2

CH	COURSE	DAY : SUNDAY DATE : 30-JUNE-2013
	CHEMICAL ENGINEERING	TIME : 9.00 a.m. to 12.00 Noon

MAXIMUM MARKS	TOTAL DURATION	MAXIMUM TIME FOR ANSWERING
180	200 Minutes	180 Minutes

MENTION YOUR DIPLOMA CET NUMBER	QUESTION BOOKLET DETAILS	
	VERSION CODE	SERIAL NUMBER
	A-2	107082

DOs :

1. Check whether the Diploma CET No. has been entered and shaded in the respective circles on the OMR answer sheet.
2. This question booklet is issued to you by the invigilator after the **2nd bell i.e., after 08.50 a.m.**
3. The serial number of this question booklet should be entered on the OMR answer sheet.
4. The version code of this question booklet should be entered on the OMR answer sheet and the respective circles should also be shaded completely.
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 9.00 a.m., till then;**
   - Do not remove the seal / staple 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.

[redacted]

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 9.00 a.m.**, remove the paper seal / polythene bag 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.**

Correct Method of shading the circle on the OMR answer sheet is as shown below :

① ● ③ ④

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 12.00 Noon**, 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 (KEA 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.

S80701

PART – A

It consists of **1 – 40** questions.

1. In solving the equations by Cramer's rule for $5x - 3y = 1$ and $2x - 5y = -11$, the value of x and y is

   (1) (3, 2) (2) (−3, −2)

   (3) (2, 3) (4) (−2, −3)

2. If $A = \begin{bmatrix} 2 & 0 & 0 \\ 1 & 2 & 0 \\ 1 & 1 & 2 \end{bmatrix}$ then A adj A is

   (1) Diagonal (2) Scalar

   (3) Identity (4) Zero matrix

3. The minor of the element 6 in a matrix $A = \begin{bmatrix} 2 & -3 & 0 \\ 4 & 1 & 6 \\ 3 & 2 & 0 \end{bmatrix}$ is

   (1) 10 (2) 11

   (3) 12 (4) 13

4. The characteristic equation of the matrix $A = \begin{bmatrix} 5 & -3 \\ 2 & 1 \end{bmatrix}$ is

   (1) $\lambda^2 - 6\lambda + 11 = 0$ (2) $\lambda^2 - 6\lambda - 11 = 0$

   (3) $\lambda^2 + 6\lambda + 11 = 0$ (4) $-\lambda^2 + 6\lambda = 0$

5. The fourth term in the expansion of $\left(\sqrt{3} + 2\right)^7$ is

   (1) 2520 (2) −2520

   (3) 1/2520 (4) −1/2520

SPACE FOR ROUGH WORK

6. The value of $(\sin 100° + \sin 20°) / (\cos 100° + \cos 20°)$ is

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

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

7. The value of $(\tan^{-1} 5/6 + \tan^{-1} 1/11)$ is

(1) 30° (2) 60°

(3) 90° (4) 45°

8. If the points (– 3, K), (5, 7) and (– 11, 1) are collinear, then the value of K is

(1) 4 (2) 3

(3) 2 (4) 1

9. The ratio of the line join of the points (2, 3) and (– 5, 6) divided by y – axis is

(1) 5 : 2 (2) 2 : 5

(3) 3 : 2 (4) 2 : 3

10. Three vertices of a triangle are (– 2, 3, 1), (– 1, 4, 2) and (– 6, 5, 2), then the centroid of the triangle is

(1) (– 3, 4, 1) (2) (0, 5/3, 1/3)

(3) (4, 3, 1) (4) (– 3, – 4, – 2)

11. The volume of a sphere is increasing at the rate of 4π c.c/sec, then the rate of increase of the radius is when the volume is $288\ \pi$ cc

