

17647

16117

4 Hours / 100 Marks

Seat No.

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- 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) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. a) **Attempt any THREE of the following:** **12**
- (i) Show by neat sketch the symbols of reciprocating pump and Tray drier as per IS 3232.
 - (ii) Draw neat and proportionate sketch of Threaded Tee.
 - (iii) Draw instrumentation symbols of Gate valve and Rotameter.
 - (iv) Draw free sketch of any two packings used in packed towers.
- b) **Attempt any ONE of the following:** **8**
- (i) Draw specification sheet for a shell and tube heat exchanger.
 - (ii) Prepare a fabrication drawing for a Jacketed Batch Reactor.
2. **Attempt any FOUR of the following:** **16**
- a) Draw a neat, proportionate drawing of horizontal storage tank.
 - b) Draw proportionate and neat sketch of straight skirt support.
 - c) Show by neat proportionate drawing of Globe valve with nomenclature.

P.T.O.

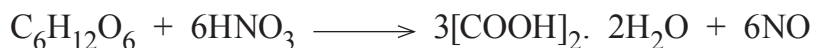
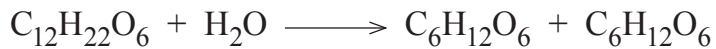
- d) Show by neat proportionate sketch of Ball valve.
- e) Draw a neat, proportionate sketch of socket and spigot joint.
- f) Draw a neat proportionate sketch of Flanged joint.

3. Attempt any FOUR of the following: 16

- a) Draw any two types of jackets used for pressure vessels.
- b) Draw a neat proportionate sketches of a corrugated expansion joint.
- c) Draw a neat proportionate drawing of a bracket support for vertical vessels.
- d) Draw neat and proportionate sketch of any two types of pipe hanger.
- e) Draw a neat sketch of a gate valve.
- f) Draw neat sketches of a swing check valve.

4. Read the process and attempt the following: 16

Oxalic acid is to be produced by oxidation of sugar. A mixed acid is prepared in a mechanically agitated vessel (MAV), incorporating a cooling coil, out of sulphuric acid, nitric acid and water. Catalyst $V_2 O_5$ is added in this vessel. Cooling tower water (CTW) is used as a cooling medium during preparation of the acid. The mixed acid is transferred to a jacketed batch reactor and sugar is added slowly to the reactor under agitation over a predetermined period. The oxidation reaction is exothermic and reaction temperature is $55-60^\circ C$. Temperature is maintained at $60^\circ C$ by circulating CTW through the jacket during the course of reaction.



Draw a process flow sheet of this plant.

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[3]

Marks

5. Answer the following:

16

- a) For the process description given in Q. No. 4 above, draw utility line diagram.
- b) Draw utility block diagram for steam.

6. For the process description given in Q. No. 4 above draw: 16

- a) Draw the equipment layout diagram for the process given above.
 - b) Draw the tank farm diagram for the process given above.
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