

Seat No.	
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M.Phil./Ph.D. Entrance Examination, October - 2021
CHEMICAL ENGINEERING

Day and Date : Thursday, 28 - 10 - 2021**Total Marks : 100****Time : 10.00 a.m. to 12.00 noon**

- Instructions :**
- 1) All questions are compulsory.
 - 2) Each question carries 2 marks.
 - 3) Answers should be marked in the given OMR answer sheet by darkening the appropriate option.
 - 4) Use black ball point pen only for marking the circle. Do not make any stray mark on the OMR Answer Sheet.
 - 5) Follow the instructions given on OMR sheet.
 - 6) Rough work shall be done on the sheet provided at the end of question paper.
 - 7) Only non-programmable calculators are allowed.

PART - I (Research Methodology)

1. Which of the following is a non-probability sample?
A) Quota sample
B) Simple random sample
C) Purposive sample
D) A) and C) both

2. If a researcher is studying the effect of using laptops in his classroom to ascertain their merit and worth, he is likely conducting which type of research?
A) Basic
B) Applied
C) Evaluation
D) Experimental

3. The most important task in teaching is
A) Directing students in development of experiences
B) Making assignments and hearing recitations
C) Making monthly reports and maintaining records
D) None of the above

P.T.O.

- 4.** A good hypothesis should be
- A) Formulated in such a way that it can be tested by the data
 - B) Precise, specific and consistent with most known facts
 - C) Of limited scope and should not have global significance
 - D) All of these
- 5.** Field study is related to
- A) Real life situations
 - B) Laboratory situations
 - C) Experimental situations
 - D) None of the above
- 6.** A statistical measure based upon the entire population is called parameter while measure based upon a sample is known as
- A) Sample parameter
 - B) Inference
 - C) Statistic
 - D) None of these
- 7.** In Hindi language the term Anusandhan refers to
- A) Follower of an aim
 - B) Preying of an aim
 - C) Attain the aim
 - D) Become goal-oriented
- 8.** The main condition which should be followed by research is
- A) Honest exploration
 - B) Knowledge of facts and principles
 - C) Standardized findings and conclusions
 - D) All of the above
- 9.** A research should be
- A) Objective
 - B) Valid
 - C) Reliable
 - D) All the above

- 10.** Reliability is the fundamental quality of a research which also reflects
- A) Validity
 - B) Verifiability
 - C) Purity of data
 - D) Superiority
- 11.** Bibliography given in a research report
- A) Helps those interested in further research and studying the problem from another angle
 - B) Shows the vast knowledge of the researcher
 - C) Makes the report authentic
 - D) None of the above
- 12.** Which comes first, theory or research?
- A) Theory, because otherwise you are working in the dark
 - B) Research, because that's the only way you can develop a theory
 - C) It depends on your point of view
 - D) The question is meaningless, because you can't have one without the other
- 13.** Which of the following is not a type of research question?
- A) Predicting an outcome
 - B) Evaluating a phenomenon
 - C) Developing good practice
 - D) A hypothesis
- 14.** The core ingredients of a dissertation are :
- A) Introduction; Data collection; Data analysis; Conclusions and recommendations
 - B) Executive summary; Literature review; Data gathered; Conclusions; Bibliography
 - C) Research plan; Research data; Analysis; References
 - D) Introduction; Literature review; Research methods; Results; Discussion; Conclusion

- 15.** Which of the following is not a data-collection method?
- A) Research questions B) Unstructured interviewing
C) Postal survey questionnaires D) Participant observation
- 16.** The research antagonistic to ex-post facto research is
- A) Experimental studies B) Library researches
C) Normative researches D) All of the above
- 17.** The per capital income of India from 1950 to 1990 is four times. This study is
- A) Social B) Factorial
C) Longitudinal D) Horizontal
- 18.** Nine years old children are taller than 7 years old ones. It is an example of
- A) Vertical studies B) Cross-sectional studies
C) Experimental studies D) Case studies
- 19.** Hypothesis cannot be stated in
- A) Declarative terms B) Null and question form terms
C) General terms D) Directional terms
- 20.** All cause non sampling errors except
- A) Faulty tools of measurement B) Inadequate sample
C) Defect in data collection D) Non response

21. For doing external criticism (for establishing the authenticity of data) a researcher must verify
 - A) The signature and handwriting of the author
 - B) The paper and ink used in that period which is under study
 - C) Style of prose writing of that period
 - D) All of the above
22. Survey study aims at
 - i) knowing facts about the existing situation
 - ii) comparing the present status with the standard norms
 - iii) criticising the existing situation
 - iv) identifying the means of improving the existing situation

A) i) and ii) only	B) i), ii) and iii)
C) i), ii), iii) and iv)	D) ii) and iii) only
23. A researcher wants to study the future of the Congress I in India. For the study which tool is most appropriate for him?