(1) 6 cm/sec (2) 1/6 cm/sec

(3) 1/36 cm/sec (4) 36 cm/sec

12. $\int \sin^2 x\, dx$ is

(1) $\cos x + c$ (2) $x/2 - (\sin 2x)/4 + c$

(3) $x/2 + (\cos 2x)/4 + c$ (4) $x/2 + (\sin 2x) / 4 + c$

SPACE FOR ROUGH WORK

13. $\int (3x^2 + x - 1)^6 (6x + 1)\, dx$ is

(1) $6 (3x^2 + x - 1)^5 + c$

(2) $(3x^2 + x - 1)^6 + c$

(3) $(3x^2 + x - 1)^7 / 7 + c$

(4) $(3x^2 + x - 1)^7 / 21 + c$

14. $\int \tan^{-1} x\, dx$ is

(1) $x \tan^{-1} x - 1/2 \log (1 + x^2) + c$

(2) $x \tan^{-1} x + 1/2 \log (1 + x^2) + c$

(3) $\tan^{-1} x - 1/2 \log (1 + x^2) + c$

(4) $\tan^{-1} x + 1/2 \log (1 + x^2) + c$

15. $\int_0^{\pi/2} \sin 3x \cos 2x\, dx$ is

(1) 3/5

(2) $-3/5$

(3) 5/3

(4) $-5/3$

16. The constant term in the expansion $(x^2 + 1/x)^{12}$ is

(1) -495

(2) 495

(3) 1/495

(4) 945

17. The projection of vector (3, 1, 3) on vector (1, – 2, 1) is

(1) $2\sqrt{6}/5$

(2) $-2\sqrt{6}/3$

(3) $2\sqrt{6}/3$

(4) $-2\sqrt{6}/5$

18. If vector a = (1, 1, 1) and vector b = (2, 2, 1) then magnitude of vector a × b is

(1) $\sqrt{26}$

(2) $\sqrt{28}$

(3) $\sqrt{24}$

(4) 1

SPACE FOR ROUGH WORK

19. The cosine of the angle between the vectors (3, – 1, 1) and vector (1, 1, – 1) is

(1) $1/\sqrt{11}$ (2) $-1/\sqrt{33}$

(3) $1/\sqrt{33}$ (4) $-1/\sqrt{11}$

20. The value of $(\sec^6 x - \tan^6 x)$ is

(1) $1 - 3\sec^2 \times \tan^2 x$

(2) $1 + \tan^2 \times \sec^2 x$

(3) $1 + 3\sec^2 \times \tan^2 x$

(4) $1 - \tan^2 \times \sec^2 x$

21. The equation to the straight line passing through (3, 2) and perpendicular to the line $5x + 2y - 3 = 0$ is

(1) $2x - 5y - 4 = 0$

(2) $2x - 5y + 4 = 0$

(3) $2x + 5y + 4 = 0$

(4) $5x - 2y + 4 = 0$

22. The slope of a line passing through the points (– 4, – 5) and (2, 3) is

(1) 3/4 (2) – 3/4

(3) 4/3 (4) – 4/3

23. The acute angle between the lines $2x - y + 3 = 0$ and $x - 3y + 2 = 0$ is

(1) 30° (2) 60°

(3) 90° (4) 45°

24. The value of $\lim_{n\to\infty} [(3 - n)(4 - n)(2n - 5)] / (4n^3 - 3)$

(1) – 1/2 (2) 1/2

(3) 3/2 (4) – 3/2

SPACE FOR ROUGH WORK

25. The value of $\lim_{x \to -3} (x^4 - 81) / (x^3 + 27)$ is

(1) 3 (2) – 3

(3) 4 (4) – 4

26. $\int_0^2 (x - 1)(x - 2)\, dx$ is

(1) 2/3 (2) – 2/3

(3) 3/2 (4) – 3/2

27. The area bounded by the curve $y = 2x^2$, the x – axis and the ordinates at $x = -1$ and $x = 2$ is

(1) – 6 sq units

(2) 3 sq units

(3) – 3 sq units

(4) 6 sq units

28. The differential equation formed by eliminating a and b from $x + y = ae^x + be^{-x}$ is

(1) $d^2y/dx^2 + y = 0$

(2) $d^2y/dx^2 - y = 0$

(3) $d^2y/dx^2 - x - y = 0$

(4) $d^2y/dx^2 + x - y = 0$

29. The solution of the differential equation $dy/dx = (1 + y^2) / (1 + x^2)$ is

(1) $\tan^{-1} y + \tan^{-1} x + c = 0$

(2) $\log (1 + y^2) + \log (1 + x^2) + c = 0$

(3) $\tan^{-1} y - \tan^{-1} x + c = 0$

(4) $\log (1 + y^2) - \log (1 + x^2) + c = 0$

SPACE FOR ROUGH WORK

30. If $\begin{vmatrix} x+2 & 5 \\ 0 & x-2 \end{vmatrix} = 0$, then x =

(1) 1 (2) 2

(3) 3 (4) 0

31. If x cot 45° cos 60° = sin 60° tan 30° then the value of x is

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

(3) 1/2 (4) 1

32. If tan x = 15/8 and x is in the III quadrant then the value of $(2 \sin x - 3 \cos x) / (2 \cos x + 3 \sin x)$ is

(1) 61/6 (2) – 61/6

(3) – 6/61 (4) 6/61

33. The value of $\{[\sin(2\pi - \theta) + \cos(-\theta)] / [\tan(-\theta) + \cot(2\pi + \theta)]\} - \{[\sin(\pi/2 + \theta) + \cos(3\pi/2 - \theta)] / [\cot(\pi + \theta) + \tan(2\pi - \theta)]\}$ is

