Seat No.	

M.Phil./Ph.D. Entrance Examination, September - 2019
CHEMICAL ENGINEERING

Day and Date : Friday, 20 - 09 - 2019   **Total Marks : 100**
Time : 1.00 p.m. to 3.00 p.m.

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

(Chemical Engineering)

1) Find the amount of KCl to be added in 100 kg of fertilizer if we wish to give 20 kg of potassium to the soil? Atomic weight of K is 39 and Cl is 35.5.

A) 74.5   B) 39

C) 38.2   D) 35.5

2) Oil seeds containing 10% of oil are treated with hexane to separate oil from oil seeds. If 100 kg of oil seeds are treated and 95% of oil is recovered, what is quantity of oil lost with the cake?

A) 0.5 kg   B) 5 kg

C) 9.5 kg   D) 0.05 kg

3) For oxidation of sulfur to sulfur trioxide, 50% excess oxygen is charged, for 32 kg of sulfur, what is amount of oxygen required?

A) 48 kg   B) 72 kg

C) 64 kg   D) 21 kg

P.T.O.

4) Venacontracta is observed in

   A) Orifice meter

   B) Venturi meter

   C) Rotameter

   D) Pitot Tube

5) Navier Stokes equation deals with law of conservation of

   A) Mass

   B) Energy

   C) Momentum

   D) Both A & B

6) A liquid flowing at constant flow rate has velocity V, for same flow rate, What will be velocity if pipe diameter is halved?

   A) 4V

   B) 2V

   C) 3V

   D) 0.25 V

7) Adsorption is accompanied by

   A) Increasing entropy of the system

   B) Increase in enthalpy of the system

   C) Increase in free energy of the system

   D) $T\Delta S$ of the system is negative

8) The effect of catalyst in a chemical reaction is to change

   A) Activation Energy

   B) Equilibrium Concentration

   C) Heat of reaction

   D) Final Product

9) What is correct thermodynamic relationship?

   A) $H = U - PV$

   B) $H = U + PV$

   C) $U = H + PV$

   D) $H + U + PV = 0$

10) For an ideal solution, value of activity coefficient is

A) 0   B) 1

C) <1   D) >1

11) In forced convection, Nusselt Number is a function of

A) Re & Sc   B) Re & Gr

C) Pr & Gr   D) Re & Pr

12) 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

13) The ratio of momentum diffusivity to mass diffusivity is equal to

A) Lewis Number

B) Schmidt Number

C) Prandtl Number

D) Sherwood Number

14) 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

15) H_2S present in naphtha reformed gas is removed by absorbing with
   A) Ethanolamine
   B) HCl
   C) H_2SO_4
   D) Water

16) When damping coefficient is less than unity, the system is
   A) Under damped
   B) Over damped
   C) Critically damped
   D) None of above

17) The most commonly used control action that is most economical is
   A) Proportional
   B) Integral
   C) Derivative
   D) PID

18) For a porous catalyst particle, where reaction and diffusion occur simultaneously, which of 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 above

19) 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

20) The catalyst promoters
   A) Improves activity of catalyst
   B) Act as catalyst support
   C) Itself has very high activity
   D) All A, B & C

21) 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

22) Which of following material is not semiconductor?

A) Silicon   B) Germanium

C) Gallium-Arsenide   D) Aluminium

23) In ball mill, crushing effectively done by

A) Compression   B) Impact

C) Attrition   D) Cutting action

24) 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

25) Unit loads like boxes, packages are transported by a _____ conveyor.

A) Flat belt   B) Bucket

C) Trough belt   D) Screw

PART - II

(Research Methodology)

26) 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

27) 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

28) 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

29) 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.

30) Which of the following is not a data-collection method?

   A) Research questions

   B) Unstructured interviewing

   C) Postal survey questionnaires

   D) Participant observation

31) The research antagonistic to ex-post facto research is

   A) Experimental studies

   B) Library researches

   C) Normative researches

   D) All of the above

32) The per capita income of India from 1950 to 1990 is four times. This study is

   A) Social

   B) Factorial

   C) Longitudinal

   D) Horizontal

33) 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

34) Hypothesis cannot be stated in

   A) Declarative terms

   B) Null and question form terms

   C) General terms

   D) Directional terms

35) All cause non sampling errors except

   A) Faulty tools of measurement

   B) Inadequate sample

   C) Defect in data collection

   D) Non response

36) 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

37) 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

38) 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

39) 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

40) 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

41) Which of the following is a non-probability sample?

A) Quota sample   B) Simple random sample

C) Purposive sample   D) (A) and (C) both

42) 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

43) 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

44) 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

45) Field study is related to

A) Real life situations   B) Laboratory situations

C) Experimental situations   D) None of the above

46) 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

47) 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

48) 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 the above

49) A research should be

A) Objective

B) Valid

C) Reliable

D) All the above

50) Reliability is the fundamental quality of a research which also reflects

A) Validity

B) Verifiability

C) Purity of data

D) Superiority

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Rough Work

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