



D-C E T - 2018

CH	COURSE	VERSION CODE	QUESTION BOOKLET SERIAL NUMBER 201585
	CHEMICAL ENGINEERING	A	
MAXIMUM MARKS	TOTAL DURATION	TIME	
180	200 Minutes	10.00 a.m. to 1.00 p.m.	
MAXIMUM TIME FOR ANSWERING	MENTION YOUR DIPLOMA CET NUMBER		
180 Minutes			

DOs :

1. Candidate must verify that the DCET number and Name printed on the OMR Answer Sheet is tallying with the DCET number and Name printed on the Admission Ticket. Discrepancy if any, report to invigilator.
2. This question booklet is issued to you by the invigilator after the **2nd bell i.e., after 9.50 a.m.**
3. The Version Code of this Question Booklet should be entered on the OMR Answer Sheet and the respective circle should also be shaded completely.
4. The Version Code and Serial Number of this question booklet should be entered on the Nominal Roll without any mistakes.
5. Compulsorily sign at the bottom portion of the OMR answer sheet in the space provided.

DON'Ts :

1. **THE TIMING AND MARKS PRINTED ON THE OMR ANSWER SHEET SHOULD NOT BE DAMAGED / MUTILATED / SPOILED.**
2. The **3rd Bell rings at 10.00 a.m., till then;**
 - Do not remove the seal present on the right hand side of this question booklet.
 - Do not look inside this question booklet.
 - Do not start answering on the OMR answer sheet.

IMPORTANT INSTRUCTIONS TO CANDIDATES

1. This question booklet contains 180 (items) questions and each question will have one statement and four answers. (Four different options / responses.)
2. After the **3rd Bell is rung at 10.00 a.m.,** remove the paper seal of this question booklet and check that this booklet does not have any unprinted or torn or missing pages or items etc., if so, get it replaced by a complete test booklet. Read each item and start answering on the OMR answer sheet.
3. During the subsequent 180 minutes:
 - Read each question (item) carefully.
 - Choose one correct answer from out of the four available responses (options / choices) given under each question / item. In case you feel that there is more than one correct response, mark the response which you consider the best. In any case, choose **only one response** for each item.
 - Completely **darken / shade** the relevant circle with a **blue or black ink ballpoint pen** against the question number on the OMR answer sheet.

ಸರಿಯಾದ ಕ್ರಮ CORRECT METHOD	ತಪ್ಪು ಕ್ರಮಗಳು WRONG METHODS

4. Use the space provided on each page of the question booklet for Rough Work. Do not use the OMR answer sheet for the same.
5. After the **last bell is rung at 1.00 p.m.,** stop marking on the OMR answer sheet and affix your **left hand thumb impression** on the OMR answer sheet as per the instructions.
6. Hand over the **OMR answer sheet** to the room invigilator as it is.
7. After separating the top sheet (Dept. Copy), the invigilator will return the bottom sheet replica (candidate's copy) to you to carry home for self-evaluation.
8. Preserve the replica of the OMR answer sheet for a minimum period of **ONE year.**

[P.T.O.]

SEAL

501282

DO NOT WRITE HERE



PART – A

It consists of 1 – 40 questions.

1. If $A = \begin{bmatrix} 3 & 0 \\ -2 & 1 \end{bmatrix}$, then $2A - 3A^T =$

(1) $\begin{bmatrix} -3 & -6 \\ -4 & 1 \end{bmatrix}$

(2) $\begin{bmatrix} -3 & 6 \\ -2 & 1 \end{bmatrix}$

(3) $\begin{bmatrix} -3 & 6 \\ -4 & -1 \end{bmatrix}$

(4) $\begin{bmatrix} -3 & 6 \\ 4 & -1 \end{bmatrix}$

2. If $[3 \ 4 \ x] \begin{bmatrix} -1 \\ 2 \\ 5 \end{bmatrix} = [2x + 8]$ then the value of $x =$

(1) 1

(2) -1

(3) $-\frac{1}{2}$

(4) $\frac{1}{2}$

3. If $\begin{vmatrix} 3 & m-1 \\ m+1 & 2 \end{vmatrix} = 3$, then the value of $m =$

(1) ± 1

(2) $\pm\sqrt{2}$

(3) ± 3

(4) ± 2

4. In solving simultaneous linear equations $x - y = 4$, $2y + 3z = -2$ and $3x + y + 2z = 1$ using Cramer's rule, the value of determinant of co-efficients of x , y and z is

