DIPLOMA - COMMON ENTRANCE TEST-2017

BT	COURSE	DAY : SUNDAY DATE : 02-07-2017
	BIOTECHNOLOGY	TIME : 10.00 a.m. to 1.00 p.m.

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 - 1	234009

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 09.50 a.m.**
3. The Serial Number of this question booklet should be entered on the OMR answer sheet and the respective circles should also be shaded completely.
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 10.00 a.m., till then;**
   - Do not remove the paper seal / polythene bag of this question booklet.
   - Do not look inside this question booklet.
   - Do not start answering on the OMR answer sheet.

CONFIDENTIAL

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 / 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 BALL POINT 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 :

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. Handover 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.**

PART – A

APPLIED SCIENCE

1. The S.I. unit of Coefficient of Viscosity is

   (A) Poise (B) NSm^{-2}

   (C) $NS^{-1}m^2$ (D) $NS^{-1}m^{-2}$

2. The prefix used for 10^{+9} is

   (A) Mega (B) Tera

   (C) Giga (D) Hecta

3. The physical quantity which has the dimensional formula $[ML^0T^{-2}]$ is

   (A) Force (B) Surface tension

   (C) Viscosity (D) Work

4. The least count of slide callipers is given by

   (A) 1 MSD + 1 VSD (B) 1 MSD × 1 VSD

   (C) 1 MSD – 1 VSD (D) $\frac{1\text{ MSD}}{1\text{ VSD}}$

5. The product of force and time is

   (A) Momentum (B) Moment

   (C) Impulse (D) Acceleration

6. The change in position of a particle in a particular direction is referred to as

   (A) Speed (B) Displacement

   (C) Velocity (D) Acceleration

Space For Rough Work

7. The equation of motion of a body for distance travelled 'S_n' in the 'n^{th}' second is given by

(A) $S_n = u + \frac{a}{2}(2n-1)$ (B) $S_n = u - \frac{a}{2}(2n-1)$

(C) $S_n = u + \frac{a}{2}(2n+1)$ (D) $S_n = u - \frac{a}{2}(2n+1)$

8. A bullet of mass 0.01 kg is fired with a velocity of 960 ms^{-1} from a rifle of mass 3 kg, the velocity of recoil of rifle is

(A) $-320\,ms^{-1}$ (B) $-0.32\,ms^{-1}$

(C) $-3.2\,ms^{-1}$ (D) $-32\,ms^{-1}$

9. One of the following is not a scalar quantity :

(A) Mass (B) Density

(C) Force (D) Speed

10. If a body fixed about a point rotates in clockwise direction, the moment of force is measured as

(A) Positive (B) Negative

(C) Zero (D) Equal

11. The resultant magnitude of two forces P and Q acting in same line and in same direction is

(A) $P - Q$ (B) $P + Q$

(C) $Q - P$ (D) $\frac{P}{Q}$

Space For Rough Work

12. The resultant magnitude of two forces 6 N and 8 N acting at right angles to each other is

(A) 100 N (B) 10 N

(C) 48 N (D) 14 N

13. The value of resultant magnitude of two forces acting at a point is maximum, when the angle between the two forces is

