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# SARDAR PATEL UNIVERSITY

## M.Sc. 2nd Semester (Surface Coating Technology) Examination (CBCS)

**Tuesday, April 12th, 2016**

**Time: 10:30 am to 1:30 pm**

## PS02CSCT02: Chemical Engineering Operations

**Total Marks: 70**

N.B. (1) Marks allotted to the question are on its RHS
(2) Illustrate your answers wherever necessary with the help of neat sketches & chemical equations

**Q.1 Choose the correct answer from the followings:** [08]

1. Blowers are generally employed for transportation of _____
   a. liquid b. solid c. gas d. none of these

2. The ____ pumps are commonly employed in industries for handling paints and high viscosity liquids.
   a. diaphragm b. centrifugal c. piston d. gear

3. _____ are the machines that discharge gases at pressures from 2 atm. to several thousand atmospheres.
   a. Fans b. blowers c. compressor d. none of these

4. Which type of heat transfer is involved in cooking of polyester resin in reactor?
   a. Conduction & Convection b. Conduction
   c. Radiaton & Conduction d. None of these

5. Size reduction in Jaw crusher is primary effected by ____
   a. impact b. shear c. compression d. attrition

6. For effective grinding, ball mill should be operated _____ than the critical speed.
   a. more b. less c. equal d. none of these

7. A plate and frame filter press is _____.
   a. a continuous vacuum filter b. a batch pressure filter
   c. a continuous pressure filter d. none of the above

8. In constant-pressure filtration _____
   a. the filtrate flow rate is maximum at the start and decrease continuously to the end.
   b. the filtrate flow rate is constant throughout.
   c. the filtrate flow rate is minimum at the start and increase continuously to the end.
   d. increases slowly to a constant value.

**Q.2 Answer *Any Seven* of the following short questions:** [14]

1. Give classification of size reduction equipment.
2. Why Blake Jaw crusher is commercially widely used in industry?
3. What is cavitations?
4. Why priming is required in centrifugal pump?
5. Explain the terms constant rate filtration and constant pressure filtration.
6. State the factors affecting the rate of filtration.
7. State Raoult's law and Dalton's law.
8. Define conduction, convection and radiation.
9. State Fourier's law of heat transfer.

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|---|---|---|
| Q.3 a | Explain with neat diagram the working principle and industrial application of Roll Crusher | [06] |
| Q.3 b | Write in brief principle, construction and operation of ball mill. | [06] |
| | **OR** | |
| Q.3 b | What are crushers? Explain Jaw crusher in detail. | [06] |
| Q.4 a | Discuss in detail different criteria for selection of pump. | [06] |
| Q.4 b | Explain in detail about single acting piston pump. | [06] |
| | **OR** | |
| Q.4 b | Write a note on centrifugal pumps. | [06] |
| Q.5 a | Write a note on Plate & Frame filter press. | [06] |
| Q.5 b | Define filtration. Write a note on Rotary drum vacuum filter. | [06] |
| | **OR** | |
| Q.5 b | What are Azeotropes? Explain azeotropic distillation process & its importance in coating industry. | [06] |
| Q.6 a | Explain the factors on which the rate of drying depends. Explain in brief. | [06] |
| Q.6 b | Explain different mechanism for heat transfer. Derive the equation for heat flow through cylinder by conduction. | [06] |
| | **OR** | |
| Q.6 b | Explain in detail rate of drying curve. | [06] |

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