(1) 6

(2) 12

(3) -8

(4) -16

SPACE FOR ROUGH WORK



5. If $A = \begin{bmatrix} -2 & 5 \\ 2 & -3 \end{bmatrix}$, then inverse of $A =$

(1) $\frac{1}{4} \begin{bmatrix} 2 & -5 \\ -2 & 3 \end{bmatrix}$

(2) $\frac{1}{4} \begin{bmatrix} -3 & -5 \\ -2 & -2 \end{bmatrix}$

(3) $\frac{1}{4} \begin{bmatrix} -2 & 2 \\ 5 & -3 \end{bmatrix}$

(4) $\frac{1}{4} \begin{bmatrix} 3 & 5 \\ 2 & 2 \end{bmatrix}$

6. The characteristic roots of the matrix $\begin{bmatrix} 4 & -2 \\ -3 & -1 \end{bmatrix}$ are

(1) 2 and -5

(2) -2 and 5

(3) -2 and -5

(4) 2 and 5

7. If $\vec{a} = 2\hat{i} - 3\hat{j} + 5\hat{k}$

$$\vec{b} = 3\hat{i} - 2\hat{j} - 5\hat{k} \text{ and}$$

$$\vec{c} = \hat{i} + 4\hat{k}$$

then the scalar product of $\vec{a} + \vec{b}$ and $\vec{b} - \vec{c}$ is

(1) -9

(2) 9

(3) 20

(4) -20

8. If A, B and C are three consecutive vertices of a parallelogram with position vectors $3\hat{i} - 2\hat{j} + \hat{k}$, $2\hat{i} + \hat{j} - \hat{k}$ and $\hat{i} - \hat{j} + \hat{k}$, then area of the parallelogram is

(1) $3\sqrt{5}$ sq. units

(2) $5\sqrt{3}$ sq. units

(3) $2\sqrt{5}$ sq. units

(4) $5\sqrt{2}$ sq. units

9. Work done by the force $2\hat{i} - 3\hat{j} + 5\hat{k}$ in moving a particle from $(-3, 1, 2)$ to $(1, -1, 1)$ is

(1) 3

(2) 9

(3) 6

(4) 15

SPACE FOR ROUGH WORK



10. The probability of drawing a non-diamond card from a well shuffled deck of 52 cards is

(1) $\frac{3}{4}$

(2) $\frac{1}{2}$

(3) $\frac{1}{4}$

(4) $\frac{12}{13}$

11. If $\tan\theta = \frac{2}{3}$ and $\pi < \theta < \frac{3\pi}{2}$, then $\sin\theta + \cos\theta =$

(1) $\frac{5}{\sqrt{13}}$

(2) $\frac{-1}{\sqrt{13}}$

(3) $\frac{1}{\sqrt{13}}$

(4) $\frac{-5}{\sqrt{13}}$

12. If $\tan A + \tan B + \tan A \tan B = 1$, then $A + B =$

(1) 180°

(2) 90°

(3) 45°

(4) 360°

13. $\sqrt{\frac{1 - \cos 40^\circ}{1 + \cos 40^\circ}} =$

(1) $\tan 20^\circ$

(2) $\cot 40^\circ$

(3) $\tan 10^\circ$

(4) $\tan 40^\circ$

14. If $\tan A = \frac{1}{2}$ and $\tan B = \frac{2}{3}$ then $\tan(A - B)$ is

(1) -1

(2) 1

(3) $\frac{-1}{8}$

(4) $\frac{1}{8}$

SPACE FOR ROUGH WORK

A

[P.T.O.]



