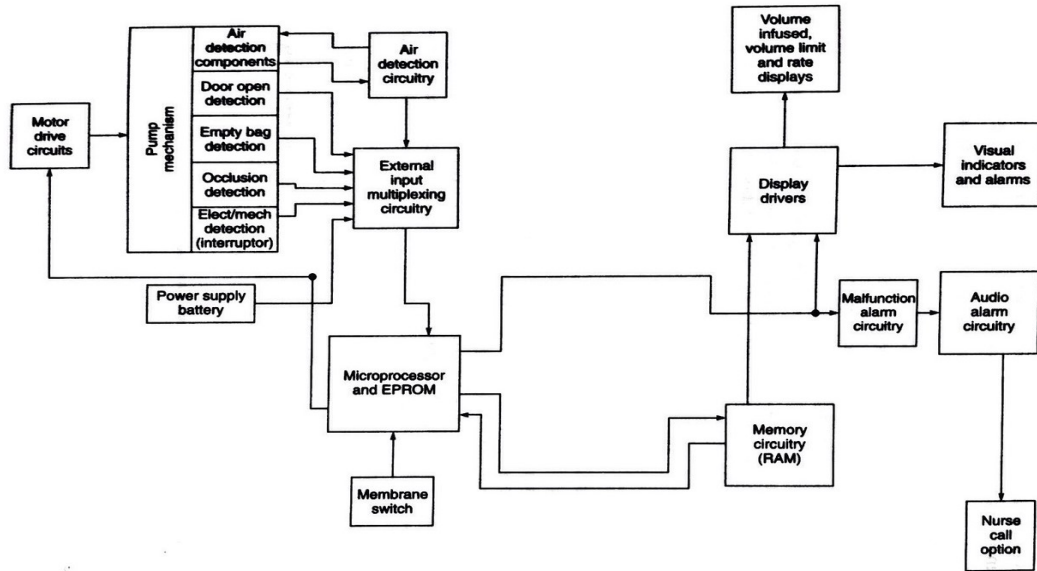
02

02



d) Draw block diagram of programmable microprocessor based infusion pump.

Ans.:-



04

e) List the technical specification of Heart-lung machine.

Ans.:- (Any 04) (other relevant technical specification should be consider)

1. Console supply voltage: 230V 50 Hz.
2. Main fuses: 6A
3. Roller pump module:
  - i) Master speed, forward and reverse: 0-250 RPM
  - ii) supply voltage: 24 V DC
4. Temperature measurement range: 0°C to + 50°C
5. Pressure measurement range: -200 mmHg to +800 mmHg or 26.7 kPa to 106.7 kPa

04

Q4. A) Attempt any THREE:

12

a) Differentiate between synchronous and asynchronous pacemaker.

Ans (any 02points should be considered)

Synchronous pacemaker	Asynchronous pacemaker
1. Synchronous pacemaker delivers a pacing stimulus only when the heart's intrinsic pacemaker fails to function at a predetermined rate.	1. Asynchronous pacemaker delivers stimuli at a fixed rate, independent of any atrial or ventricular activity
2. This type is commonly used.	2. This type is now rarely used.
3. Synchronous pacemaker detect spontaneous ventricular activity and the output of the pacemaker is either suppressed or discharged in order to make the impulse fall within the safe period of the QRS complex.	3. In asynchronous pacemaker, there is a small risk of producing dangerous dysrhythmias if the impulse coincides with the vulnerable period of the T wave.