(A) 0° (B) 90°

(C) 180° (D) 45°

14. Rise of liquid in a capillary tube is due to

(A) Energy (B) Viscosity

(C) Surface tension (D) Pressure

15. The ratio of volume stress to volume strain is called

(A) Bulk modulus (B) Young's modulus

(C) Rigidity modulus (D) Poisson's ratio

16. The reciprocal of bulk modulus of elasticity is called

(A) Compressibility (B) Rigidity

(C) Plasticity (D) Modulus of elasticity

17. The force of cohesion is maximum in

(A) Solids (B) Gases

(C) Liquids (D) Plasma

Space For Rough Work

18. The value of surface tension is 80 dyne/cm. What will be its value in Nm^{-1} ?

(A) $8 \times 10^{2}\ Nm^{-1}$ (B) $80\ Nm^{-1}$

(C) $8 \times 10^{-2}\ Nm^{-1}$ (D) $8 \times 10^{3}\ Nm^{-1}$

19. Pressure at the bottom of a container having base area of $10\ m^2$ filled with water to a height of 10 m is

(A) 9.8×10^{4} Pa (B) 980×10^{4} Pa

(C) 9.8×10^{-4} Pa (D) 980×10^{-4} Pa

20. 100 °C when expressed in absolute scale is

(A) 100 K (B) 0 K

(C) 273 K (D) 373 K

21. Gas law which gives the relation between pressure and volume changes is

(A) Boyle's law (B) Charles' law

(C) Gay-Lussac's law (D) Hooke's law

22. Amount of heat required to raise the temperature of one gram of water through 1 °C is

(A) Heat capacity (B) Conductivity

(C) Calorie (D) Joule

23. An example of longitudinal wave is

(A) Sound waves (B) Waves on the surface of water

(C) Light waves (D) Electromagnetic waves

Space For Rough Work

24. The relation between velocity of sound v, and absolute temperature T is

(A) $v \propto T$ (B) $v \propto \frac{1}{T}$

(C) $v \propto \sqrt{T}$ (D) $v \propto T^2$

25. The distance between a node and the next antinode in a stationary wave is equal to

(A) one wavelength (B) half wavelength

(C) twice wavelength (D) one fourth wavelength

26. Damage caused by marching military columns to the suspension bridge is due to

(A) Echo (B) Resonance

(C) Beats (D) Interference

27. During forced vibrations, if the forced frequency is F_1 and natural frequency is F_2, the body resonates if

(A) $F_1 > F_2$ (B) $F_2 > F_1$

(C) $F_1 = 2.5\, F_2$ (D) $F_1 = F_2$

28. The fundamental frequency of transverse vibrations of the stretched string is inversely proportional to

(A) tension (B) length of string

(C) square root of tension (D) square root of length of string

29. Minimum length of a hall to produce an echo is

(A) 50 m (B) 34 m

(C) 25 m (D) 17 m

Space For Rough Work

30. The property of light that Huygen's wave theory could explain is

(A) Polarisation (B) Photoelectric effect

(C) Interference (D) Compton effect

31. The spectrum of black body radiation is successfully explained by

(A) Newton's corpuscular theory of light

(B) Huygen's wave theory of light

(C) Maxwell's electromagnetic theory of light

(D) Planck's quantum theory of light

32. For constructive interference of light, the path difference should be

(A) $\frac{2n\lambda}{2}$ (B) $(2n+1)\frac{\lambda}{2}$

(C) $(2n+1)\frac{\lambda}{3}$ (D) $(2n+1)\frac{\lambda}{4}$

33. Two very close objects are just resolved if the central maximum of one object is on

(A) central maximum of another

(B) first minimum of another

(C) beyond second minimum of another

(D) between central maximum and first minimum of another

34. The light is incident at polarising angle θ_p and the angle of refraction is r, then

(A) $\theta_p + r = 0°$ (B) $\theta_p + r = 90°$

(C) $\theta_p + r = 180°$ (D) $\theta_p + r = 360°$

Space For Rough Work

35. Minimum energy required to remove an electron from the metal surface is called

(A) Kinetic energy (B) Potential energy

(C) Work function (D) Energy function

36. When the size of the scattering particle is small, the intensity of scattered light is inversely proportional to

(A) fourth power of wavelength (B) square of wavelength

(C) square root of wavelength (D) cube of wavelength

37. Time for which an atom stays in metastable state is of the order of

(A) Seconds (B) Milli-seconds

(C) Micro-seconds (D) Nano-seconds

38. If an element emits β-ray then its atomic number

(A) increases by one (B) decreases by one

(C) remains same (D) decreases by two

39. If the concentration of H^+ ions is more than 10^{-7} gm ion per litre, the solution is

(A) Base (B) Acid

(C) Neutral (D) Both Acid and Base

40. A galvanic cell is one in which

(A) chemical energy produce electric energy

(B) electric energy produce chemical energy

(C) chemical energy will not produce electric energy

(D) electric energy will not produce chemical energy

Space For Rough Work

PART – B

APPLIED MATHEMATICS

41. The value of x if $\begin{vmatrix} 1 & 2 & 3 \\ 2 & x & 3 \\ 3 & 4 & 3 \end{vmatrix} = 0$ is

(A) 0 (B) –3

(C) 3 (D) 18

42. The value of x, if $4x + y = 7$, $3y + 4z = 5$ and $3z + 5x = 2$ is

(A) 0 (B) 1

(C) 3 (D) –1

43. If $A = \begin{bmatrix} 2 & -1 \\ 3 & -4 \end{bmatrix}$, then A^{-1} is

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

(C) $-\frac{1}{11}\begin{bmatrix} -4 & -3 \\ 1 & 2 \end{bmatrix}$ (D) $-\frac{1}{11}\begin{bmatrix} -4 & 1 \\ -3 & 2 \end{bmatrix}$