15. The numerical value of $\sin 10^\circ \sin 50^\circ \sin 70^\circ =$

(1) $\frac{\sqrt{3}}{8}$

(2) $\frac{1}{8}$

(3) $\frac{3}{16}$

(4) $\frac{1}{16}$

16. $\frac{\sin 12^\circ + \cos 12^\circ}{\sin 12^\circ - \cos 12^\circ} =$

(1) $\cot 33^\circ$

(2) $-\tan 33^\circ$

(3) $-\tan 57^\circ$

(4) $\tan 57^\circ$

17. The polar form of the complex number $\sqrt{3} - i$ is

(1) $2 \left[\cos \frac{\pi}{6} + i \sin \frac{\pi}{6} \right]$

(2) $2 \left[\cos \frac{\pi}{6} - i \sin \frac{\pi}{6} \right]$

(3) $2 \left[\cos \frac{\pi}{3} + i \sin \frac{\pi}{3} \right]$

(4) $2 \left[\cos \frac{\pi}{3} - i \sin \frac{\pi}{3} \right]$

18. The value of $\lim_{x \rightarrow \infty} x \left[\sqrt{x^2 + 1} - x \right]$ is

(1) 1

(2) 2

(3) $\frac{1}{2}$

(4) 0

19. The value of $\text{Lt}_{x \rightarrow 3} \frac{x\sqrt{x} - 3\sqrt{3}}{\sin(x-3)}$ is

(1) $\frac{3\sqrt{3}}{2}$

(2) $3\sqrt{3}$

(3) $\frac{2}{3\sqrt{3}}$

(4) $\frac{1}{3\sqrt{3}}$

SPACE FOR ROUGH WORK



20. The value of $\lim_{x \rightarrow 0} \frac{1 - \sqrt{\cos x}}{x^2}$ is

(1) 1

(2) $\frac{1}{4}$

(3) 2

(4) $-\frac{1}{2}$

21. The equation of line passing through the point (1, -3) and having slope $\frac{1}{2}$ is

(1) $x - 2y - 7 = 0$

(2) $2x - y + 7 = 0$

(3) $x - 2y - 4 = 0$

(4) $x - y + 4 = 0$

22. The equation of line passing through the point (-2, 3) and parallel to the line $5x + 3y + 5 = 0$ is,

(1) $5x + 3y - 19 = 0$

(2) $5x + 3y + 1 = 0$

(3) $5x + 3y + 19 = 0$

(4) $3x - 5y + 1 = 0$

23. If $y = e^x \log x$ then $\frac{dy}{dx}$ is

(1) $e^x \left[\frac{1}{x} + \log x \right]$

(2) $e^x \left[\frac{1}{x} - \log x \right]$

(3) $e^x \cdot \frac{1}{x}$

(4) $e^x + \frac{1}{x}$

24. If $y = \log (\tan x + \sec x)$, then $\frac{dy}{dx}$ is,

(1) $-\sec x$

(2) $\sec x$

(3) $\frac{\sec x}{\tan x + \sec x}$

(4) $\log(\sec^2 x + \tan x \sec x)$

SPACE FOR ROUGH WORK



25. If $\frac{x^2}{2} + \frac{y^2}{2} = 1$ then $\frac{dy}{dx}$ is

(1) $\frac{1+x}{y}$

(2) $\frac{x}{y}$

(3) $\frac{-x}{y}$

(4) $\frac{1-x}{y}$

26. If $x = \frac{1}{t}$; $y = 3t^3$ then $\frac{dy}{dx}$ is,

(1) $-6t^4$

(2) $-9t^4$

(3) -6

(4) -9

27. If $y = (\sin x)^{\log x}$ then $\frac{dy}{dx}$ is

(1) $(\sin x)^{\log x} \left[\log x \cos x + \frac{\log \sin x}{x} \right]$

(2) $(\sin x)^{\log x} \left[\frac{\log x}{\sin x} + \frac{\log \sin x}{x} \right]$

(3) $(\sin x)^{\log x} [-\log x \cot x + \log \sin x]$

(4) $(\sin x)^{\log x} \left[\log x \cot x + \frac{\log \sin x}{x} \right]$

28. If $y = e^{5x} + e^{-5x}$ then $\frac{d^2y}{dx^2}$ at $x = 0$ is,

(1) 25

(2) -25

(3) 50

(4) -50

29. The rate of change of volume of a sphere with respect to radius, when its radius 3 cm is

(1) 3π

(2) 6π

(3) 18π

(4) 36π

30. The equation of normal to the curve $y = x^2$ at $(2, 2)$ is

(1) $x - 4y - 10 = 0$

(2) $x - 4y + 10 = 0$

(3) $x + 4y - 10 = 0$

(4) $x + 4y + 10 = 0$

SPACE FOR ROUGH WORK



31. The value of $\int e^{5 \log x} dx$ is

(1) $5x^4 + C$

(2) $\frac{x^6}{6} + C$

(3) $6x^6 + C$

(4) $\frac{x^5}{5} + C$

32. The value of $\int \frac{\cos x - \sin x}{\cos x} dx$ is

(1) $x - \cos x + C$

(2) $x + \cos x + C$

(3) $x + \log \sec x + C$

(4) $x - \log \sec x + C$

33. The value of $\int (2 + \sin^3 x) \cos x dx$ is,

(1) $2 \sin x + \frac{(\sin x)^4}{4} + C$

(2) $\frac{\sin^4 x}{4} + C$

(3) $2 \cos x + \frac{(\cos x)^4}{4} + C$

(4) $\frac{\cos^4 x}{4} + C$

34. The value of $\int \frac{x+5}{x^2+10x-5} dx$ is,

(1) $\log(x^2 + 10x - 5)^2 + C$

(2) $\frac{1}{2} \log(x^2 + 10x - 5) + C$

(3) $\frac{1}{2} \log(x + 5) + C$

(4) $\log(x + 5)^2 + C$

35. The value of $\int 4x \log 5x dx$ is,

(1) $\frac{x^2 \log 5x}{2} - \frac{x^2}{4} + C$

(2) $\frac{x \log 5x}{5} + \frac{x^2}{2} + C$

(3) $5x \log 5x + 1 + C$

(4) $2x^2 \log 5x - x^2 + C$

SPACE FOR ROUGH WORK



36. $\int_0^{\pi/4} \frac{\sec^2 x}{1 + \tan x} dx =$

(1) $-\log 2$

(2) $\log 2$

(3) $\log 3$

(4) $\log 4$

37. The volume of a solid generated by revolving the curve $y = \tan x$ about x-axis between the lines $x = 0$ and $x = \frac{\pi}{4}$ is,

(1) $\pi + \frac{\pi^2}{4}$ cu. units

(2) $1 + \frac{\pi}{4}$ cu. units

(3) $1 - \frac{\pi}{4}$ cu. units

(4) $\pi - \frac{\pi^2}{4}$ cu. units

38. Order and degree of differential equation $\frac{d^2y}{dx^2} = \sqrt{1 - \frac{dy}{dx}}$ are

(1) 2 and 2 respectively

(2) 2 and 1 respectively

(3) 1 and 2 respectively

(4) 1 and 1 respectively

39. The differential equation obtained by eliminating the arbitrary constants from the equation $y^2 = a \sin x + b \cos x$ is

