M/P ENT – 28

Total No. of Pages : 12

Seat No.	

M.Phil/Ph.D. Entrance (Special Drive) Examination, May - 2019
Part - I : CHEMICAL ENGINEERING

Day and Date : Tuesday, 21 - 05 - 2019 **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.**

1) A 1000W heater is rated to operate at a direct current (DC) of 10A. If the heater is supplied alternating current (AC) for producing the same quantity of heat the value of current should be

A) lav = 10A

B) lrms = 10A

C) lpeak = 10A

D) lrms = $10\sqrt{2}$A

2) 100 mol/hr of Butane (CH4) and 133 mol/hr of air are fed into a combustor. The percent excess air used is:

A) 40%

B) 30%

C) 20%

D) 10%

3) The objective of bypass stream is to:

A) Control the composition of final exit stream

B) Utilize valuable reactants

C) Get high extent of reaction

D) All of the above

4) Can one piece of equipment be treated as a set of several subsystems:

A) Yes

B) No

C) Depends on the equipment type

D) Both 'a' and 'c'

5) A closed stationery system consists of a 5 kg mass. During a certain process 50 kJ of work are done on the system and internal energy increased by 5000 J per kg. The total amount of heat exchange with the system is

A) -100 kJ B) -75 kJ

C) -50 kJ D) -25 kJ

6) If a system consists of two immiscible luiquids (such as CCL4 and CH3OH), how many phases are there:

A) 1 B) 2

C) 3 D) 4

7) The frictional resistance of a pipe varies approximately with _____ of the liquid:

A) pressure B) velocity

C) square of velocity D) cube of velocity

8) The lifting of a Helicopter is based on:

A) Torricelli Theorem B) Bernoulli's principle

C) Law of gravitation D) Coulomb's law

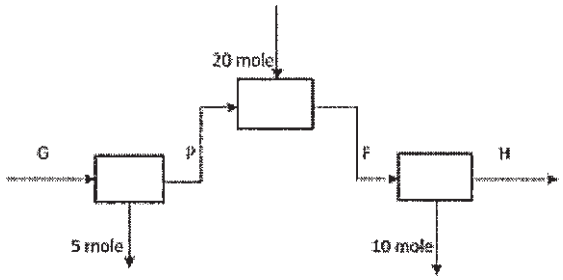
9) A flow in which liquid particle has definite path of flow and don't cross each other is called:

A) streamline flow
B) turbulent flow
C) laminar flow
D) both 'a' and 'c'

10) If y=f(x) is a linear equation then a definite integral _____ can exactly be found by:

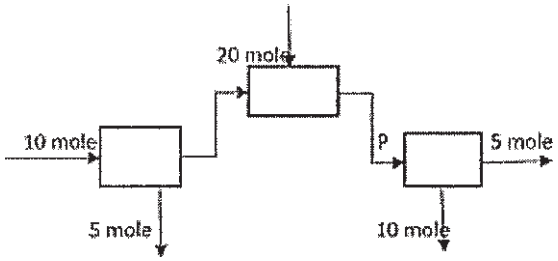
A) Trapezoidal rule
B) Newton-Raphson method
C) Jacobi algorithm
D) Central difference scheme

11. What is the value of P in the following process?



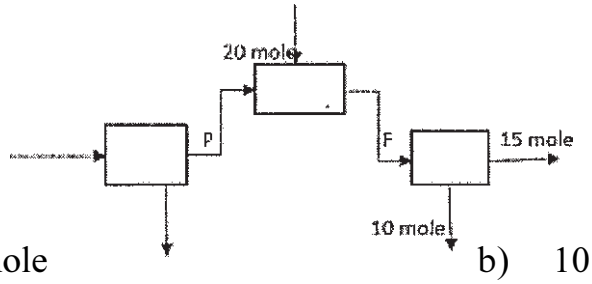
a) 5 mole
b) 10 mole
c) 15 mole
d) 20 mole

12) What is the value of P in the following process?



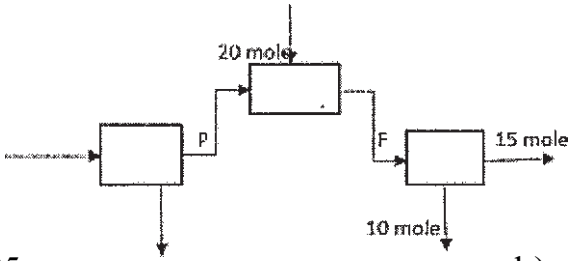
a) 5 mole
b) 15 mole
c) 25 mole
d) 35 mole

13) What is the value of P in the following process??



