I B.TECH – EXAMINATIONS, JUNE - 2011
PROCESS ENGINEERING PRINCIPLES
(BIOTECHNOLOGY)

Time: 3hours   Max.Marks:80

Answer any FIVE questions
All questions carry equal marks
- - -

1.a) Distinguish between the unit operations: Extraction and leaching.
  b) What is the role of Engineer in bio process?   [8+8]

2.a) What is the gravitational force constant [g_c] explain its significance with the F.P.S units and dimensions?
  b) Define dyne and gram weight. How are they related? What are the dimensions and units of this conversion factor?   [8+8]

3.   Water is to be pumped from a storage tank through 7.5 cm dia pipe of 200 m long to an over head tank situated at a height of 20 m from the level of the pump using the additional data find the power required.
     Data: Mass flow rate = 8.0 kg/sec
              Frictional losses are = 0.15 J/kg per meter of pipe
              Pump efficiency = 60%.   [16]

4.a) Define absolute, reduced and apparent viscosity terms. State the units in CGS and SI systems.
  b) Briefly write on the viscosity of a fermentation broth suspension.
  c) Write on capillary viscometer for determining the viscosity.   [5+3+8]

5.a) What is Mach number, subsonic and supersonic?
  b) Derive equation for Mach number of an ideal gas in terms of its acoustic velocity.
                                                           [8+8]

6.   Derive Erguns equation for a fluid flowing through a packed bed.   [16]

7.   Write short note on:
     a)   Pitot tube
     b)   Variable area meter.   [8+8]

8.a) Discuss in detail the construction and working of a centrifugal pump.
  b) Explain the performance curve of a centrifugal pump.   [8+8]

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