(1) $2y \frac{d^2y}{dx^2} + 2 \left(\frac{dy}{dx} \right)^2 - y^2 = 0$

(2) $\frac{d^2y}{dx^2} + \left(\frac{dy}{dx} \right)^2 + y^2 = 0$

(3) $2y \frac{d^2y}{dx^2} - 2 \left(\frac{dy}{dx} \right)^2 + y^2 = 0$

(4) $2y \frac{d^2y}{dx^2} + 2 \left(\frac{dy}{dx} \right)^2 + y^2 = 0$

40. The solution of differential equation $x \frac{dy}{dx} + y = x - 1$ is

(1) $xy = x - \frac{x^2}{2} + C$

(2) $xy = \frac{x^2}{2} - x + C$

(3) $xy + \frac{x^2}{2} + x = C$

(4) $xy - \frac{x^2}{2} - x = C$

SPACE FOR ROUGH WORK



PART – B

It consists of 41 – 80 questions.

41. The value of 20 peta Hertz is

- (1) 20×10^9 Hz
- (2) 20×10^{12} Hz
- (3) 20×10^{15} Hz
- (4) 20×10^{18} Hz

42. The total reading for Screw Gauge is found by

- (1) $TR = PSR + (HSR \times LC) \pm ZE$
- (2) $TR = PSR + (HSR \times LC) \pm ZC$
- (3) $TR = (PSR + HSR) \times LC \pm ZE$
- (4) $TR = (PSR + HSR) \times LC \pm ZC$

43. The least count of a slide calipers is 0.01 cm. In a setting the zero of the Vernier Scale lies between 3.2 cm and 3.3 cm and 5th division of the Vernier co-incides with the main scale division. The total reading is

- (1) 3.35 cm
- (2) 3.35 mm
- (3) 3.25 cm
- (4) 3.25 mm

44. The rectangular component of a vector R are

- (1) $R_x = R\cos\theta, R_y = R\sin\theta$
- (2) $R_x = R\sin\theta, R_y = R\cos\theta$
- (3) $R_x = \cos\theta; R_y = \sin\theta$
- (4) $R_x = -\cos\theta; R_y = -\sin\theta$

45. A body of weight 5 kg is suspended by means of a light string. It is pulled horizontally until the string makes an angle of 30° with the vertical. Then the horizontal force applied is

- (1) $\frac{1}{\sqrt{3}}$ kg wt
- (2) 5 kg wt
- (3) $5\sqrt{3}$ kg wt
- (4) $\frac{5}{\sqrt{3}}$ kg wt

SPACE FOR ROUGH WORK

A

[P.T.O.]



46. Among these which is the vector quantity ?
- (1) Work (2) Energy
(3) Surface tension (4) Power
47. The resultant of two like parallel forces P and Q acting at a point is
- (1) P + Q away from P
(2) P + Q away from Q
(3) P ~ Q in between P and Q
(4) P + Q in between P and Q
48. Shock absorbers in automobiles is an example for
- (1) Tensile stress (2) Compressive stress
(3) Shear stress (4) Breaking stress
49. The elasticity of steel compared to rubber is
- (1) More (2) Less
(3) Equal (4) Less than or equal
50. The stress-strain graph for an elastic body within elastic limit is
- (1) Linear (2) Curved
(3) Parabola (4) Hyperbola
51. The maximum stress of steel wire is 500 N/mm^2 , if the area of cross section of wire is 0.05 m^2 then the force is
- (1) 25 N (2) 25 KN
(3) 25 MN (4) 250 N
52. In case of concave meniscus, the angle of contact is
- (1) Acute (2) Right angle
(3) Linear (4) Obtuse

SPACE FOR ROUGH WORK



53. The surface tension of a liquid varies as
- (1) Directly with temperature, inversely with density
 - (2) Directly with both temperature and density
 - (3) Inversely with both temperature and density
 - (4) Inversely with temperature and directly with density
54. The thrust on the bottom of a container having base area 0.5 m^2 filled with water to a height of 6 cm is
- (1) 147 N
 - (2) 294 N
 - (3) 147 dynes
 - (4) 294 dynes
55. The fastest mode of transfer of heat is
- (1) Conduction
 - (2) Convection
 - (3) Radiation
 - (4) Transmission
56. Pressure is directly proportional to absolute temperature at constant volume is a statement of
- (1) Charle's law
 - (2) Boyle's law
 - (3) Gay-Lussac's law
 - (4) Boltzmann's law
57. Boyle's law is applicable for
- (1) Isothermal process
 - (2) Isobaric process
 - (3) Isochoric process
 - (4) Isotonic process
58. At absolute zero temperature, the pressure and volume of a given mass of gas is
- (1) 1
 - (2) 273
 - (3) -273
 - (4) 0
59. In cold countries, the windows are provided with double doors because
- (1) Air between two windows behaves as a perfect insulator
 - (2) Air between two windows behaves as a perfect conductor
 - (3) To strengthen the windows
 - (4) Security purpose