44. The characteristic equation of the matrix $A = \begin{bmatrix} 2 & -1 \\ 5 & -6 \end{bmatrix}$ is

(A) $A^2 + 8A - 7I = 0$ (B) $A^2 + 4A - 17I = 0$

(C) $A^2 + 4A + 7I = 0$ (D) $A^2 + 4A - 7I = 0$

Space For Rough Work

45. If $\begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix} + A = \begin{bmatrix} 5 & 1 \\ 3 & 2 \end{bmatrix}$, then A is

(A) $\begin{bmatrix} 3 & 2 \\ -2 & 0 \end{bmatrix}$ (B) $\begin{bmatrix} 3 & -2 \\ 2 & 0 \end{bmatrix}$

(C) $\begin{bmatrix} -2 & 3 \\ 2 & 0 \end{bmatrix}$ (D) $\begin{bmatrix} 0 & 3 \\ -2 & 2 \end{bmatrix}$

46. The middle term of the expansion of $\left(x^2 - \frac{2}{x}\right)^{24}$ is

(A) ${}^{24}C_{10}2^{10}x^{12}$ (B) ${}^{24}C_{11}2^{12}x^{12}$

(C) ${}^{24}C_{13}2^{10}x^{10}$ (D) ${}^{24}C_{12}2^{12}x^{12}$

47. The term independent of x in $\left(x^2 - \frac{4}{3x}\right)^9$ is

(A) ${}^9C_6(4)^6$ (B) ${}^9C_6(3)^{-6}$

(C) ${}^9C_6\left(\frac{4}{3}\right)^6$ (D) ${}^9C_6\left(\frac{3}{4}\right)^6$

48. If $3i - 2j + k$, $i - 3j + 5k$, $2i + j - 4k$ are the sides of a triangle, then the triangle is

(A) Right angled triangle (B) Equilateral triangle

(C) Isosceles triangle (D) Isosceles right angled triangle

49. If $\vec{a} = (2, -1, 4)$ and $\vec{b} = (2, -3, 4)$, then projection of $\vec{a}$ on $\vec{b}$ is

(A) $\frac{23}{\sqrt{21}}$ (B) $\frac{23}{\sqrt{29}}$

(C) $\frac{-23}{\sqrt{29}}$ (D) $\frac{-23}{\sqrt{21}}$

Space For Rough Work

50. The sine of the angle between the vectors $(2i - 2j + k)$ and $2i + j + 2k$ is

(A) $\frac{\sqrt{65}}{3}$ (B) $\frac{\sqrt{65}}{\sqrt{3}}$

(C) $\frac{\sqrt{65}}{9}$ (D) $\sqrt{65}$

51. If $x \sin^2 45 = \frac{\tan^2 45 + \cot^2 30}{\sin^2 45 + \cos^2 45}$ then the value of x is

(A) 4 (B) 2

(C) 6 (D) 8

52. The value of $\frac{4}{3}\sec^2 \frac{\pi}{3} - \text{cosec}^2 \frac{\pi}{6} + \frac{3}{4}\tan^2 \frac{\pi}{4} - 2\sin^2 \frac{\pi}{3}$ is

(A) $-\frac{11}{12}$ (B) $\frac{53}{12}$

(C) $\frac{7}{12}$ (D) $-\frac{7}{12}$

53. The value of

$$\frac{\sin(90-\theta)}{\cos(360-\theta)} + \frac{\sec\left(\frac{3\pi}{2}+\theta\right)}{\text{cosec}(\pi+\theta)} + \frac{\tan(180-\theta)}{\tan(-\theta)} \text{ is}$$

(A) 1 (B) –1

(C) 3 (D) 2

54. The value of cosec 43 cot 43 cot 47 cos 47

(A) 1 (B) 0

(C) –1 (D) 2

Space For Rough Work

55. The value of $\frac{\tan 69^\circ + \tan 66^\circ}{1 - \tan 69^\circ \tan 66^\circ}$

(A) 1 (B) -1

(C) 0 (D) ∞

56. If $\tan \frac{A}{2} = x$ then sin A + tan A is

(A) $\frac{4x}{1-x^2}$ (B) $\frac{4x}{1+x^2}$

(C) $\frac{4x}{1+x^4}$ (D) $\frac{4x}{1-x^4}$

57. The value of $\sin 70^\circ - \sin 50^\circ - \sin 10^\circ$ is

(A) 1 (B) 0

(C) -1 (D) $\frac{1}{2}$

58. $\sin^{-1} x$ is also equal to

(A) $\text{cosec}^{-1}\left(\frac{1}{x}\right)$ (B) $\text{cosec}\, x$

(C) $\text{cosec}^{-1} x$ (D) $\frac{1}{\sin x}$

59. Centroid divides the median in the ratio

(A) 2 : 1 (B) 1 : 2

(C) 1 : 1 (D) 1 : 4

60. The co-ordinates of a point which divides the line join of the points (a + b, a − b) and (a − b, a + b) in the ratio 2 : 3 is