A) Questionnaire	B) Rating scale
C) Interview	D) Schedule
24. Catharsis means discharge of emotions. A teacher can let off pent-up energy of his disciples through

A) Picnics / excursions	B) Mock-parliament
C) Celebration of festivals	D) All of the above
25. Seeing a very big turnout, it was reported that JD will win the election, the conclusion was based on

A) Random sampling	B) Cluster sampling
C) Purposive sampling	D) Systematic sampling

- 6-

- 30.** Discharge from a 24 inch pipe of water at 10 ft./sec will be ____ ft³/sec.
A) 7.65 B) 32.36
C) 48.22 D) 125.6
- 31.** Isotropic turbulence occurs
A) where there is no velocity gradient B) at higher temperatures
C) only in Newtonian fluids D) none of these
- 32.** Consider two pipes of same length and diameter through which water is passed at the same velocity. The friction factor for rough pipe is f_1 and that for smooth pipe is f_2 . Pick out the correct statement.
A) $f_1 = f_2$
B) $f_1 < f_2$
C) $f_1 > f_2$
D) Data not sufficient to relate f_1 & f_2
- 33.** Bernoulli's equation for steady, frictionless, continuous flow states that the ____ at all sections is same.
A) total pressure B) total energy
C) velocity head D) none of these
- 34.** Drag is defined as the force exerted by the
A) fluid on the solid in a direction opposite to flow
B) fluid on the solid in the direction of flow
C) solid on the fluid
D) none of these

- 35.** Drag co-efficient for flow past immersed body is the ratio of _____ to the product of velocity head and density.
- A) shear stress
 - B) shear force
 - C) average drag per unit projected area
 - D) none of these
- 36.** In forced convection, Nusselt Number is a function of
- A) Re & Sc
 - B) Re & Gr
 - C) Pr & Gr
 - D) Re & Pr
- 37.** Pressure difference is increased due to increase rate of flow of either gas or liquid, level of liquid rises in down spout, this is called as
- A) Weeping
 - B) Priming
 - C) Flooding
 - D) Coning
- 38.** The ratio of momentum diffusivity to mass diffusivity is equal to
- A) Lewis Number
 - B) Schmidt Number
 - C) Prandlt Number
 - D) Sherwood Number
- 39.** Smoke is an example of
- A) Solid dispersed in liquid
 - B) Solid dispersed in gas
 - C) Liquid dispersed in gas
 - D) Gas dispersed in liquid
- 40.** H_2S present in naphtha reformed gas is removed by absorbing with
- A) Ethanolamine
 - B) HCl
 - C) H_2SO_4
 - D) Water

41. When damping coefficient is less than unity, the system is
 - A) Under damped
 - B) Over damped
 - C) Critically damped
 - D) None of the above
42. The most commonly used control action that is most economical is
 - A) Proportional
 - B) Integral
 - C) Derivative
 - D) PID
43. For a porous catalyst particle, where reaction and diffusion occur simultaneously, which of the following statement is correct?
 - A) Diffusion and reaction occur in series
 - B) Diffusion and reaction occur in parallel
 - C) Reaction may be controlled by diffusion
 - D) None of the above
44. Catalyst loses its activity due to
 - A) Loss in surface area of active components
 - B) Agglomeration of metal particles caused by thermal sintering of solid surfaces
 - C) Covering of catalyst active sites by foreign substance
 - D) All A), B) & C)
45. The catalyst promoters
 - A) Improves activity of catalyst
 - B) Act as catalyst support
 - C) Itself has very high activity
 - D) All A), B) & C)

- 46.** Nylon 6, 6 is produced by
- A) Chain growth polymerization
 - B) Step growth polymerization
 - C) Both chain and step polymerization
 - D) None of the above
- 47.** Which of following material is not semiconductor?
- A) Silicon
 - B) Germanium
 - C) Gallium-Arsenide
 - D) Aluminium
- 48.** In ball mill, crushing effectively done by
- A) Compression
 - B) Impact
 - C) Attrition
 - D) Cutting action
- 49.** For a particle settling in water at its terminal velocity, which of following is correct?
- A) Buoyancy = Weight + drag
 - B) Weight + Buoyancy + drag
 - C) Drag = Buoyancy + weight
 - D) Drag = Weight
- 50.** Unit loads like boxes, packages are transported by a _____ conveyor.
- A) Flat belt
 - B) Bucket
 - C) Trough belt
 - D) Screw



Rough Work

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