SPACE FOR ROUGH WORK



60. The sound waves and light waves can be differentiated by
- | | |
|------------------|------------------|
| (1) Interference | (2) Diffraction |
| (3) Reflection | (4) Polarization |
61. The velocity of sound in gas is independent of
- | | |
|-----------------|--------------|
| (1) Temperature | (2) Pressure |
| (3) Humidity | (4) Density |
62. The superposition of two waves of same frequency moving in opposite direction is
- | | |
|----------------------|----------------------|
| (1) Progressive wave | (2) Transverse waves |
| (3) Sound wave | (4) Stationary wave |
63. For every degree raise of temperature, the velocity of sound waves in gas is increased by
- | | |
|-------------|-------------|
| (1) 6 m/s | (2) 60 m/s |
| (3) 0.6 s/m | (4) 0.6 m/s |
64. The angle between the particle vibration and wave propagation in a transverse wave is
- | | |
|----------------|-----------------|
| (1) 0° | (2) 45° |
| (3) 90° | (4) 180° |
65. The original tension in the string if the frequency of a sonometer wire is doubled, when the tension is increased by 12 kg wt is
- | | |
|-------------|--------------|
| (1) 2 kg wt | (2) 4 kg wt |
| (3) 8 kg wt | (4) 12 kg wt |
66. At resonance, the body vibrates with
- | | |
|---------------------|---------------------|
| (1) Small amplitude | (2) Large amplitude |
| (3) Zero amplitude | (4) Same amplitude |

SPACE FOR ROUGH WORK



67. Beats occurs in mining due to the presence of

- (1) Ore
- (2) Water
- (3) Contaminated air
- (4) Fossils

68. The statement which is correct in these is

- (1) X-rays have longer wavelength than microwaves
- (2) Gamma rays have shorter wavelength than microwaves
- (3) UV-rays have shorter wavelength than violet rays
- (4) Red rays have longer wavelength than infrared rays

69. LASER is used in

- (1) LIDAR
- (2) RADAR
- (3) SONAR
- (4) GPS

70. Nano means

- (1) One hundredth of meter
- (2) One thousandth of meter
- (3) One millionth of meter
- (4) One billionth of meter

71. Microphone is a

- (1) Transducer
- (2) Receiver
- (3) Channel
- (4) Transmitter

72. The principle behind optical fibre is

- (1) Total internal refraction
- (2) Total internal reflection
- (3) Reflection
- (4) Refraction

73. Faraday's I law of electrolysis is represented mathematically as

- (1) $M = ZQ$
- (2) $Z = MQ$
- (3) $Q = MZ$
- (4) $M = \frac{Z}{Q}$

SPACE FOR ROUGH WORK

A

[P.T.O.]



87. The electrical conductivity of a weak electrolyte increases with
- (1) decrease of temperature (2) decrease of pressure
(3) increase of dilution (4) none of the above
88. Acid-base theory of _____ explains AlCl_3 solution is acidic in nature.
- (1) Arrhenius (2) Bronsted-Lowry
(3) Ostwald's (4) G.N. Lewi's
89. The sum of pH and pOH of any given solution is
- (1) 10^{-7} (2) 10^{-14} (3) 7 (4) 14
90. The spontaneity of any chemical reaction obeys the following _____ condition.
- (1) $\Delta H = 0$; $\Delta G = 0$; $\Delta S = 0$
(2) $\Delta H = -ve$; $\Delta G = -ve$; $\Delta S = +ve$
(3) $\Delta H = +ve$; $\Delta G = +ve$; $\Delta S = +ve$
(4) $\Delta H = -ve$; $\Delta G = -ve$; $\Delta S = -ve$
91. Formation of long chains, branches and networks in the organic compounds can be explained by _____ property.
- (1) aromatisation (2) configuration
(3) catenation (4) confirmation
92. The process of conversion of aliphatic and alicyclic hydrocarbons in to aromatic hydrocarbons in the presence of suitable catalysts is called
- (1) aromatisation (2) acylation
(3) alkylation (4) cyclisation
93. The correct order of reactivity of halogen towards alkenes varies as
- (1) $\text{I} > \text{Br} > \text{Cl} > \text{F}$ (2) $\text{F} > \text{Cl} > \text{Br} > \text{I}$
(3) $\text{F} < \text{Cl} > \text{Br} < \text{I}$ (4) $\text{Br} < \text{Cl} > \text{F} < \text{I}$

SPACE FOR ROUGH WORK



94. Alkynes may be converted in to alkanes by _____ method.
- (1) halogenation (2) hybridisation
(3) hydrogenation (4) dehydrogenation
95. The correct order of ease of dehydrohalogenation for different alkyl groups but same halogen is
- (1) primary > secondary > tertiary (2) secondary > primary > tertiary
(3) tertiary > primary > secondary (4) tertiary > secondary > primary
96. It is believed that petroleum have originated from _____ sources.
- (1) animal (2) plant
(3) both animal and plants (4) none of the above
97. IUPAC name of the compound have the structural formula
- $$\begin{array}{ccccccc} & \text{H} & \text{H} & \text{H} & \text{H} & \text{NH}_2 & \\ & | & | & | & | & | & \\ \text{Cl} & - \text{C} & - \text{C} & - \text{C} & - \text{C} & - \text{C} & - \text{COOH} \\ & | & | & | & | & | & \\ & \text{H} & \text{H} & \text{H} & \text{Br} & \text{H} & \end{array}$$
- (1) 2-amino 3-bromo 6-chloro hexanoic acid
(2) 1-chloro 4-bromo 5-amino hexanoic acid
(3) 1-amino 2-bromo 5-chloro pentanoic acid
(4) amino-bromo-chloro-1, 4, 5 – pentanoic acid
98. The correct order of reactivity of halogen acid towards addition to alkenes is
- (1) HCl > HBr > HI (2) HI > HBr > HCl
(3) HBr > HCl > HI (4) HI > HCl > HBr
99. Petroleum products storage tanks should be painted with _____ coloured paint.
- (1) yellow (2) black
(3) red (4) white

