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Subject Code : | 0 | 6 |

Test Booklet No. : 00294

TEST BOOKLET

CHEMICAL ENGINEERING

Time Allowed : 2 (Two) Hours   Full Marks : 200

INSTRUCTIONS

1. The name of the Subject, Roll Number as mentioned in the Admission Certificate, Test Booklet No. and Subject Code shall be written legibly and correctly in the space provided on the Answer Sheet with black ball pen.

2. **Space provided for Series in the Answer Sheet is not applicable for Optional Subject. So the space shall be left blank.**

3. All questions carry equal marks. Your total marks will depend only on the number of correct responses marked by you in the Answer Sheet.

4. No candidate shall be admitted to the Examination Hall/Room 20 minutes after commencement of distribution of the paper. The Supervisor of the Examination Hall/Room will be the time-keeper and his/her decision in this regard is final.

5. No candidate shall leave the Examination Hall/Room without prior permission of the Supervisor/ Invigilator. No candidate shall be permitted to hand over his/her Answer Sheet and leave the Examination Hall/Room before expiry of the full time allotted for each paper.

6. No Mobile Phone, Pager, etc., are allowed to be carried inside the Examination Hall/Room by the candidates. Any Mobile Phone, Pager, etc., found in possession of the candidate inside the Examination Hall/Room, even if on off mode, shall be liable for confiscation.

7. No candidate shall have in his/her possession inside the Examination Hall/Room any book, notebook or loose paper, except his/her Admission Certificate and other connected paper permitted by the Commission.

8. Complete silence must be observed in the Examination Hall/Room. No candidate shall copy from the paper of any other candidate, or permit his/her own paper to be copied, or give, or attempt to give, or obtain, or attempt to obtain irregular assistance of any kind.

9. After you have completed filling in all your responses on the Answer Sheet and the Examination has concluded, you should hand over to the Invigilator *only the Answer Sheet*. You are permitted to take away with you the Test Booklet.

10. Violation of any of the above Rules will render the candidate liable to expulsion from the Examination Hall/Room and disqualification from the Examination, and according to the nature and gravity of his/her offence, he/she may be debarred from future Examinations and Interviews conducted by the Commission for appointment to Government Service.

11. Smoking inside the Examination Hall/Room is strictly prohibited.

12. **This Test Booklet contains one sheet (two pages) for Rough Work at the end.**

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[No. of Questions : 100]

1. Which of the following is a unit operation?

(A) Sublimation

(B) Sulphonation

(C) Pyrolysis

(D) Hydrolysis

2. Which of the following is **not** equivalent to standard atmospheric pressure?

(A) 1·01325 Pa

(B) 1·0135 bar

(C) 760 mm Hg

(D) $1·01325 \times 10^5$ N/m^2

3. One mole of a compound contains

(A) one molecule of the substance

(B) one atom of the substance

(C) $6·023 \times 10^{23}$ molecules

(D) $22·4 \times 10^3$ molecules

4. Shear stress in a fluid flowing in a round pipe

(A) varies parabolically across the cross-section

(B) remains constant over the cross-section

(C) is zero at the centre and varies linearly with radius

(D) is zero at the wall and increases linearly to the centre

5. With increase in the temperature, viscosity of a liquid

(A) increases

(B) decreases

(C) remains constant

(D) None of the above

6. Hydraulic radius is the ratio of

(A) wetted perimeter to flow area

(B) flow area to wetted perimeter

(C) flow area to square of wetted perimeter

(D) square root of flow area to wetted perimeter

7. $f = \dfrac{16}{N_{Re}}$ is valid for

(A) turbulent flow

(B) laminar flow through an open channel

(C) steady flow

(D) None of the above

8. Limiting reactant for a chemical equation is the reactant that is

(A) present in excess of the stoichiometric amount

(B) present exactly as per stoichiometric amount

(C) present in the smallest stoichiometric amount

(D) not having any relation with stoichiometry

9. When chemical reaction occurs in a process, then usually the number of independent material balances and the number of atomic species

(A) is different

(B) is equal

(C) may or may not matter

(D) is irrelevant

10. The amount of air or oxygen required for bringing a process into complete combustion is called

(A) theoretical air or oxygen

(B) excess air or oxygen

(C) practical requirement

(D) None of the above

11. With rise in temperature, the heat capacity of a substance

(A) increases

(B) decreases

(C) remains unchanged

(D) either (A) or (B) depends on the substance

12. A stream bled off to remove an accumulation of inerts or unwanted material in the process is called

(A) bypass stream

(B) purge stream

(C) recycle stream

(D) process stream

13. In general, a gas that exists below its critical temperature is called

(A) a critical gas

(B) a condensate

(C) a vapour

(D) a smoke

14. Gibbs' phase rule is given by

(A) $F + C = P + 2$

(B) $F - C = P - 2$

(C) $F = C + P + 2$

(D) $F = C - P + 2$

15. The forces acting on a particle settling in a fluid are

(A) gravitational and buoyant forces

(B) centrifugal and drag forces

(C) gravitational or centrifugal, buoyant and drag forces

(D) external, drag and viscous forces

16. If more than two branches of pipes are to be connected at the same point, then which of the following is used?

(A) Elbow

(B) Union

(C) Tee

(D) None of the above

17. Pressure drop in a packed bed for laminar flow is given by

(A) Kozeny-Carman equation

(B) Blake-Plummer equation

(C) Leva's equation

(D) None of them

18. How many atoms are there per unit cell in a body-centred cubic lattice system?

(A) 2

(B) 3

(C) 4

(D) 6

19. A material is able to retain the deformation permanently by virtue of its

(A) elasticity

(B) plasticity

(C) ductility

(D) malleability

20. Which one is a non-magnetic material?

(A) Cobalt

(B) Nickel

(C) Zinc

(D) None of the above