Name :	<u>Overan</u>
Roll No.:	
Invigilator's Signature :	

CS/B.Tech (BME)/SEM-7/BME-702/2010-11 2010-11

ARTIFICIAL ORGANS & REHABILITATION ENGINEERING

Time Allotted: 3 Hours Full Marks: 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP - A

(Multiple Choice Type Questions)								
1.	Cho	oose the correct alternatives for the following : $10 \times 1 = 10$						
	i)	Insulin is produced from proinsulin by the splitting of						
		a)	A-peptide	b)	B-peptide			
		c)	C-peptide	d)	D-peptide.			
	ii)	i) An example of a biological transducer is						
		a)	Blood	b)	Cochlea			
		c)	Eardrum	d)	Hormone.			

Whole blood is considered to be a iii)

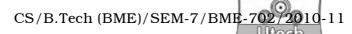
Fluid b) Non-Newtonian fluid a)

Viscous fluid Dilute fluid. c) d)

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iv)	For fixation of cadaveric heart valves the type of solution						
	used is						
	a)	Glutararaldhyde	b)	Formaldehyde			
	c)	Sulphuric acid	d)	Normal saline.			
v)	Cupraphan is a membrane used in						
	a)	Oxygenator	b)	Bioreactor			
	c)	Hemodialyzer	d)	Audiometer.			
vi)	Spec	ctacle is an example of					
	a)	Orthotic device	b)	Prosthetic device			
	c)	Supporting device	d)	Additive device.			
vii)	ii) Blood cells when passing through small capil become						
	a)	Round shaped	b)	Bullet shaped			
	c)	Disc shaped	d)	Sickle shaped.			
viii)	i) An example of mechanical heart valve is						
	a)	Iron valve	b)	Ball & Caged valve			
	c)	Titanium valve	d)	Tissue valve.			
ix)	Туре	e-I Diabetes Mellitus is a	a/an				
	a)	age related disorder	b)	auto-immune disorder			
	c)	genetic disorder	d)	none of these.			
x)	Rehabilitation falls under the category of						
	a)	primary prevention	b)	secondary prevention			
	c)	tertiary prevention	d)	none of these.			



GROUP - B

(Short Answer Type Questions)

Answer any three of the following.

 $3 \times 5 = 15$

- 2. What are the different types of cardiac valves? Explain with examples. 3+2
- 3. What are the basic criteria of a biocompatible scaffold ? Explain with reference to artificial skin grafting. 2+3
- 4. Define orthosis and prosthesis? What do you understand by human gait cycle? 2 + 3
- 5. What do you understand by Rehabilitation aids? Explain with examples. 2 + 3
- 6. Explain the Non-Newtonian behaviour of blood. What do you understand by the plasma skimming phenomenon? 3 + 2
- 7. Discuss the basic mechanism of artificial waste disposal. Mention different methods of waste removal. What is middle molecule hypothesis? 2 + 2 + 1

GROUP - C

(Long Answer Type Questions)

Answer any three of the following.

 $3 \times 15 = 45$

- 8. How is skin grafting done? What are the different design parameters for skin grafting? Explain the REDY system with reference to Artificial Kidney. Give the functional diagram of the hemodialyzer. 3+4+5+3
- 9. Explain the functioning of a Heart Lung Machine. What are the different types of oxygenators used? What is preening? How is it useful? 6+6+2+1
- 10. What is pure tone audiometry? Give the functional diagram of an audiometer. What is masking in audiometry? What is bone conduction hearing? 5+5+3+2

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11. Describe the Liver Assist Device (LAD). What is the need of recirculation of dialysate? Explain the recirculating of dialysis system. What is "BUN" and its significance?

4 + 2 + 7 + 2

- 12. What is haemodialyzer? What do you understand by counter-current exchange in an haemodialyzer? With the help of suitable diagrams, explain the different types of haemodialyzers. What is cross-current and current flow. 3+3+5+4
- 13. What are the different types of prosthetic heart valves?

 Explain with the help of diagrams. What is the process of regeneration of artificial skin.

 5 + 5 + 5

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