SPACE FOR ROUGH WORK



100. Among the following the more acidic nature of hydrogen is in
- (1) $\text{HC} \equiv \text{CH}$ (2) $\text{H}_2\text{C} = \text{CH}_2$
(3) $\text{H}_3\text{C} - \text{CH}_3$ (4) CH_4
101. In a gyratory crusher the mechanism of size reduction is primarily by
- (1) Compression (2) Impact
(3) Attrition (4) Cutting action
102. A fluid energy mill is used for
- (1) Cutting (2) Grinding
(3) Ultragrinding (4) Crushing
103. Cement clinker is reduced to fine size by a
- (1) roll crusher (2) ball mill
(3) tube mill (4) hammer mill
104. In a fertilizer plant, molten ammonium nitrate is mixed with limestone in a
- (1) Pug mill (2) Mixer-extruder
(3) Banbury mixer (4) Muller mixer
105. Which of the following conveyor is the most suitable for transportation by sticky material ?
- (1) Apron conveyor (2) Belt conveyor
(3) Screw conveyor (4) Pneumatic conveyor
106. Paddle agitator
- (1) is suitable for mixing low viscosity liquids
(2) produces axial flow
(3) moves at very high speed
(4) none of these

SPACE FOR ROUGH WORK



107. Highly viscous liquids and pastes are agitated by
- (1) propellers
 - (2) turbine agitators
 - (3) multiple blade paddles
 - (4) none of these
108. The capacity of the belt conveyor, depends upon the cross section of the load and the _____ of the belt.
- (1) thickness
 - (2) length
 - (3) speed
 - (4) none of these
109. Maximum size reduction in a ball mill is done by the _____ action.
- (1) impact
 - (2) compression
 - (3) attrition
 - (4) cutting
110. Mixing of plastic solids is generally facilitated by
- (1) dispersion
 - (2) mastication
 - (3) kneading
 - (4) none of these
111. The S.I. unit of viscosity is given by
- (1) N.s/m²
 - (2) N.m/s
 - (3) N/s
 - (4) N.s/m
112. Potential flow is characterised by
- (1) irrotational and frictionless flow
 - (2) irrotational and frictional flow
 - (3) one in which dissipation of mechanical energy into heat occurs
 - (4) the formation of eddies within the stream
113. Measurement of pressure difference with very high precision is done by using _____ type of manometer.
- (1) U-tube
 - (2) Differential manometer
 - (3) Inclined manometer
 - (4) Inverted U-tube manometer

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114. In _____, the viscosity increases with an increasing velocity gradient.
- (1) Pseudo plastic fluids (2) Dilatent fluids
(3) Bingham fluids (4) None of these
115. Reynolds number is the ratio of
- (1) viscous forces to gravity forces
(2) inertial forces to viscous forces
(3) viscous forces to inertial forces
(4) inertial forces to gravity forces
116. Bernoulli's equation describes
- (1) mechanical energy balance in potential flow
(2) kinetic energy balance in laminar flow
(3) mechanical energy balance in turbulent flow
(4) mechanical energy balance in boundary layer
117. The head of centrifugal pump _____ continuously as the capacity is decreased.
- (1) decreases (2) increases
(3) becomes less (4) none of these
118. The need to priming is eliminated by providing
- (1) Negative suction head
(2) Positive suction head
(3) Positive discharge head
(4) Negative discharge head
119. _____ valves are commonly used to minimise the pressure drop in the open position and to stop the flow rather than controlling it.
- (1) Globe (2) Ball
(3) Gate (4) Diaphragm

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120. Velocity head on sudden enlargement in a horizontal pipe is converted in to _____ head.
- (1) Elevation (2) Pressure
(3) Both elevation and pressure (4) Neither elevation nor pressure
121. The volume occupied by 0.2 mole of methane
- (1) 4.48 L (2) 8.96 L (3) 4.04 L (4) 2.24 L
122. Which of the following weighs the least ?
- (1) 2 gram atom of N (2) 3×10^{23} atom of C
(3) 20 gram of CO_2 (4) 1 mole of SO_2
123. 1 mole of Methane contains
- (1) 6.02×10^{23} atoms of H (2) 4 gm atom of hydrogen
(3) 1.81×10^{23} molecules of methane (4) 3 gram of carbon
124. Which of the following phrases would be incorrect to use ?
- (1) a molecule of an element (2) an atom of an element
(3) a molecule of a compound (4) an atom of a compound
125. Equal volumes of different gases at fixed temperature and pressure
- (1) have equal weights (2) equal masses
(3) equal densities (4) equal number of moles
126. Number of gm. moles of solute dissolved in one litre of a solution is called its
- (1) equivalent weight (2) molarity
(3) molality (4) normality
127. Conversion of 80 ft/hr to m/sec is
- (1) 6.77×10^{-3} (2) 7.62×10^{-3}
(3) 5.07×10^{-3} (4) 2.02×10^{-3}

