

B.Tech I Year(R07) Supplementary Examinations, May/June 2010
PROCESS ENGINEERING PRINCIPLES
(Bio-Technology)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Explain the following terms:
 - i. Steady state process
 - ii. Solute
 - iii. Rate of a process(b) Distinguish between the unit processes: isomerisation and reduction. [9+7]
2. (a) What is gravitational force constant (gc) explain its significance with the FPS units and dimensions.
(b) Define dyne and gram wt. How are they related? What are the dimensions and units of this conversion factor. [8+8]
3. (a) Stating the assumptions derive Bernoullis equation.
(b) Sulphuric acid of 98% is to be pumped from a tanker at ground level to, to an over head storage tank which is 30 m above the ground level through a 5 cm dia pipe at a flow rate of 30 kg per 10 mins. What is the horsepower required? [8+8]
4. (a) With the help of neat sketch explain Newton's law of viscosity.
(b) Draw the plots of shear stress vs shear rate diagrams for Newtonian and Bingham fluids explain the significance of the yield stress.
(c) A Newtonian fluid of $\mu = 0.7$ cp is held between two infinite plates separated by 0.03 cm. Calculate the shear stress on the stationary bottom plate when the upper plate is moved with constant velocity of 30 cm per sec. [5+5+6]
5. A reverse osmosis unit for purifying brackish water has about 900,000 hollow fibers that permit the diffusion of water but reject most of the salt. The fibers are 85μ m in outside diameter and 42μ m in inside diameter and about 3m long. The average through the pipe is 2000lit/day when the feed pressure is 400psig. What is the pressure drop within an individual fiber from the feed and to the discharge end. [16]
6. Mention and explain continuous types of fluidization. [16]
7. What is the technique used in preventing leakages around moving parts. Explain the devices used in brief. [16]
8. (a) Give the differences between diaphragm pumps and peristaltic pumps.
(b) How positive displacement pumps work, explain? [6+10]
