

Printed Pages : 3



CH-304

(Following Paper ID and Roll No. to be filled in your Answer Book)

**PAPER ID : 994304**

Roll No.

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**B. Tech.**

(SEM. III) (ODD SEM.) THEORY  
EXAMINATION, 2014-15  
**FLUID FLOW & SOLID HANDLING**

Time : 3 Hours]

[Total Marks : 100

- 1** Attempt any four parts of the following : **5×4=20**
- Explain the following: Cavitation and NPSH
  - Define Significance of Reynold Number and Euler Number?
  - Define angle of nip and Rittengers Law
  - Explain sedimentation.
  - Draw and explain Rheological diagram.
  - What are the disadvantages of Pitot tube ?
- 2** Attempt any four parts of the following : **5×4=20**
- Write the names of five size reduction equipment and explain any one.
  - Derive necessary expression for the constant pressure filtration process.
  - Establish the Bernoulli's theorem from Euler's equation.
  - Define Work Index.

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- e) Particles of average feed size  $25 * 10^{-3}$  m are crushed to an average product size of  $5 * 10^{-3}$  at the rate of 15 ton /h .At this rate the crusher consumes 32 kw of power of which 2kW are required for running the mill empty.What would be the power consumption if 10 t/h of this product is further crushed to  $1 * 10^{-4}$  size in the same mill?Assume rittinger law is applicable.
- f) Define major and minor losses in pipe flow.

**3** Attempt any two parts of the following : **10×2=20**

- a) With the help of neat sketch explain the working principle of a centrifugal pump in detail also discuss the characteristic curve for centrifugal pump.
- b) Calculate the energy required to crush 100 tons/hr of limestone if 80% of the feed passes through a screen of 3.75 cm aperture and 80% of the product passes through a screen of 0.03 cm aperture. The work index for lime stone is 12.74, when capacity is expressed in tons/hr, energy required in hp and size of feed and product in feet.
- c) A centrifugal pump having an overall efficiency of 72% delivers  $0.03 \text{ m}^3/\text{s}$  of water to a height of 20 m through a 10 cm diameter pipe of 80 m long. Taking friction coefficient  $f=0.01$ , calculate the power required to run the pump.

**4** Attempt any two parts of the following : **10×2=20**

- a) An oil of specific gravity 0.8 is flowing through a orifice meter having inlet diameter 20 cm and orifice diameter 10 cm. The oil-mercury differential manometer shows a reading of 25 cm. Calculate the discharge of oil through orifice meter. Take,  $C_d=0.64$ .

- b) Explain briefly the principle and working of a plate and filter press.
- c) A certain set of crushing rolls has 100 cm diameter by 38 cm width face .They are so set that the crushing surfaces are 1.25 cm apart at the narrowest point. The manufacturer recommends that they may be at 5 to 100 rpm. They are to crush a rock having a specific gravity of 2.35 and angle of nip is 30°. What are the maximum permissible size of feed and the maximum actual capacity in tons /hr ,if the actual capacity is 12% of the theoretical?

5 Attempt any two parts of the following : **10×2=20**

- a) What do you understand by screen analysis? Explain. Also derive an expression for finding the effectiveness of a screen in a screening operation.
- b) A simple U tube manometer is installed across an orifice meter. The manometer is filled with mercury (sp. gravity 13.6) and the liquid above the mercury is carbon tetrachloride (sp. gravity 1.6). The manometer reads 200 mm. What is the pressure difference over the manometer in  $N/m^2$  ?
- c) Discuss different types of conveyer used for transportation of solids.