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128. What would be the amount of hydrogen produced if 175 gram of iron taken into reaction ?
[at. wt. of Fe = 55.85]
- (1) 41.84 gram (2) 14.02 gram
(3) 8.355 gram (4) 5.8335 gram
129. 1 Btu/lb°F is equivalent to _____ kcal/kg°C.
- (1) 1 (2) 2.42
(3) 1.987 (4) 4.97
130. Overall material balance for crystallization operation is, Feed =
- (1) Solvent + Crystals + Saturated Solution
(2) Solvent + Crystals – Saturated Solution
(3) Crystals + Saturated Solution
(4) Crystals + Unsaturated Solution
131. A limiting reactant is the one which decides the _____ in the chemical reaction.
- (1) equilibrium constant (2) conversion
(3) rate constant (4) formation
132. A gas occupies a volume of 283 CC at 10°C. If it is heated to 20°C at constant pressure, the new volume of the gas will be _____ CC.
- (1) 283 (2) 566
(3) 293 (4) 141.5
133. Volume occupied by one gm. mole of a gas at S.T.P. is
- (1) 22.4 lts (2) 2240 lts
(3) 22.4 CC (4) 359 lts

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134. 98 gram of H_2SO_4 is dissolved in water to prepare 1 lt. of solution. The normality of solution is

- (1) 5 N (2) 3 N (3) 2 N (4) 1 N

135. Conversion of 499 gm. of $CuSO_4 \cdot 5H_2O$ to mole is [mol.wt. of $CuSO_4 = 159.5$]

- (1) 6 mole (2) 3 mole
(3) 5 mole (4) 2 mole

136. Average molecular weight is ratio of

- (1) $\frac{\text{Total mass of the mixture}}{\text{Total moles of the mixture}}$ (2) $\frac{\text{Total moles of the mixture}}{\text{Total mass of the mixture}}$
(3) $\frac{\text{Individual weight}}{\text{Total weight}}$ (4) $\frac{\text{Molecular weight}}{\text{Valency}}$

137. The weight of $4m^3$ of chlorine gas at a temperature of $35^\circ C$ and a pressure of 0.986 atm

- (1) 5.01 kg (2) 2.16 kg (3) 8.11 kg (4) 11.07 kg

138. In a chemical process, the recycle stream is purged for

- (1) increasing the yield (2) enriching the product
(3) limiting the inerts (4) heat conversion

139. A very dilute solution is prepared by dissolving ' x_1 ' mole of solute in ' x_2 ' mole of a solvent. The mole fraction of solute is approximately equal to

- (1) $\frac{x_1}{x_1 + x_2}$ (2) $\frac{x_2}{x_1}$
(3) $\frac{x_2}{x_1 + x_2}$ (4) $\frac{x_1}{x_2}$

140. Elements in a periodic table are arranged in order of their

- (1) metallic characteristics (2) mass number
(3) atomic number (4) atomic weight

SPACE FOR ROUGH WORK



141. Thermosetting polymers are compared to thermoplastic ones are
- (1) more brittle
 - (2) formed by addition polymerization
 - (3) easily reshaped and reused
 - (4) soluble in all organic solvents
142. Which of these cannot drawn into fibres ?
- (1) Polyamide
 - (2) Unsaturated polyesters
 - (3) Saturated polyesters
 - (4) Polyacrylonitrile
143. Condensation polymerisation of _____ produces Bakelite.
- (1) Propylene
 - (2) Phenol and formaldehyde
 - (3) Phenol and acetaldehyde
 - (4) Urea and formaldehyde
144. Styrene Butadiene Rubber (SBR) as compared to natural rubber has
- (1) Poor tensile strength
 - (2) Poorer resistance
 - (3) Greater amount of heat build up heavy loading
 - (4) All (1), (2) and (3)
145. Flexible plastic pipes are made of
- (1) High Density Polyethylene (HDPE)
 - (2) Low Density Polyethylene (LDPE)
 - (3) Polypropylene
 - (4) Unsaturated polyester
146. Mastication of rubber means
- (1) softening
 - (2) a treatment to retard its deterioration due to oxidation
 - (3) improving its curing rate
 - (4) depression of its freezing point

