22608

12425

03 Hours / 70 Marks Seat No. | | | | | | | | |

Instructions – (1) All Questions are *Compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answer with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Use of Non-programmable Electronic Pocket Calculator is permissible.

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

Marks

1. Attempt any FIVE of the following: **10**

a) Write names any four CAD initial setting commands.

b) State any two formatting commands used in CAD.

c) Give the applications of check valve in chemical industry.

d) Name any two types of flanges used in chemical industry.

e) Draw a neat sketch of square pitch used in shell and tube heat exchanger.

f) Name any two types of heads used in different vessels.

g) Draw IS-3232 symbols of –

i) Centrifugal pump,

ii) Distillation column.

Marks

2. Attempt any THREE of the following: **12**

a) State the use of CAD initial setting commands for –

i) Ltscale

ii) Limits

iii) Grid

iv) Ortho

b) Give the procedure of any four modify commands used in CAD.

c) Draw a neat sketch of Globe valve.

d) Draw saddle support (Plate type).

3. Attempt any THREE of the following: **12**

a) Explain the fundamentals of computer aided drafting (CAD) and state its application.

b) State the command prompts used to draw the distillation column in sequential order.

c) Draw a neat sketch of screwed flanges.

d) Draw a neat sketch of bracket or Lug support.

4. Attempt any THREE of the following: **12**

a) Draw a neat sketch of Butterfly valve with nomenclature.

b) Draw a neat and proportionate sketch of single rod and angle iron hanger.

c) Draw any two types of Jackets used in batch reactor.

d) Draw a control scheme used for heat exchanger.

e) Write a specification sheet for batch reactor.

Marks

5. Attempt any TWO of the following: **12**

a) Draw a neat and proportionate sketch of Kettle type reboiler.

b) Formaldehyde is produced by oxydehydrogenation of methanol. The air is heated to an air pre heater and methanol is heated in a vaporiser. Then they are mixed in the desired proportion and are introduced. into a fixed bed reactor. The reaction occurring in the bed are :

$CH_3OH \rightarrow HCHO + H_2$

$CH_3OH + ½\ O_2 \rightarrow HCHO + H_2O$

The product gases containing formaldehyde, hydrogen water, methanol, O_2 and N_2 are cooled in a heat exchanger using a suitable cooling medium. The exothermicity associated with the reaction is removed by passing compressed water on the shell side of the fixed bed reactor and utilized for producing the low pressure steam. The cooled product gases are then introduced into a battery of scrubber/absorber in which formaldehyde and water are absorbed in water. The liquid mixture leaving the absorber containing formaldehyde methanol and water is sent to an intermediate storage tank. The crude formaldehyde solution from formaldehyde intermediate storage tank is then fed to a distillation column from the top of which methanol is obtained and is recycled to the vaporiser and formaldehyde in the form of formalin (37% formaldehyde solution) is removed as a bottom product. Draw a process flow diagram/sheet of this plant.

c) Draw P and I diagram of the process given in Q. No. 5(b).

6. Attempt any TWO of the following: **12**

a) Draw ULD for formaldehyde plant. Process in Q. No. 5(b)

b) Draw a neat sketch of utility block diagram, equipment layout and tank farm for formaldehyde plant.

c) Draw a neat and proportionate sketch of U-tube shell and tube heat exchanger.

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