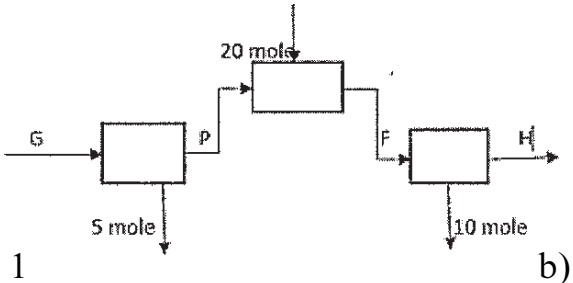
a) 5 mole
b) 10 mole
c) 15 mole
d) 20 mole

14) What is the value of F*P in the following process?



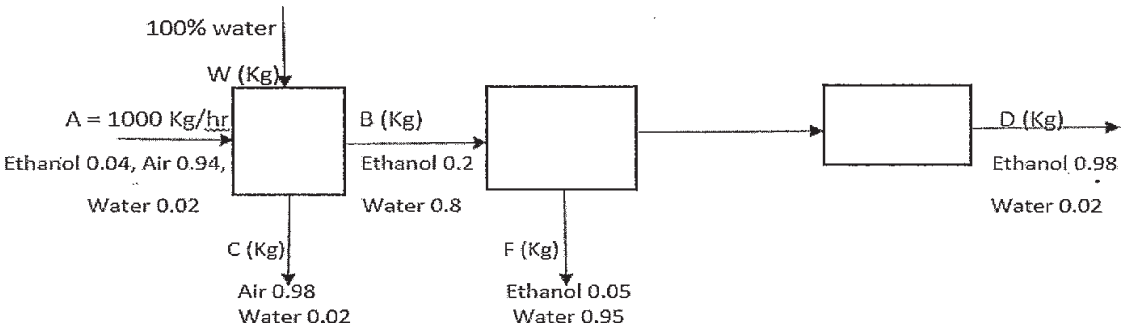
a) 25
b) 125
c) 150
d) 225

15) What is the value of H/P in the following process, if 2P + H = 16?



a) 1
b) 3
c) 6
d) 8

Answer the following questions 16–20 for the diagram.



16) What is the value of B?

a) 100 Kg/hr
b) 200 Kg/hr
c) 300 Kg/hr
d) 400 Kg/hr.

17) What is the value of C?

a) 400 Kg/hr
b) 689.5 Kg/hr
c) 819.6 Kg/hr
d) 959.2 Kg/hr

18. What is the value of W?

a) 159.2 Kg/hr
b) 281.3 Kg/hr
c) 465.7 Kg/hr
d) 633.8 Kg/hr

19. What is the value of F?

a) 98.5 Kg/hr
b) 131.1 Kg/hr
c) 167.7 Kg/hr
d) 256.4 Kg/hr

20. What is the value of D?

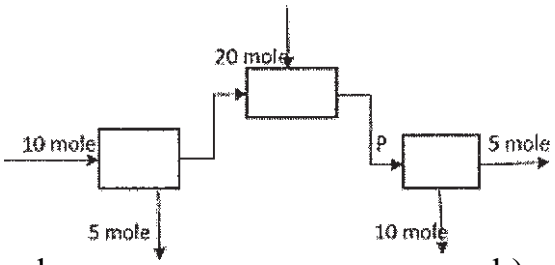
a) 32.3 Kg/hr
b) 49.1 Kg/hr
c) 85.6 Kg/hr
d) 105.3 Kg/hr

View answer

21) What is the specific gravity of a substance with density 100 kg/m3 with respect to reference substance of density 100 lb/m3?

a) 1.1
b) 2.2
c) 3.3
d) 4.4

22) What is the value of P in the following process?



a) 5 mole
b) 15 mole
c) 25 mole
d) 35 mole

23) A 40% gas in a system has partial pressure 4 atm, what is Henry's constant?

a) 1.6 atm b) 4 atm

c) 10 atm d) 16atm

24) In the Tyler standard screen scale series, when the mesh number increases from 3 mesh to 10 mesh, then

A) the clear opening decreases B) the clear opening increases

C) the clear opening is unchanged D) the wire diameter increases

25) The effectiveness of a heat exchanger in the ε – NTU method is defined as

A) $\frac{\text{increase in temperature of the cold fluid}}{\text{decrease in temperature of hot fluid}}$

B) $\frac{\text{actual exit temperature attained by the cold fluid}}{\text{maximum exit temperature attained by the cold fluid}}$