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147. The high density polythene is about _____ gm/cc.
(1) 0.95 (2) 0.98 (3) 1.0 (4) 1.18
148. Styrene Butadiene Rubber (SBR) is not used for making
(1) front wheel tyres of aeroplanes (2) gaskets
(3) soles of shoes (4) none of these
149. Plastics are safe to be used upto a maximum temper of _____ °C.
(1) 100°C (2) 120°C
(3) 150°C (4) 180°C
150. Buna-N is also called as
(1) Butyl rubber (2) Nitrile rubber
(3) Neoprene (4) Thiokol
151. Which of the following is most suitable for measuring temperature in the range of – 87 to 371°C ?
(1) Bimetallic thermometer
(2) Vapour-pressure thermometer
(3) Resistance temperature detectors
(4) Radiation pyrometer
152. The gradual shift in the indication of the instrument over an extended period of time during which true value of variable does not change is referred to as
(1) Drift (2) Zero drift
(3) Span drift (4) Dead zone
153. In vapour-pressure thermometer the vapour pressure of a volatile liquid varies with _____ of liquid.
(1) Pressure (2) Temperature
(3) Density (4) None of these

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154. Which thermocouple can be used to measure temperature around 1400°C ?
- (1) Copper – Constantum (2) Aluminium – Chromel
(3) Platinum – Platinum + Rhodium (4) Chromel – Constantum
155. The _____ of the fluid contained in the temperature sensing element (i.e. bulb) of filled system thermometers changes with change in temperature.
- (1) Pressure (2) Volume
(3) Viscosity (4) All of 1, 2, 3
156. A barometer measures _____ pressure.
- (1) absolute (2) guage
(3) both absolute and guage (4) dynamic
157. Humidity is most commonly measured by
- (1) Partial vapour pressure determination
(2) Dry and wet bulb temperature measurement
(3) Physical expansion
(4) Evaporation
158. Working principle of radiation pyrometer is based on
- (1) Wien's law (2) Kirchoff's law
(3) Stefan-Boltzmann law (4) Seeback effect
159. A pH meter has _____ cells.
- (1) one (2) two (3) four (4) no
160. A instrument used to measure the density of a liquid is
- (1) Hygrometer (2) Hydrometer
(3) Psychrometer (4) None of these

SPACE FOR ROUGH WORK



161. Heat transfer rate per unit area is called
- (1) thermal conductivity
 - (2) heat flux
 - (3) heat transfer coefficient
 - (4) thermal diffusivity
162. What is the unit of thermal conductivity ?
- (1) w/m^2k
 - (2) w/mk
 - (3) w/m
 - (4) w/k
163. Heat sensitive materials can be concentrated in an evaporator which employs
- (1) vacuum
 - (2) high pressure of liquid
 - (3) high residence time
 - (4) none of these
164. The number of kg of liquid vapourised per kg of steam fed to the evaporator is defined as
- (1) capacity
 - (2) rate of evaporation
 - (3) economy
 - (4) rate of vapourisation
165. Baffles in shell side of shell and tube heat exchanger are used to
- (1) increase the tube side heat transfer coefficient
 - (2) decrease the tube side heat transfer coefficient
 - (3) increase the shell side heat transfer coefficient
 - (4) decrease the shell side heat transfer coefficient
166. A perfect black body is a perfect _____ of radiation.
- (1) absorber
 - (2) emitter
 - (3) both 1 and 2
 - (4) neither 1 nor 2
167. Film boiling occurs at _____ pressure.
- (1) atmospheric
 - (2) sub-atmospheric
 - (3) negative
 - (4) very high

SPACE FOR ROUGH WORK



168. Dropwise condensation is promoted on a/an _____ surface.
- (1) glazed (2) oily
(3) coated (4) smooth
169. Heat transfer occurs by natural convection because change in temperature causes difference in
- (1) viscosity (2) density
(3) thermal conductivity (4) heat capacity
170. In case of parallel flow heat exchanger, the lowest temperature theoretically attainable by the hot fluid is _____ the outlet temperature of the cold fluid.
- (1) equal to
(2) more than
(3) less than
(4) either more or less than (depending upon the fluid)
171. If moisture content of solid on dry basis is X , then the same on wet basis is
- (1) $\frac{X}{X+1}$ (2) $\frac{X}{1-X}$
(3) $\frac{1+X}{X}$ (4) $\frac{1-X}{X}$
172. Milk is dried usually in a _____ dryer.
- (1) freeze (2) spray
(3) tray (4) rotary
173. Moisture contained by a substance in excess of the equilibrium moisture is called the _____ moisture.
- (1) critical (2) unbound
(3) bound (4) free

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174. Moisture in a solid exerting an equilibrium vapour pressure equal to that of pure liquid at the same temperature is called _____ moisture.
- (1) unbound (2) critical
(3) free (4) bound
175. In a paper industry, paper is dried in a _____ dryer.
- (1) tunnel (2) heated cylinder
(3) conveyor (4) festoon
176. Calcium ammonium nitrate fertilizer is dried in a _____ dryer.
- (1) vacuum (2) rotary
(3) tray (4) tunnel
177. Refractory bricks are usually dried in _____ dryer.
- (1) tray dryer (2) tunnel
(3) conveyor (4) festoon
178. Drying of solid involves _____ transfer.
- (1) only heat (2) only mass
(3) both heat and mass (4) none of these
179. For continuous drying of granular or crystalline material, the dryer used is the _____ dryer.
- (1) tunnel (2) tray
(3) rotary (4) none of these
180. All the moisture in a non-hygroscopic material is the _____ moisture.
- (1) free (2) equilibrium
(3) unbound (4) bound

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