

Name: _____ Hall Ticket No.

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Answer All Questions. All Questions Carry Equal Marks. Time: 20 Min. Marks: 10.**I Choose the correct alternative:**

1. Design of heterogeneous catalytic reactor involves consideration of ----- []
(a) Only chemical steps (b) only physical steps (c) both (a) & (b) (d) only (b)
2. Heat and mass transfer effects are the controlling factors in ----- []
(a) Very fast heterogeneous reactions (b) Very slow heterogeneous reactions
(c) Homogeneous reactions (d) Very fast homogeneous reactions
3. The catalytic activity of enzyme is due to their capacity of ----- []
(a) Lower the potential energy (b) lower the kinetic energy
(c) increase the activation energy (d) lower the activation energy
4. For large values of Thiele Modulus ($L/\sqrt{K/D}$) of a solid catalyzed first order reaction, the effectiveness factor (η) is equal to----- []
(a) 1 (b) $L\sqrt{K/D}$ (c) $1 + L\sqrt{K/D}$ (d) $1/(L\sqrt{K/D})$
5. For a solid catalyzed first order reaction $A \xrightarrow{K} P$ the pore diffusion if Thiele Modulus of the reaction is ----- []
(a) > 5 (b) > 1 (c) > 10 (d) < 0.5
6. 'Unreacted core model' represents the reaction involving ----- []
(a) combustion of Coal particles (b) Roasting of Sulphide ores
(c) Manufacture of Carbon disulphide from elements (d) Co
7. Which of the following resistance is not involved in the combustion of a carbon particle []
(a) Gas film (b) Ash (c) Chemical reaction (d) none
8. Tick correct sentences []
(a) $M_H \gg 1$, all the reaction occurs in the film (b) $M_H \ll 1$, no reaction occurs in the film
(c) $M_H \ll 1$, bulk volume becomes the controlling rate factor (d) all of the above
9. Select G/L contactor----- []
(a) Spray tower (b) static mixer (c) Agitated Tank (d) all
10. In cocurrent flow, the capacity of static mixer is----- []
(a) Very high (b) Medium –high (c) Low (d) Medium

II Fill in the blanks

11. In a heterogeneous catalytic reaction, the overall rate of reaction depends upon -----
12. The rate controlling step in a solid-gas non catalytic reaction occurring at very high temperature is -----
13. For a solid catalyzed first order reaction $A \xrightarrow{K} P$ effectiveness factor (ϵ) is given by $\epsilon = \tanh(L\sqrt{K/D}) / (L\sqrt{K/D})$, for $L\sqrt{K/D} < 0.5$, the value of ϵ is-----
14. Define film conversion parameter (M^2_H) =-----
15. In counter current flow, the capacity of Spray tower is -----
16. At any time there exists an unreacted core of material which shrinks in size during reaction, that model is called -----
17. Solid catalyzed reactions, the expression for rate of reaction is-----
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