



Name :
Roll No. :
Invigilator's Signature :

CS/B.Tech/BME/SEM-7/BME-702/2012-13

2012

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)

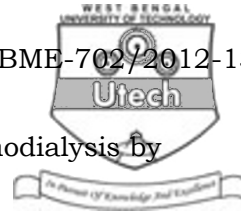
1. Choose the correct alternatives for any *ten* of the following :

$10 \times 1 = 10$

- i) In artificial oxygenator, defoaming is carried out by passing oxygenated blood over
- a) Polyethylene coated screen
 - b) Silicone coated screen
 - c) Dacron coated screen
 - d) Nylon coated screen.
- ii) Cupraphan is a membrane used in
- a) Oxygenator
 - b) Bioreactor
 - c) Hemodialyzer
 - d) Audiometer.



- iii) Conductive hearing loss is due to the
- a) Damage of cochlea
 - b) secondary root problem in middle ear
 - c) problems in the air conduction route
 - d) damage auditory route.
- iv) Blood corpuscles while passing through small capillaries, deform into
- a) Biconcave disc
 - b) Spherical shaped
 - c) Round shaped
 - d) Bullet shaped.
- v) Above 50 sec^{-1} shear rate, blood behave like
- a) Newtonian fluid
 - b) Non-Newtonian fluid
 - c) Pseudo plastic fluid
 - d) Plastic fluid.
- vi) The bone conduction route is
- a) Having no function with basilar membrane
 - b) Having function with Eustachian tube
 - c) Having no function with external auditory meatus
 - d) None of these.
- vii) Moderate loss of hearing falls in the range of
- a) 10-15 dB
 - b) 41-55 dB
 - c) 61-70 dB
 - d) None of these.
- viii) Frequency response of a hearing aid must be
- a) 10-10 kHz
 - b) 25-50 kHz
 - c) 20-20 kHz
 - d) 20-10 kHz.



- ix) The maximum resistance offer in hemodialysis by
- a) Blood film
 - b) Dialysate film
 - c) Hemodialysis membrane
 - d) Flow rate.
- x) The optimum blood flow rate in hemodialyzer is
- a) 200 ml/min
 - b) 400 ml/min
 - c) 600 ml/min
 - d) 800 ml/min.
- xi) In socket design, the principle of 'total contact' (double wall sockets) is followed to avoid
- a) edema
 - b) bone healing
 - c) hypersensitive reaction
 - d) none of these.

GROUP - B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. Explain the Newtonian and Non-Newtonian behaviour of blood. What do you understand by the plasma skimming phenomenon ? $3 + 2$
3. What do you mean by "Rheological properties of blood" ? Explain the effect of hematocrit on blood viscosity. $2 + 3$



4. Explain the basic mechanism of artificial waste disposal. Mention different methods of waste removal. What is middle molecule hypothesis ? $2 + 1\frac{1}{2} + 1\frac{1}{2}$
5. What are the different types of engineering concept which are commonly used in improving communication disorder ? 5

GROUP - C

(Long Answer Type Questions)

Answer the following. $3 \times 15 = 45$

6. a) Mention the different types of hearing losses (conductive, sensorineural and mixed) by drawing different audiograms.
- b) What is masking and why it is important in audiometry ?
- c) Describe the hearing aid with special notes on transducers. $6 + 4 + 5$
7. a) Define the term impairments and disabilities.
- b) Briefly explain on the different parameters of GAIT.
- c) Draw the functional diagram of an audiometer. $5 + 5 + 5$
8. Why an artificial lung is needed during bypass heart surgery ? Describe membrane oxygenator with a neat sketch. What is the need of recirculation of dialysate ? Explain the recirculating of dialysis system. $3 + 4 + 2 + 6$
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