(1) 0 (2) – 1

(3) + 1 (4) – 2

34. If sin A = 5/13 and sin B = 4/5 then the value of cos (A – B) is

(1) 65/56 (2) 56/65

(3) 16/65 (4) – 16/65

35. On simplification the value of $(\cos^3 A - \cos 3A) / \cos A + (\sin^3 A + \sin 3A) / \sin A$ is

(1) 3 (2) 1

(3) 2 (4) 0

SPACE FOR ROUGH WORK

36. $d/dx\left(\sqrt{\sin^2 x}\right.$ is

(1) cos x
(2) sin 2x
(3) $\cos^2 x$
(4) $\sqrt{\cos x / \sin x}$

37. $d/dx \tan^{-1} \sqrt{(1-\cos 2x)/(1+\cos 2x)}$ is

(1) 1
(2) 0
(3) tan x
(4) cos x

38. If $y = \sin x^x$ then dy/dx is

(1) x log sin x
(2) cos x^x
(3) sin x^x (x cot x + log sin x)
(4) cos x^x (x tan x + log sec x)

39. $d/dx\left(\sin h^{-1} x\right)$ is

(1) $1/\sqrt{1+x^2}$
(2) $1/\sqrt{1-x^2}$
(3) $1/\sqrt{x^2-1}$
(4) $1/\sqrt{x^2+1}$

40. The equation to the normal to the curve $y = 5x^2 + 4x - 11$ at the point (– 1, 2) is

(1) $x - 6y + 11 = 0$
(2) $x + 6y - 11 = 0$
(3) $6x - y + 11 = 0$
(4) $6x + y - 11 = 0$

SPACE FOR ROUGH WORK

PART – B

It consists of **41 – 80** questions.

41. Which of the following is dimensional physical quantity ?
    (1) pressure
    (2) strain
    (3) mechanical advantage
    (4) sp.gravity

42. The principle of vernier is
    (1) n VSD = (n + 1) MSD
    (2) (n – 1) VSD = n MSD
    (3) n MSD = (n – 1) V SD
    (4) (n – 1) MSD = n VSD

43. A screw gauge has a pitch of $\frac{1}{2}$ mm and 50 division on sleeve. The reading when the jaws touch is +5 division. While gripping a wire the reading is PSR = 3 PSD and HSR = 17, then the diameter of wire is
    (1) 1.62 cm
    (2) 0.162 cm
    (3) 0.162 mm
    (4) 16.2 mm

44. The extension of the material by itself without increase of load takes place
    (1) within elastic limit
    (2) beyond elastic limit
    (3) beyond yield point
    (4) at breaking point

45. If the strain in a wire is 0.1%, then the change in the length of the wire of length 5 m is
    (1) 5×10^{-2} m
    (2) 5×10^{-3} m
    (3) 5×10^{-4} m
    (4) 5×10^{-3} cm

46. A force of 10 N acting on a body fixed at a point the distance from the fixed point to the line of force is 2 m. Then the moment of the force is _____ N-m.
    (1) 0.002
    (2) 0.02
    (3) 2
    (4) 20

SPACE FOR ROUGH WORK

47. By Lami's theorem, P Q R are three forces acting in equilibrium and angle between PR, PQ, QR, are α, β, γ respectively then which of the following is correct ?

(1) $\frac{P}{\sin\beta} = \frac{Q}{\sin\gamma} = \frac{R}{\sin\alpha}$

(2) $\frac{P}{\sin\gamma} = \frac{Q}{\sin\alpha} = \frac{R}{\sin\beta}$

(3) $\frac{P}{\sin\alpha} = \frac{Q}{\sin\beta} = \frac{R}{\sin\gamma}$

(4) $\frac{P}{\sin\alpha} = \frac{Q}{\sin\gamma} = \frac{R}{\sin\beta}$

48. If the line of action of the force passes through the point of rotation, then the moment of force is

(1) Maximum

(2) Less than one

(3) Greater than one

(4) Zero

49. 1 Kilo calorie of heat is equal to _____ joule.

