

17647

**11920**

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

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| <b>1. (A) Attempt any THREE of the following :</b>                           | <b>12</b>    |
| (a) Draw symbols of batch reactor and tray drier as per IS 3232.             |              |
| (b) Draw neat and proportionate sketch of threaded elbow.                    |              |
| (c) Draw instrumentation symbols of gate valve and rotameter.                |              |
| (d) Draw free hand sketch of cross partition ring and intalox saddle.        |              |
| <b>(B) Attempt any ONE of the following :</b>                                | <b>08</b>    |
| (a) Draw specification sheet for a batch reactor.                            |              |
| (b) Prepare a fabrication drawing for a Shell and Tube Heat Exchanger.       |              |
| <b>2. Attempt any FOUR of the following :</b>                                | <b>16</b>    |
| (a) Draw a neat, proportionate drawing of plain jacket and half coil jacket. |              |
| (b) Draw a neat, proportionate sketch of angular skirt support.              |              |
| (c) Draw a neat sketch of ball valve.  |              |
| (d) Draw neat and proportionate sketch of gate valve.                        |              |
| (e) Draw a neat, proportionate sketch of hydraulic joint.                    |              |
| (f) Draw a neat proportionate sketch of screwed flanged joint.               |              |

- 3. Attempt any FOUR of the following :** **16**
- (a) Draw any two types of covers used for vessels.
  - (b) Draw a neat, proportionate sketch of corrugated expansion joint.
  - (c) Draw a bracket support for vertical vessels.
  - (d) Draw any two types of pipe hangers.
  - (e) Draw a neat, proportionate sketch of spring loaded safety valve.
  - (f) Draw a neat and proportionate sketch of diaphragm valve.
- 4. Draw a process flow sheet for the process described below :** **16**
- Absolute alcohol is obtained by carrying out the fractional distillation of 96% by weight ethyl alcohol. The fresh feed (ethyl alcohol) is fed to an azeotropic column where benzene is used as an azeotrope breaker. The ternary azeotrope of ethanol, benzene and water is formed as an overhead which is condensed and phase separation is achieved in a decanter. From the decanter, the benzene rich layer is recycled to the azeotrope column (as reflux) and water rich layer is sent to a second fractionating column (a recovery column), where water is drained as bottoms. Almost ethanol + benzene is removed from the top of the recovery column which is recycled at the top of the azeotrope column. The bottom of the azeotrope column gives almost pure ethanol (99.5%).
- 5. Answer any ONE of the following :** **16**
- (a) For the process described in Q. No. 4 above, draw utility line diagram.
- OR**
- (b) (i) Draw a neat sketch of globe valve. **8**
  - (ii) Draw a neat sketch of U-tube Heat Exchanger. **8**
- 6. Attempt any TWO of the following :** **16**
- (a) For the process described in Q. No. 4 above, draw the equipment layout diagram.
  - (b) For the process described in Q. No. 4 above, draw the tank farm diagram.
  - (c) Draw a process instrumentation diagram for reactor temperature control.
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