04



	<p><b>b) List technical specification of ventilator.</b>  <b>Ans :(any four)</b>  <b>Power Source:</b> - 220/230 V Ac 50 Hz supply.  <b>Ventilation parameters:</b> -</p> <ol style="list-style-type: none"> <li>1. Tidal volume - 200 – 2000 ML (Adult patient). 50 to 300 ML (Paediatric PC mode).</li> <li>2. Respiratory rate - 5 – 100 BPH.</li> <li>3. Pressure - 0 – 100 cm H<sub>2</sub>O.</li> <li>4. Inspiratory Peak Flow - 4 – 100 l/min.</li> <li>5. Minute volume - 1 – 30 l/min.</li> <li>6. Oxygen Concentration - 21 –100 %</li> <li>7. Inspiratory pause - 0.1 – 5.5 sec.</li> <li>8. PEEP/CPAP - 30 cm H<sub>2</sub>O.</li> </ol> <p><b>Ventilation modes :</b></p> <ol style="list-style-type: none"> <li>1. Pediatric mode.</li> <li>2. Controlled mode.</li> <li>3. Asst. Controlled mode.</li> <li>4. Pressure Controlled Ventilation.</li> <li>5. SIMV/V and SIMV/P.</li> <li>6. Bipressure Ventilation.</li> <li>7. CPAP and PEEP.</li> <li>8. Facility for Non-Invasive ventilation</li> </ol>	<b>04</b>
	<p><b>c) Write down need of central monitor.</b>  <b>Ans:</b>  <b>Need of Central monitor:</b> Central monitoring is the process of acquiring &amp; recording the physiological parameter of different patients simultaneously on a single monitor at central station. In ICU the no. of critical patient is always high monitoring the physiological parameter for each patient is done by using bedside monitor but in some cases to reduce the manpower require delivering care</p>	<b>04</b>
	<p><b>d) Draw a labelled block diagram of suction apparatus.</b>  <b>Ans:</b></p> <div style="text-align: center;"> </div> <p style="text-align: center;"><b>(any relevant diagram should be considered)</b></p>	<b>04</b>

<b>Q.4</b>	<b>B)</b>	<p><b>Attempt any ONE :</b></p>	<b>06</b>
	<b>a)</b>	<p><b>Give steps for maintenance of Defibrillator</b></p> <p><b>Ans:</b></p> <ol style="list-style-type: none"> <li>1. To get good defibrillation paddles should be clean. So that if it is dirty cleans them with sprit.</li> <li>2. Check the insulation of coil chord, mains cable.</li> <li>3. Check the battery.</li> <li>4. Check the fuses and consumable.</li> <li>5. Check the switches such as joules, charge, discharge, synchronisation</li> </ol>	<b>06</b>
	<b>b)</b>	<p><b>Draw the neat block diagram of Hemodialysis machine. List technical specification of it.</b></p> <p><b>Ans:</b></p> <div style="text-align: center;"> <p style="text-align: center;"><i>Blood flow path is shown</i></p> </div> <p><b>Technical specification: ( Any 3 relevant technical specification should be consider)</b></p> <ol style="list-style-type: none"> <li>1. Power input to be 220-240VAC, 50Hz.</li> <li>2. Dialysate temperatures selectable between 35 degrees C to 39 deg.C.</li> <li>3. Variable conductivity setting between 12 to 15.</li> <li>4. Dialysate flow 200-800 ml/mt.</li> <li>5. Heparin pump with syringe sizes 20 to 30 ml with pump flow rate from 1-10 ml/hr.</li> <li>6. Ultra filtration 0.1 to 2.5 liters/hr.</li> <li>7. Blood pump rate from 20-500 ml/min.</li> </ol>	<b>03</b>
			<b>03</b>



Q.5	<b>Attempt any FOUR:</b>	<b>16</b>
	<p>a) <b>Draw the block diagram of atrial synchronous pacemaker.</b></p> <p><b>Ans :</b></p> <div data-bbox="284 325 738 640"></div> <div data-bbox="779 304 1323 598"><p><b>OR</b></p></div>	<b>04</b>
	<p>b) <b>Explain the following modes of ventilator:</b></p> <ul style="list-style-type: none"><li>(i) Assist</li><li>(ii) Assist/Control</li></ul> <p><b>Ans:</b></p> <p>i) <b>Assist:</b></p> <p>A ventilator which augments the inspiration of the patient's inspiratory effort. A pressure sensor detects the slight negative pressure that occurs each time the patient attempts to inhale and triggers the process of inflating the lungs. Thus the ventilator helps the patient to inspire when needed. A sensitivity adjustment provided on the equipment helps to select the amount of effort required on the patient's part to trigger the inspiration process. The assist mode is required for those patients who are able to breathe but is unable to inhale a sufficient amount of air or for whom breathing requires a great deal of effort.</p> <p>ii) <b>Assist/Control:</b></p> <p>A ventilator which combines both the controller and assistor functions. In these devices, if the patient fails to breathe within a pre-determined time, a timer automatically triggers inspiration process to inflate the lungs. Therefore, the breathing is controlled by the patient as long as it is possible, but in case the patient should fail to do so, the machine is able to take over the function. Such devices are most frequently used in critical care units.</p>	<b>02</b>  <b>02</b>