(1) 4.186

(2) 41.86

(3) 418.6

(4) 4186

50. The correct relation between °F and K scale is

(1) $5K = 9 (F - 32)$

(2) $9K = -5(F - 32)$

(3) $K = \frac{9}{5} (F - 32) - 273$

(4) $K = \frac{5}{9} (F - 32) + 273$

51. Two coherent sources 2×10^{-4} m apart are illuminated by the light of wave length 5000×10^{-10}m. The distance between the source and screen is 0.2m, then fringe width is

(1) 0.05×10^{-3} m

(2) 5×10^{-3}m

(3) 0.5×10^{-3}m

(4) 50×10^{-3}m

SPACE FOR ROUGH WORK

52. Resolving power of microscope is

(1) Equal to the resolution of the microscope

(2) Reciprocal to the resolution of the microscope

(3) Reciprocal to the focal length of the microscope

(4) Product of wave length and semi vertical angle

53. Which of the following phenomenon confirm that light is transverse wave ?

(1) Diffraction

(2) Interference

(3) Refraction

(4) Polarization

54. In Field emission

(1) High positive voltage is used

(2) Secondary electrons are used

(3) High energy is used

(4) High radiations are used

55. Which of the following is not true ?

(1) Photoelectric emission is an instantaneous process

(2) Photoelectric emission do not takes place below threshold frequency

(3) The K.E. of the photoelectron depends on the wavelength of incident radiation

(4) Number of photoelectrons emitted is directly proportional to the intensity

56. Poisson's ratio is the ratio of

(1) $\frac{Lateral\ strain}{Linear\ strain}$ (2) $\frac{Linear\ strain}{Lateral\ strain}$

(3) $\frac{Lateral\ strain}{Volume\ strain}$ (4) $\frac{Volume\ strain}{Lateral\ strain}$

SPACE FOR ROUGH WORK

57. The pressure at a depth of 100 m below the surface of water density 1000 kgm^{-3} is

(1) $98 \times 10^5\ Nm^{-2}$ (2) $9.8 \times 10^4\ Nm^{-2}$

(3) $980 \times 10^4\ Nm^{-2}$ (4) $98 \times 10^4\ Nm^{-2}$

58. When two capillary tube of different diameters are dropped vertically in a liquid, the height of the liquid is

(1) More in the tube of larger diameter

(2) More in the tube of smaller diameter

(3) Lesser in the tube of smaller diameter

(4) Same in both the tubes

59. The property by virtue of which a liquid opposes relative motion between its different layers is

(1) Viscosity (2) Elasticity

(3) Surface tension (4) Inertia

60. The maximum amount of force acting for a short duration is known as

(1) Momentum (2) Inertia

(3) Power (4) Impulse

61. Absolute zero is the temperature of a gas at which, the _____ of gas is theoretically zero.

(1) Mass (2) Weight

(3) Volume (4) Density

62. When the particle is in SHM having amplitude ' r ' ,then its velocity is

(1) $v = \omega\ (r^2 - y^2)$ (2) $v = \omega\sqrt{r^2 - y^2}$

(3) $v = r\omega^2$ (4) $v = r\omega^3$

SPACE FOR ROUGH WORK

63. Ripples in water are the example for

(1) Transverse wave

(2) Longitudinal wave

(3) Sound wave

(4) Ultrasonic wave

64. The length of one ventral segment in stationary wave is equal to

(1) Full wavelength of the wave

(2) Twice the wavelength of the wave

(3) Half a wavelength of the wave

(4) Quarter a wavelength of the wave

65. A stretched string under a tension T vibrates with a frequency f. When the tension is increased by 4 times, then the frequency becomes _____

(1) same (2) doubled

(3) tripled (4) zero

66. The appearance of additional frequencies in scattered beam of light is known as

(1) Raman effect

(2) Coherent scattering

(3) Incoherent scattering

(4) Bipolar scattering

67. Two properties of LASER are

(1) Highly monochromatic and extremely intense

(2) Highly chromatic and extremely fast

(3) Very high frequency and extremely high wave length

(4) Very high power and extremely low amplitude

SPACE FOR ROUGH WORK

68. To form a galvanic cell
    (1) difference in concentration of electrolyte is required
    (2) difference in concentration of frequency is required
    (3) difference in concentration of amplitude is required
    (4) both (2) and (3)

69. pH value is not having its application in
    (1) determination of quality of soil
    (2) determination of quality of textile dyes
    (3) determination of quality of chemicals
    (4) determination of quality of electron