(A) $\frac{5a+5b}{5}, \frac{5a-5b}{5}$ (B) $\frac{a+b}{5}, \frac{a-b}{5}$

(C) $\frac{5a+b}{5}, \frac{5a-b}{5}$ (D) $\frac{5a-b}{5}, \frac{a+5b}{5}$

Space For Rough Work

61. The equation of straight line whose intercepts are 3 and 5 on the axes is

(A) $5x - 3y = 15$ (B) $5x + 3y = 15$

(C) $5x + 3y = 1$ (D) $15x + 15y = 1$

62. The angle between the lines whose slopes are $\sqrt{3}$ and $\frac{1}{\sqrt{3}}$ respectively is

(A) $\frac{\pi}{6}$ (B) $\frac{\pi}{3}$

(C) $\frac{\pi}{4}$ (D) $\frac{\pi}{2}$

63. The equation of the straight line passing through (2, 3) and x intercept is twice its y intercept is

(A) $x + 2y = 8$ (B) $x - 2y = 8$

(C) $x + y = 4$ (D) $2x + 2y = 8$

64. The equation to the line passing through the point (–6, 7) and parallel to the line joining (3, 4) and (6, –8) is

(A) $4x + y + 31 = 0$ (B) $x + 4y - 1 = 0$

(C) $x - 4y + 1 = 0$ (D) $4x + y + 17 = 0$

65. $\lim_{0 \to \pi/2} (\sec\theta - \tan\theta)$ is equal to

(A) 0 (B) 1

(C) $\frac{\pi}{2}$ (D) π

66. $\lim_{x \to 4} \frac{x - 4}{3 - \sqrt{13 - x}}$ is equal to

(A) 3 (B) 9

(C) 6 (D) 0

Space For Rough Work

67. If $y = (1 + \log x)^5$, then $\frac{dy}{dx}$ is

(A) $5(\log x)^4$ (B) $\frac{5}{x}(1 + \log x)^4$

(C) $5(1 + \log x)^4$ (D) $5x^4 \log x$

68. If $x = \cos^{-1} t$ and $y = \sin^{-1} t$, then $\frac{dy}{dx}$ is

(A) -1 (B) 1

(C) $\frac{1}{2\sqrt{1-t^2}}$ (D) $\frac{2}{\sqrt{1-t^2}}$

69. If $y = x \log y$, then $\frac{dy}{dx}$ is

(A) $\frac{\log x^x}{x - y}$ (B) $\frac{\log y^x}{x - y}$

(C) $\frac{\log y^y}{x - y}$ (D) $\frac{\log y^y}{y - x}$

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

(A) $\frac{1}{(x+2)^2}$ (B) $\frac{2x+3}{(x+2)^2}$

(C) $-\frac{1}{(x+2)^2}$ (D) $\frac{2x-3}{(x+2)^2}$

71. The equation of tangent to the curve $y^2 = 4x$ at (1, 2) is

(A) $x + y - 3 = 0$ (B) $x - y + 1 = 0$

(C) $2x - y = 0$ (D) $2x + y - 4 = 0$

Space For Rough Work

72. The maximum value of $7 - 8x - 2x^2$ is

(A) 15 (B) -4

(C) -2 (D) 31

73. The value of $\int \log 2x \, dx$ is

(A) $x \log 2x + x + C$ (B) $x \log 2x - x + C$

(C) $\frac{1}{2x} + C$ (D) $\frac{1}{x} + C$

74. The value of $\int \sec^4 x \cdot \tan x \, dx$

(A) $\frac{\sec^4 x}{4} + C$ (B) $4 \sec^4 x + C$

(C) $3 \sec^2 x + C$ (D) $\frac{\tan^4 x}{4} + C$

75. The value of $\int x \log x \, dx$ is

(A) $\frac{x^2}{2} \log x - \frac{x^2}{2} + C$ (B) $\frac{x^2}{2} \log x + \frac{x^2}{2} + C$

