

B.TECH SEM - III (2007 COURSE) (CHEMICAL ENGG.) :**SUMMER - 2018****SUBJECT: MECHANICAL OPERATION**Day: **Thursday**
Date: **24/05/2018****S-2018-2560**Time: **02.30 PM TO 05.30 PM**
Max Marks: **80****N.B.:**

- 1) Q.No.1 and 5 are **COMPULSORY**. Out remaining questions, attempt **ANY TWO** questions from each section.
- 2) Figures to the right indicate **FULL** marks.
- 3) Assume suitable data, if necessary.
- 4) Draw neat diagrams **WHEREVER** necessary.
- 5) Use of non-programmable calculator is **ALLOWED**.

SECTION-I

- Q.1** a) Differentiate between crushing and grinding operation. (05)
b) What are the grinding parameters in Ball mill? (05)
c) Why do we classify particles? (04)
- Q.2** a) Write a short note on Ball Mill. (08)
b) List the size reduction equipments. (05)
- Q.3** a) Define the following: (06)
i) Volume surface mean diameter ($\overline{D_s}$)
ii) Mass mean diameter ($\overline{D_w}$)
iii) Volume mean diameter ($\overline{D_v}$)
b) Calculate the surface volume mean diameter for the following particulate material. (07)

Size Range (μm)	Mass of particles in the range(gm)
-704+352	25
-352+176	37.5
-176+88	62.5
-88+84	75
PAN	50

- Q.4** a) Write a short note on liquid mixing. (07)
b) List the range of impellers. (06)

SECTION-II

- Q.5** a) A helical screw has a diameter 50 cm and rotating at 80 rpm in a solution of viscosity 140 poise and density of 0.95 gm/cm^3 calculate the HP required. (06)
Data:

$$Po = \frac{100}{Re}, \text{Re} < 30$$

$$Po = 3.5, \text{Re} > 30$$

- b) What is Sedimentation? Explain in detail. (04)
c) What is membrane filtration? Explain in detail. (04)
- Q.6** a) What is the application of batch settling test to design of thickeners? (06)
b) Write a note on kynch theory. (07)
- Q.7** Explain the following: (13)
i) Cake filtration
ii) Clarification
iii) Membrane filtration
- Q.8** Explain the cyclone separator in detail with block diagram. (13)