c) **State the troubleshooting steps carried out for bedside monitor.**

**Ans: Following any two steps should be consider**

Problem	Cause	Action
Nothing is displayed	Mains not available. Fuse blown.	Mains switch gets ON. Replace the fuse.
Parameters are absent	Faulty modules.	Check and replace the faulty modules.
Cannot store data in memory	Improper connection between memory and processor.	Correct the connection between memory and processor.
Alarm dose not ring	Improper alarm setting.	Replace the SpO <sub>2</sub> module. Replace the sensor.

04

d) **Describe the concept of AED.**

**Ans :**

An important development in the field of defibrillator has been the development and successful use of smart automatic or advisory external defibrillator (AED) which are capable of accurately analyzing the ECG and of making reliable shock decision. They are designed to detect ventricular fibrillation with sensitivity and specificity comparable to that of well trained paramedics then deliver or recommended (advisory) an appropriate high energy defibrillating shock. AED require self adhesive electrode instead of hand held paddles for two reasons. Firstly, the ECG signal acquired from self adhesive electrodes usually contains less noise and has higher quality. Hence, it allows a faster and more accurate analysis of ECG and therefore facilitates better shock decision. Secondly, "Hand-off: defibrillation is safe procedure for the operator .especially if the operator has little or no training. An automatic external defibrillator is the ability of the device to accurately assess the patient's heart and appropriate therapy decision. It is small, light and virtually maintenance free. While it is on standby mode for long periods, the device automatically self tests its electronic circuitry every day and periodically performs an internal discharge and recalibration. The device is powered by long life disposable lithium battery with enough capacity for 75 discharges and one year of self test. It uses a low energy biphasic waveform.

04

e) **List different types of oxygenators and give its impotence.**

**Ans :**

There are two types of oxygenators which are used in heart-lung machine:

1. Bubble oxygenators
2. Membrane oxygenators

**Importance :**

Oxygenator is a device that is capable of exchange in oxygen and carbon dioxide in the blood of human body during surgical procedure.

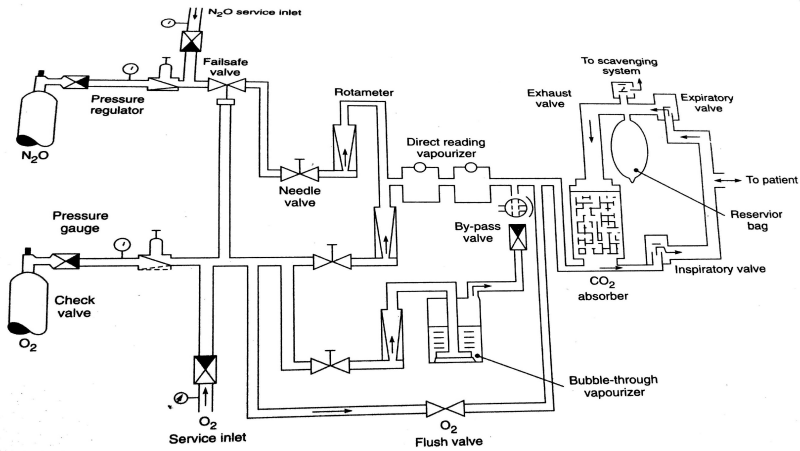
The oxygenators repeatedly draw of the blood from the veins, reoxygenates and pumps it into the arterial system.

