

17647

15162

4 Hours / 100 Marks

Seat No.

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Instructions : (1) All Questions are *compulsory*.

(2) Figures to the right indicate full marks.

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

Marks

1. (A) Attempt any THREE :

12

- (a) Draw symbols as per IS 3232 for any two heat exchange equipments.
- (b) Draw symbols used in instrumentation as per IS 3232 for Ball Valve, Solenoid Valve.
- (c) Draw a free hand sketch of bubble cap tray used in distillation column.
- (d) Draw sectional view of expander, cross used for small dia. pipes.

(B) Attempt any ONE :

8

- (a) Draw specification table for a shell and Tube Heat Exchanger.
- (b) Draw a neat labelled fabrication assembly drawing for a batch reactor.

2. Attempt any FOUR :

16

- (a) Draw neat proportional drawing of conical head and hemispherical head used for pressure vessels.
- (b) Draw neat sectional view of plain flange and male & female flange facings used for flanged joints.
- (c) Draw a neat free hand sketch of roller support.
- (d) Draw a neat free hand sketch of spring loaded safety valve.
- (e) Draw a neat sketch of Gate Valve.
- (f) Draw a neat sketch of expansion joint used for steam pipes.

3. Attempt any FOUR : 16

- (a) Draw internal spiral coils used for heat exchange in a reactor.
- (b) Draw a neat free hand sketch of CI Flanged Joint.
- (c) Draw a neat drawing of leg support used for vertical vessels.
- (d) Draw a neat sketch of straight and angular skirt support.
- (e) Draw a neat proportional diagram of diaphragm valve.

4. Read the following process description and attempt following : 16

Iso Propyl Alcohol (IPA) is vapourised. IPA is heated and fed to a reactor where it undergoes dehydrogenation to get acetone. The reactor exit gases contain water vapour, hydrogen, acetone and unreacted IPA vapours. It is then passed through a condenser where most of the acetone, water and alcohol are condensed. The final traces of alcohol and acetone are removed in water scrubber. The effluent from the scrubber is combined with condensate from condenser and distilled in column to produce pure acetone and effluent containing water and alcohol. This effluent is distilled in a second column to separate excess water. The product from second column is an azeotrope of water and IPA containing 11% alcohol. ZnO and Cu are used as catalyst and reaction is carried out at temperature of 400° to 500 °C and 40 to 50 psi pressure.

Draw a neat detailed process flow diagram with legends for the above process. Draw process and instrumentation diagram for the above process.

5. (a) For process described above draw Utility Line Diagram (ULD). 16

- (b) Draw instrumentation diagram for distillation column. Or heat exchanger used in above process.

6. For the process described above : 16

- (a) Draw Equipment Layout.
 - (b) Draw Tank Farm.
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