70. The prefix "mega" stands for
    (1) 10^3 (2) 10^{-3}
    (3) 10^{-6} (4) 10^6

71. A bullet of mass 0.01 kg is fired from a rifle of mass 20 kg with a speed of 10 m/s , then the recoil velocity of rifle is _____ m/s.
    (1) -1 (2) -0.05
    (3) -200.01 (4) -0.005

72. Final velocity of a body thrown downwards is _____
    (1) Maximum (2) Minimum
    (3) No change (4) Zero

73. A person throws a sand bag from a boat at rest in a pond then boat moves
    (1) In the same direction (2) In the opposite direction
    (3) In a perpendicular direction (4) In circular direction

74. Two equal forces at a point, the square of their resultant is equal to three times the product of the forces. Then the angle between the forces is equal to
    (1) 30° (2) 45°
    (3) 60° (4) 90°

SPACE FOR ROUGH WORK

75. Equilibrant is a force
    (1) Which brings a body in equilibrium
    (2) Which moves the body along the resultant force
    (3) in zig-zag movement of the body
    (4) Which moves the body in opposite direction to equilibrant force

76. The best value of reverberation time for speech listener _____
    (1) 0.5 to 1.5 s
    (2) 0.15 to 0.5 s
    (3) 0.05 to 0.15 s
    (4) 0.5 to 5 s

77. 3 strings of equal lengths but stretched with different tensions are made to vibrate, if their masses per unit length are in the ratio 3:2:1 and frequencies are same then the ratio of the tensions _____
    (1) 1:2:3
    (2) 2:3:1
    (3) 1:3:2
    (4) 3:2:1

78. Newton's formula for velocity of sound was corrected by
    (1) Boyle
    (2) Charles
    (3) Laplace
    (4) Hertz

79. Light waves are composed of both electric and magnetic field is proposed by
    (1) Newton's corpuscular theory
    (2) Huygen's wave theory
    (3) Maxwell's theory of light
    (4) Plank's theory

80. If 'a' and 'b' are the amplitudes of two interfering waves then for destructive interference the amplitude ' R' is
    (1) $R = ab$
    (2) $R = a/b$
    (3) $R = a - b$
    (4) $R = a + b$

SPACE FOR ROUGH WORK

PART – C

It consists of **81-180** questions :

81. Bernoulli's equation for steady , frictionless , continuous flow states that the _____at all sections is same.

(1) total pressure (2) total energy

(3) velocity (4) pressure head

82. Small pressure differences in liquids is measured using an

(1) U-tube manometer (2) inclined tube manometer

(3) pitot tube (4) variable area meter

83. Steady flow occurs when

(1) conditions change steadily with time

(2) conditions are the same at adjacent points at any instants

(3) conditions do not change with time at any point

(4) rate of velocity is constant

84. Reynolds number is ratio of

(1) viscous force to gravity force

(2) inertial force to viscous force

(3) viscous force to inertial force

(4) inertial force to gravity force

85. Cavitation occurs in a centrifugal pump when

(1) the suction pressure < vapour pressure of the liquid

(2) the suction pressure > vapour pressure of the liquid

(3) the suction pressure = vapour pressure

(4) the suction pressure = developed head

SPACE FOR ROUGH WORK

86. The vacuum pump in any compressor which takes suction at pressure _____ atmospheric and discharges at atmospheric pressure.

(1) equal to (2) above

(3) below (4) none of these

87. The _____ pumps are commonly employed in industry for handling viscosity liquids.

(1) gear pumps (2) rotary pumps

(3) plunger pumps (4) centrifugal pumps

88. The head of centrifugal pump _____ continuously as the capacity is decreased.

(1) decreases (2) increases

(3) becomes less (4) becomes more

89. The removal of air from the suction line and pump casing is known as

(1) air binding (2) priming

(3) NPSH (4) suction head

90. In a single effect evaporator, the economy is _____

(1) 1 (2) < 1

(3) > 1 (4) 0

91. In extractive distillation, solvent is added to alter the _____ of the mixture.

(1) viscosity (2) temperature

(3) composition (4) relative volatility

92. Molecular distillation is

(1) high temperature distillation (2) for heat sensitive materials

(3) very low pressure distillation (4) both (2) and (3)

SPACE FOR ROUGH WORK

93. Mc Cabe Thiele- method uses _____ for material and energy balance.

(1) molar units (2) weight fractions

(3) any type of units (4) both (1) and (2)

94. Steam distillation is used to separate _____

(1) azeotropes

(2) high boiling substances from non-volatile impurities

(3) heat sensitive materials

(4) mixtures with low relative volatility

95. Moisture in a substance exerting an equilibrium vapour pressure less than that of pure liquid at the same temperature is called _____ moisture.

