

Here timing circuit is used to monitor the volume of the dialysate solution. If 2 litres of solution is allowed then the circuit deliver the signal to stop the dialysate flow in to the peritoneal cavity.

At the same time timing circuit is used to monitor the diffusion time also. After 30 minutes of diffusion time the timing circuit deliver a signal to stop the diffusion process.

Then the dialysate solution is removed from the abdomen using suction pump. After that the fresh dialysate solution is allowed to enter in to the peritoneal cavity.

If the volume of dialysate solution sucked from the peritoneal cavity is less than 2litres then the alarm circuit is operated. If alarm is operated then sudden action should be taken to take care of the patient.

Difference between Extra corporeal dialysis & Intra corporeal dialysis

Extracorporeal dialysis(Haemodialysis)	Intra corporeal dialysis(Peritoneal cavity dialysis)
Blood is purified by an artificial kidney machine in which blood is taken out from the body and waste products diffuse through a semipermeable membrane which is continuously rinsed by a dialysing solution	The Peritoneal cavity in our body is used as semipermeable membrane and by passing the dialysate in to it waste products are removed from the blood by diffusion
More effective for separating the waste products	Less effective
Complex and risk because blood is taken out from the body.	Simple and risk free
Dialysing time is about 3 to 6 hours	Dialysing time is about 9 to 12 hours

TWO MARKS

1 Give two important factors that demand internal pace maker's usage.

The two important factors that demand internal pace maker's usage are

- (i). Type and nature of the electrode used
- (ii). Nature of the cardiac problems.
- (iii). Mode of operation of the pacemaker system.

2) Classify Pacing modes

Based on the modes of operation of the pacemakers, they can be classified into five types. They are:

- i) Ventricular asynchronous pacemaker(fixed rate pacemaker)
- ii) Ventricular synchronous pacemaker.

- iii) Ventricular defibrillator inhibited pacemaker (demand pacemaker)
- iv) Atrial synchronous pacemaker.
- v) Atrial sequential ventricular inhibited pacemaker.

3) What are the batteries used for implantable pacemaker?

The batteries used for implantable pacemakers are

- (i).Mercury cell, (ii).Lithium cells, (iii). Nuclear cell

4) What types of electrodes are used in a defibrillator?

The electrodes used in a defibrillator are

- (i)Internal electrodes - Spoon shaped
- (ii)External electrodes –Paddle shaped

5) What is meant by fibrillation

The condition at which this necessary synchronism is lost is known as fibrillation. During fibrillation the normal rhythmic contractions of either atria or the ventricles are replaced by rapid irregular twitching of the muscular wall

6) Calculate the energy stored in 16 μ F capacitor of a DC defibrillator that is charged to a potential of 5000 Vdc.

Given Data:

$$\begin{aligned}C &= 16\mu\text{F} \\V &= 5000 \\E &= (1/2) CV^2 \\&= (1/2) 16 \times 10^{-6} \times 25 \times 10^6 \\&= \mathbf{200 \text{ Joules}}\end{aligned}$$

16 MARKS QUESTIONS

1. What is pacemaker? Discuss the different modes of operation of cardiac pacemaker in detail. (16)
2. What are 'internal pace maker', 'external pacemaker', 'competitive & non competitive' pace making modes ,demand mode, standby mode(12)
3. What is fibrillation? Discuss in detail direct current defibrillator (10)
4. Explain in detail about the working of synchronised d.c defibrillator(8)
5. Explain with relevant diagrams the principle of demand pacemaker (or) R-wave inhibited pacemaker(8)
6. Write shorts notes on defibrillator based on electrode placement(6)
7. Explain in detail about A.C ,Square wave, Double Square wave defibrillator(16)
8. Explain in detail about heart lung machine(16)
9. Discuss in detail about dialyser(16)