The oxygenator serves as the lung during the open heart surgery as the lung.

02

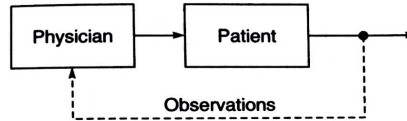
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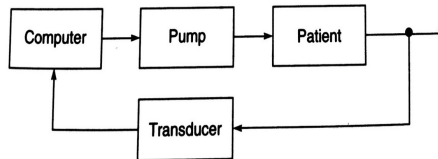
	<p><b>f) State the need of :</b> <b>(i) Anesthesia machine</b> <b>(ii) Suction apparatus</b> <b>Ans:</b> <b>i) Anesthesia machine:</b> A surgical method of treatment consists mainly of operations which are normally carried out under some form of anesthesia. So anesthesia ensures that the patient does not feel pain and minimizes patient discomfort. It provides the surgeon with favorable conditions for the work. <b>ii) Suction apparatus:</b> The main function of this device to remove liquids and gases (such as vomiting, saliva) from mouth and respiratory tract, and also during surgeries to remove fluid from operated area.</p>	<p><b>4 marks</b></p> <p><b>02</b></p> <p><b>02</b></p>
<p><b>Q6)</b></p>	<p><b>Attempt any FOUR:</b></p>	<p><b>16</b></p>
	<p><b>a) Draw neat diagram of Anesthesia machine.</b> <b>Ans :</b></p> 	<p><b>04</b></p>
	<p><b>b) Write down need of Pacemaker leads. State different leads used for pacemaker.</b> <b>Ans:</b> <b>Need:</b> Leads are thin, soft, insulated wires about the size of spaghetti noodles. The leads carry the electrical impulse from the pacemaker to your heart and relay information about the heart's natural activity back to your pacemaker. <b>Pacemaker lead:</b> 1. Unipolar: In uniplar system one electrode in inside or on the heart &amp; is the stimulating electrode, &amp; the second electrode is usually a large metal plate attached to the pulse generator. The current in this case flows between the pacing electrode in the heart &amp; the indifferent electrode via the body tissue. 2. Bipolar leads: Bipolar leads which have two electrodes positioned in the heart are designed with a coaxial connector requiring only a single receptacle resulting in improvement in the size of bipolar pacemaker connector. In the bipolar electrode system both electrodes are approximately of the same size and both are placed inside or on the heart so that current flows between the two electrodes. 3. Myocardial leads: This is connected to outer wall of heart muscle. 4. Endocardial leads: This is connected to inner side of heart chamber.</p>	<p><b>02</b></p> <p><b>02</b></p>

c) **Draw the block diagram of conventional method and closed loop control drug delivery system.**

Ans :



**Fig a. Conventional method drug delivery system**



**Fig b. Closed loop control drug delivery system**

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d) **Write technical specification of baby incubator.**

Ans: (any 04)

- 1) Air temperature control range: 25°C -38°C (>37°C temperature setting.)
- 2) Skin temperature control range:35°C - 37°C
- 3) Power supply: 230v AC 50 Hz.
- 4) Humidity control range:40-95%RH
- 5) Water tank capacity: 1.0000ml
- 6) Weight 89 kgs Approx

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e) **Describe concept of heart block.**

Ans :

Heart block occurs whenever the conduction system fails to transmit the pacing impulses from the atria to the ventricles properly.

In first degree block an excessive impulse delay at AV junction occurs that causes the P-R interval to exceed 0.2 second for normal adults.

Second degrees block result in the complete but intermittent inhibition of pacing impulse, which may also occur at the AV node.

A total and continuous impulse blockage is called third –degree block. It may occur at the AV node or elsewhere in the conduction system. In this case, the ventricles usually continue to contract but a sharply reduced rate (40BPM) because of impulses that only periodically originate from the atria.

04