C) $\frac{\text{actual exit temperature attained by the hot fluid}}{\text{minimum exit temperature attainable by the hot fluid}}$

D) $\frac{\text{acutual heat transfer rate}}{\text{maximum possible heat transfer rate from hot fluid to cold fluid}}$

Part - II : RESEARCH METHODOLOGY

26) Hypothesis which explain relationship between two variables is

A) Causal B) Relational

C) Descriptive D) Tentative

27) A Hypothesis from which no generalization can be made is

A) •Null Hypothesis

B) Barren Hypothesis

C) Descriptive Hypothesis

D) Analytical Hypothesis

28) _____which deals with the techniques by which the procedures specified in the sampling, statistical and observational designs can be carried out

A) Statistical design

B) Observational design

C) Operational design

D) Sampling design

29 Which of the following is a non-probability.sample?

A) Quota sample

B) Simple random sample

C) Purposive sample

D) (a) and (c) both

30) A Hypothesis contributes to the development of _____

A) Theory

B) Generalization

C) Evolution

d) Concept

31) Concepts which cannot be given operational definitions are _____ concepts

A) Verbal

B) Oral

C) Hypothetical

D) Operational

32) A Hypothesis which develops while planning the research is

A) Null Hypothesis

B) Working Hypothesis

C) Relational Hypothesis

D) Descriptive Hypothesis

33 _____which deals with the techniques by which the procedures specified in the sampling, statistical and observational designs can be carried out

A) Statistical design

B) Observational design

C) Operational design

D) Sampling design

34. The _____ is not used as a measure of association for nominal, nonparametric variables.

A) Chi-square
B) Phi
C) Cramer's v
D) Z score

35) When a hypothesis is stated negatively it is called

A) Relational Hypothesis
B) Situational Hypothesis
C) Null Hypothesis
D) Casual Hypothesis

36. A _____ is an abstraction formed by generalization from particulars

A) Hypothesis
B) Variable
C) Concept
D) facts

37) A tentative proposition subject to test is

A) Variable
B) Hypothesis
C) Data
D) Concept

38) What level of measurement would be used if participants were asked to choose their favorite picture from a set of six?

A) Ordinal
B) Nominal
C) Ratio
D) Interval

39) Conclusions from qualitative research are

A) less certain than from quantitative research
B) Of little practical use.
C) Of descriptive value only.
D) Seldom defensible.

40) What is the appropriate test statistic to use to determine the significance of the coefficient of determination in a bivariate regression?

A) F statistic
B) Z score
C) X2
D) ANOVA

41. The first step in formulating a problem is

A) Statement of the problem
B) Gathering of Data
C) Measurement
D) Survey

42) To ensure adequate informed consent, a researcher should include all of the following components in an introduction except _____

A) Promise of anonymity and confidentiality
B) Sponsoring organization
C) Purpose of the research
D) Estimate of when the research study will be published

43) _____ Will help in finding out a problem for research.

A) Professor
B) Tutor
C) HOD
D) Guide

44) What does a descriptive study seek to accomplish?

A) Attempts to capture a population's characteristics by making inferences from a sample's characteristics and testing resulting hypotheses
B) Emphasizes a full contextual analysis of a few events or conditions and their interrelations
C) Discovers answers to the questions who, what, when, where, or how much
D) Attempts to reveal why or how one variable produces changes in another

45) An interval scale contains _____

A) Mutually exclusive and collectively exhaustive categories as well as the property of order, but not distance or unique origin
B) The properties of order, classification, and equal distance between points but no unique origin
C) Mutually exclusive and collectively exhaustive categories, but without the properties of order, distance, and origin
D) The properties of classification, order, equal distance, and unique origin

46) Second step in problem formulation is

A) Statement of the problem

B) Understanding the nature of the problem

C) Survey

D) Discussions

47) Last step in problem formulation is

A) Survey

B) Discussion

C) Literature survey

D) Re Phrasing the Research problem

48) Which of the following is true of resistant statistics?

A) Inappropriate for statistical analysis

B) Corrupted with measurement bias

C) Based on nominal scales

D) Able to resist influence of extreme values

49) Which quartile value(s) are likely to be most different between bell-shaped and highly skewed distributions?

A) The first or third quartile, depending on the skewing.

B) The second quartile or mean.

C) All quartiles.

D) The fourth quartile

50) Which ONE of these is the best description of secondary data?

A) Ordinary data

B) Existing data

C) Omnibus data

D) Ordinal data

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Rough Work

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