(1) bound (2) unbound

(3) critical (4) free

96. 1 bar is almost equal to _____ atmosphere.

(1) 1 (2) 10

(3) 100 (4) 1000

97. 1 gram mole of methane contains

(1) 6.023×10^{23} atoms of hydrogen

(2) 4 gram atoms of hydrogen

(3) 3.01×10^{23} molecules of methane

(4) 3 grams of carbon

98. Number of gram equivalent of solute dissolved in 1 liter of solution is called its _____

(1) normality (2) molarity

(3) molality (4) none of these

SPACE FOR ROUGH WORK

99. The total volume occupied by a gaseous mixture is equal to the sum of the pure component volumes is _____

(1) Dalton's law
(2) Amagot's law
(3) Gas Lussac's law
(4) Avogadro's law

100. In a temperature recorder thermocouple is an example of _____

(1) primary element
(2) secondary element
(3) functioning element
(4) manipulated element

101. When damping co-efficient is unity the system is _____

(1) over damped
(2) critically damped
(3) under damped
(4) highly fluctuating

102. Response of a linear control system for a change in set point is called _____

(1) servo problem
(2) frequency response
(3) regulator problem
(4) transient response

103. A negative gain margin expressed in decibels means _____

(1) a stable system
(2) unstable system
(3) critically damped system
(4) none of these

104. Desirable characteristic of an instrument is _____

(1) high drift
(2) high fidelity
(3) high measuring lag
(4) poor reproducibility

105. Continuous measurement of moisture content of paper in paper industry is done by measuring _____

(1) electric resistance through the paper
(2) thermal conductivity through the paper
(3) magnetic susceptibility
(4) both (2) and (3)

SPACE FOR ROUGH WORK

106. Whether thermo chemical reaction occurs in a single step or in multiple steps, the enthalpy change is constant. This is the _____law.

(1) Laplace-Lavoisier (2) Roult's

(3) Hess's (4) Gibb's

107. The order of a reaction with respect to the given reactant is the power of that reactant's _____, in the experimentally determined rate equation.

(1) nature (2) temperature

(3) concentration (4) pressure

108. Buffers are the solutions which have the property of _____ changes in pH on addition of small amounts of acids or alkalies.

(1) assisting (2) resisting

(3) supporting (4) allowing

109. An aqueous or molten solution which allows electric current to pass through it easily and the solution decomposes into products . The process is known as _____

(1) neutrolysis (2) analysis

(3) synthesis (4) electrolysis

110. The splitting of a compound into two fragments , and carries one electron each , such a fragment is known as _____

(1) free radical (2) cation

(3) anion (4) carbanion

111. Cement clinker is reduced to fine size by

(1) roll crusher (2) ball mill

(3) tube mill (4) hammer mill

112. Mixer used rubber compounding is

(1) mixer-extruder (2) banburry mixer

(3) muller mixer (4) paddle mixer

SPACE FOR ROUGH WORK

113. Size of ultra fine particles can be expressed in terms of

(1) centimeter (2) screen size

(3) micron (4) surface area per unit mass

114. Mesh indicates the number of holes per

(1) square inch (2) linear inch

(3) square foot (4) linear foot

115. Which of the following cannot be recommended for transportation of abrasive material ?

(1) belt conveyor (2) apron conveyor

(3) flight conveyor (4) chain conveyor

116. To handle smaller quantity of fluid at higher discharge pressure, use

(1) reciprocating pump (2) centrifugal pump

(3) volute pump (4) rotary vacuum pump

117. Viscosity of a gas varies _____ with temperature.

(1) exponentially (2) linearly

(3) logarithmically (4) both 1 and 2

118. Pick out the Hagen-Poiseulli's equation

(1) $\Delta P/\rho = 4.f\, L/D\, .V^2/2g_c$ (2) $\Delta P = 32\mu LV/g_c D^2$

(3) $\Delta P/L = 150(1-\varepsilon)/\varepsilon^3.\mu.Vo^2/g_c{}^2.D_p$ (4) $\Delta P = 32\mu L^2V/g_c D$

119. Bernoulli's equation accounts for

(1) various momentums (2) various masses

(3) different forms of mechanical energy (4) different forms of pressure

SPACE FOR ROUGH WORK

120. Enamels and paints are generally

(1) reheopectic (2) pseudo-plastic

(3) thixotropic (4) dilatent

121. Multipass heat exchangers are used _____

(1) because of simplicity of fabrication

(2) for low heat load

(3) to obtain higher heat transfer co-efficient of shorter tube

(4) to reduce the pressure drop

122. In counter flow compared to parallel flow_____

(1) LMTD is greater

(2) less surface area is required for a given heat transfer rate

(3) both (1) and (2)

