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Scheme – I

Sample Question Paper

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Program Name	: Diploma in Chemical Engineering
Program Code	: CH
Semester	: Third
Course Title	: Mechanical Operations
Marks	: 70

22313

Time: 3 Hrs.

Instructions:

(1) All questions are compulsory.

(2) Illustrate your answers with neat sketches wherever necessary.

(3) Figures to the right indicate full marks.

(4) Assume suitable data if necessary.

(5) Preferably, write the answers in sequential order.

Q.1) Attempt any FIVE of the following.   **10 Marks**

    a) List the equipments used for classification of solids.

    b) Name the four common ways of breaking solids in size-reduction machines.

    c) Define Capacity and Effectiveness of screen.

    d) List the types of screening equipment.

    e) Give principle of cyclone separator.

    f) List the equipments used for transportation in industry.

    g) List the different types of agitators.

Q.2) Attempt any THREE of the following.   **12 Marks**

    a) Distinguish between Crushing and grinding.

    b) Explain the construction and working of Trommels.

    c) Draw neat and labeled diagram of rotary drum filter and explain its working

    d) Explain working of cyclone separator.

Q.3) Attempt any THREE of the following.   **12 Marks**

    a) Draw neat and labeled diagram of Ball mill

b) Calculate the operating speed of ball mill if Operating speed is 55% of critical speed and Critical speed is 40% more than operating speed

Data: Diameter of ball mill = 800mm

Diameter of ball = 60mm

c) Derive the equation for effectiveness of screen

d) Give any two industrial applications for cyclone separator and wet scrubber.

Q.4) Attempt any THREE of the following.   **12 Marks**

a) Derive an expression for angle of nip and give any two industrial application of roll crusher.

b) Explain the importance of screen analysis in chemical industry.

c) Explain 1-2-3-2-1-2-3-2… filtration system.

d) Explain the effect of following factors on filtration.

    i) Viscosity of filtrate   ii) Area of filter

    iii) Porosity of cake   iv) Pressure drop across filter

e) Give any two industrial applications of fabric filter and electrostatic filter.

Q.5) Attempt any TWO of the following.   **12 Marks**

a) With neat sketch explain construction of electrostatic precipitator.

b) State any three industrial importance of each

    i) Ribbon blender   ii) Sigma mixer

c) Explain the role of pneumatic conveyor in cement industry

Q.6) Attempt any TWO of the following.   **12 Marks**

a) Explain the role of cyclone separator in cement industry

b) Explain Batch sedimentation test. Draw the graph of settling velocity and justify the graph.

c) Explain the vertex formation in sigma mixer

Scheme – I

Sample Test Paper - I

Program Name	: Diploma in Chemical Engineering	
Program Code	: CH	
Semester	: Third	**22313**
Course Title	: Mechanical Operations	
Marks	: 20	**Time: 1 Hour.**

Instructions:

(1) All questions are compulsory.

(2) Illustrate your answers with neat sketches wherever necessary.

(3) Figures to the right indicate full marks.

(4) Assume suitable data if necessary.

(5) Preferably, write the answers in sequential order.

Q.1 Attempt any FOUR.   **08 Marks**

    a) Define average particle size.

    b) Define Kick's law.

    c) Define Mesh and Screening

    d) Differentiate Ideal screen and actual screen.

    e) Define Stroke's law for sedimentation.

    f) Distinguish between sedimentation and centrifugation

Q.2 Attempt any THREE.   **12 Marks**

    a) A bauxite mixture is screened through 10 mesh screen size. The cumulative screen analysis
       is given as

     Feed fraction =0.87, overflow fraction = 0.95, underflow fraction = 0.55

     Calculate –

     Mass ratio of overflow to feed

     Mass ratio of underflow to feed

     Effectiveness of screen

    b) Explain the importance of screen analysis in chemical industry.

    c) State Explain constant rate and constant pressure filtration.

    d) Draw neat and labeled diagram of rotary drum filter and explain its working

    e) Explain filter aid. State characteristics of good filtering media.

    f) Explain Batch sedimentation test

Scheme – I

Sample Test Paper - II

Program Name	: Diploma in Chemical Engineering	
Program Code	: CH	**22313**
Semester	: Third	
Course Title	: Mechanical Operations	
Marks	: 20	**Time: 1 Hour**

Instructions:

(1) All questions are compulsory.

(2) Illustrate your answers with neat sketches wherever necessary.

(3) Figures to the right indicate full marks.

(4) Assume suitable data if necessary.

(5) Preferably, write the answers in sequential order.

Q.1 Attempt any FOUR.   **08 Marks**

    a) Draw neat sketch of cyclone separator.

    b) Give the industrial application of electrostatic precipitator

    c) Draw neat diagram of belt conveyor

    d) Explain the importance of transportation in chemical industry

    e) Sate two purpose of mixing

    f) Draw two types of agitators

Q.2 Attempt any THREE.   **12Marks**

    a) With neat sketch explain construction of electrostatic precipitator.

    b) Give the industrial application of fabric filter

    c) Explain the working of pneumatic conveyor with neat diagram

    d) List the equipments used for transportation in industry. Explain any one of them.

    e) Explain construction and working of ribbon blender

    f) Discuss any two industrial importance of Ribbon blender