(4) more surface area is required for a given heat transfer rate

123. Kg of liquid evaporated per hour in an evaporator is defined as _____

(1) capacity (2) economy

(3) steam load (4) rate of evaporation

124. Rate of heat transfer per unit _____ is heat flux.

(1) area (2) length

(3) volume (4) width

125. Fouling factor is _____

(1) a dimensionless quantity

(2) does not provide safety factor for design

(3) accounts for additional resistances to heat flow

(4) accounts for no resistance to heat transfer

SPACE FOR ROUGH WORK

126. Rotary dryers cannot handle _____ materials.

(1) free flowing (2) dry

(3) sticky (4) granular

127. Refractory bricks are usually dried in a _____ drier.

(1) tray (2) tunnel

(3) conveyor (4) festoon

128. Moisture contained by a substance in excess of the equilibrium , moisture is called _____ moisture.

(1) unbound (2) free

(3) critical (4) bound

129. Detergent solution is dried to a powder in a _____

(1) spray drier (2) tunnel drier

(3) tray drier (4) rotary drier

130. pH value of an alkaline solution is

(1) 7 (2) > 7

(3) < 7 (4) constant over wide range

131. On-off control is a special case of _____ control.

(1) PID (2) PD

(3) PI (4) P

132. Thermocouple measures _____

(1) current (2) voltage

(3) flow rate (4) temperature

SPACE FOR ROUGH WORK

133. In ammonia reactor pressure measurement is done by using _____

(1) U-tube manometer (2) Bellow gauge

(3) Bourdon gauge (4) Pirani gauge

134. Analysis of natural gas is done by _____

(1) orsat apparatus (2) spectrometer

(3) chromatography (4) emission spectrometer

135. Emf generated in a thermocouple is of the order of _____

(1) nano volts (2) milli volts

(3) micro volts (4) macro volts

136. Point velocity is measured by using _____

(1) orifice meter (2) venturimeter

(3) pitot tube (4) velocity meter

137. Fluid used in hydraulic controller is _____

(1) water (2) air

(3) steam (4) oil

138. Pressure of 0.01 Psi (absolute) can be measured by _____

(1) ionization gauge (2) pirani gauge

(3) Mcloid gauge (4) bourdon gauge

139. Flapper nozzle is a _____ controller.

(1) pneumatic (2) electronic

(3) hydraulic (4) electric

140. A compound which when dissolved in water yields hydroxyl ions is _____

(1) an acid (2) an alkali

(3) salt (4) non aqueous solution

SPACE FOR ROUGH WORK

141. Cyclic organic compounds with conjugated double bonds are considered as _____ hydrocarbons.

(1) aliphatic (2) aromatics

(3) unsaturated (4) saturated

142. Trivial name of hydroxy benzene is _____

(1) benzyl alcohol (2) toluene

(3) phenol (4) benzaldehyde

143. Petroleum is chiefly _____

(1) alkanes (2) cycloalkanes

(3) aromatics (4) mixture of (1), (2) and (3)

144. Product formed by chlorination of methane in the presence of light are _____ and HCl.

(1) CH_3Cl (2) CH_2Cl_2

(3) $CHCl_3$ (4) All of these

145. Derivatives of benzene are commonly called _____

(1) phenols (2) esters

(3) carotenoids (4) benzenoids

146. Fluid energy mill comes in the category of

(1) grinder (2) crusher

(3) cutting machine (4) ultrafine grinder

147. Which of the following gives the crushing energy required to create new surface ?

(1) Taggarts rule (2) Fick's law

(3) Rittinger's law (4) None of these

SPACE FOR ROUGH WORK

148. For transportation of pasty material , one will use

(1) apron conveyor (2) belt conveyor

(3) screw conveyor (4) bucket conveyor

149. Ultra fine grinders separate principally by

(1) slow compression (2) impact

(3) attrition (4) cutting action

150. Newton's law of viscosity relates _____

(1) shear stress and velocity

(2) velocity gradient and pressure intensity

(3) shear stress and rate of angular deformation

(4) pressure gradient and rate of angular deformation

151. Which of the following is a dimensionless parameter ?

(1) angular velocity (2) specific weight

(3) kinematic viscosity (4) Reynold's number

152. The maximum pressure difference for transportation of gases is produced by

(1) vacuum pumps (2) blowers

(3) fans (4) compressors

153. The co-efficient of discharge of an orifice-meter is a function of

(1) Reynold's number at the orifice

(2) ratio of orifice to pipe diameter

(3) both (1) and (2)

(4) none of the above

SPACE FOR ROUGH WORK

154. _____ can be used for exploring the velocity distribution across the pipe section.

(1) rotameter (2) pitot tube

(3) current meter (4) venturimeter

155. The pressure drop through the globe valve is much _____ than through gate valve.

(1) greater (2) lesser

(3) (1) and (2) (4) none of these

156. S.I. unit of heat flux is _____

(1) W/m (2) W/m^2

(3) W/mK (4) W/m^2K

157. Heat flow mechanism in solids is known as _____

(1) conduction (2) convection

(3) radiation (4) both (2) and (3)

158. Mass transfer co-efficient is defined as _____

(1) Flux = co-efficient x concentration difference

(2) Flux = co-efficient / concentration difference

(3) Flux = concentration difference / co-efficient

(4) Flux = concentration difference + co-efficient

159. Positive deviation from Raoult's law means a mixture whose total pressure is _____

(1) greater than that computed for ideality

(2) less than that computed for ideality

(3) less than the sum of vapour pressures of the components

(4) equal to that computed for ideality

SPACE FOR ROUGH WORK

160. For a binary mixture with low relative volatility_____

(1) use steam distillation

(2) use molecular distillation

(3) use high pressure distillation

(4) an azeotrope may be formed during distillation

161. The quantity of the heat required to evaporate 1 kg of a saturated liquid is called

(1) specific heat (2) 1 K cal

(3) 1 cal (4) latent heat

162. Dry air is a mixture of

(1) vapors (2) gases

(3) both (1) and (2) (4) neither (1) nor (2)

163. Mass number of an atom is the sum of the numbers of

(1) neutrons and protons (2) protons and electrons

(3) neutrons and electrons (4) both (1) and (2)

164. Molality is defined as the number of gram moles of solute per _____ of solvent.

(1) litre (2) kg

(3) gram mole (4) gram

165. The total number of atoms in 8.5 gm of NH_3 is _____ x 10^{23}.

(1) 9.03 (2) 3.01

(3) 1.204 (4) 6.02

166. To measure the temperature of a red hot object we use _____

(1) thermistor (2) thermometer

(3) radiation pyrometer (4) optical pyrometer

SPACE FOR ROUGH WORK

167. Notches are used to measure fluid flow rates in _____

(1) closed channels (2) open channels

(3) vertical pipe lines (4) horizontal pipe lines

168. Flow rate of a liquid containing heavy solids can be best measured by _____

(1) segmental orifice (2) concentric orifice

(3) rotameter (4) eccentric orifice

169. The corrector plate in a vapor pressure thermometer is _____ element.

(1) primary (2) secondary

(3) functioning (4) manipulating

170. Response of a system to a sinusoidal input is called _____

(1) impulse response (2) unit step response

(3) frequency response (4) both (1) and (2)

171. A mole is the amount of substance which contains _____ atoms/molecule/ions.

(1) 6.023×10^{23} (2) 6.022×10^{22}

(3) 6.23×10^{22} (4) 6.23×10^{23}

172. A gas law which relates the volume of a gas to the number of molecules of the gas is _____

(1) Avogadro's law (2) Boyle's law

(3) Charle's law (4) Gay – Lussac's law

173. The process due to which an acid completely reacts with a base is known as _____

(1) oxidation (2) reduction

(3) neutralization (4) combustion

SPACE FOR ROUGH WORK

174. A solution whose pH below 7 is _____

(1) blood (2) milk

(3) lime water (4) ammonia solution

175. Amount of heat absorbed or liberated when diamond is converted into graphite then the enthalpy of _____ is considered.

(1) formation (2) solution

(3) combustion (4) transition

176. The characteristic functional group for addition reaction is _____

(1) single bond (2) double bond

(3) triple bond (4) multiple bond

177. Two and more organic compounds having same molecular formula but different structure due to presences of same substituents are _____ isomers.

(1) chain (2) functional

(3) optical (4) position

178. For obtaining an instant temperature _____ is used along with oxygen.

(1) methane (2) ethane

(3) ethyne (4) benzene

179. When acetylene gas is passed through a red hot tube _____ is produced.

(1) methane (2) ethane

(3) ethyne (4) benzene

180. For coarse reduction of hard solids , use

(1) impact (2) attrition

(3) compression (4) cutting

SPACE FOR ROUGH WORK

CH

32

A-2