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

76. $\int_0^{\pi/4} \tan^2 x \, dx$ is equal to

(A) $\frac{\pi}{4} - 1$ (B) $1 - \frac{\pi}{4}$

(C) $\frac{\pi^2}{16}$ (D) $\frac{\pi^2}{16} - 1$

Space For Rough Work

77. The value of $\int_0^1 x\sqrt{1-x^2}\,dx$ is

(A) $-\frac{1}{3}$ (B) 0

(C) ∞ (D) $\frac{1}{3}$

78. The volume generated by revolving the line $y = x + 1$ about the x-axis between the ordinates $x = 0$ and $x = 2$

(A) $\frac{26\pi}{3}$ units (B) $\frac{10\pi}{3}$ units

(C) $\frac{26}{3}$ units (D) 4 units

79. The degree and order of the differential equation $\frac{d^2y}{dx^2} = \left[1+\left(\frac{dy}{dx}\right)^2\right]^{1/3}$ are

(A) 2 and 1 (B) 1 and 2

(C) 3 and 2 (D) 2 and 3

80. The solution of differential equation $\frac{dy}{dx} + y\tan x = \sec x$ is

(A) $y\sec x = \tan x + C$

(B) $y\sin x = \sec x + C$

(C) $\log(\sec x) = \tan x + C$

(D) $y\sec x = -\cot x + C$

Space For Rough Work

PART – C

BIOTECHNOLOGY

81. An example for a neutral buffer is

(A) ammonium hydroxide and ammonium chloride

(B) acetic acid and ammonium hydroxide

(C) acetic acid and sodium acetate

(D) citric acid and sodium citrate

82. Noble gases are generally unreactive because they

(A) have stable outer electron shells (B) are not abundant

(C) have large atomic size (D) are monatomic

83. Chemical bond implies

(A) attraction

(B) attraction or repulsion

(C) repulsion

(D) attraction or repulsion balanced at a particular distance

84. The maximum number of electrons that can be accommodated in a quantum shell is

(A) n (B) n^2

(C) $2n^2$ (D) $n(n + 1)$

85. Which of the following organic compounds answers to both iodoform test and Fehling's test ?

(A) Ethanol (B) Methanol

(C) Propanone (D) None

Space For Rough Work

86. The first amino acid in a polypeptide chain is

(A) Serine (B) Valine

(C) Alanine (D) Methionine

87. α-maltose consists of

(A) one α-D-glucopyranose unit and one β-D-glucopyranose unit with 1-2 glycosidic linkage

(B) two α-D-glucopyranose units with 1-2 glycosidic linkage

(C) two β-D-glucopyranose units with 1-4 glycosidic linkage

(D) two α-D glucopyranose units with 1-4 glycosidic linkage

88. If position of functional group varies in each of its isomer then it is

(A) position isomerism (B) functional group isomerism

(C) chain isomerism (D) All of them

89. A chemical substance that acts as an immediate source of energy for many biological reactions is

(A) Protein (B) Glucose

(C) Adenosine triphosphate (D) Adenosine monophosphate

90. A Kinase is an enzyme that

(A) removes phosphate groups of substrates

(B) uses ATP to add a phosphate group to the substrate

(C) uses NADH to change the oxidation state of the substrate

(D) removes water from double bond

91. Globular proteins is present in

(A) Blood (B) Milk

(C) Eggs (D) All of these

Space For Rough Work

92. Phagocytosed food is digested with the help of enzyme are present in

(A) Ribosome (B) Lysosome

(C) Mitochondria (D) Golgi complex

93. During meiosis, chiasmata are observed at

(A) Pachytene (B) Diplotene

(C) Leptotene (D) Diakinesis

94. Gene mutation occurs at the time of

(A) DNA repair (B) DNA replication

(C) Cell division (D) RNA transcription

95. Downs syndrome is characterised by

(A) 19 trisomy (B) 21 trisomy

(C) only one X chromosome (D) two X and one Y chromosome

96. The membrane bound organell present in both Eukaryotes and Prokaryotes is/are

(A) Endoplasmic reticulum (B) Ribosome

(C) Nucleus (D) Golgi apparatus

97. Corn flour-sugar solutions are example for _____ type of fluids.

(A) Pseudoplastic (B) Thixotropic

(C) Dilatent (D) Rheopectic

98. If the vapour pressure of benzene is 108.12 kPa and vapour pressure of toluene is 41.863 kPa at 355.9 K, then relative volatility is

(A) 2.18 (B) 2.38

(C) 2.58 (D) 2.78

Space For Rough Work

99. Tendency of the liquid to segregate towards the walls and to flow along the walls is termed as _____

(A) flooding (B) weeping

(C) channeling (D) condensing

100. Colburn analogy shows the relation between _____ & _____.

(A) heat transfer; mass transfer (B) heat transfer; fluid friction

(C) mass transfer; fluid friction (D) heat transfer; momentum transfer

101. Water enters the heat exchanger at 328 K & leaves at 358 K. Hot gases enter at 578 K & leave at 433 K. If the total heat transfer area is 500 m^2 and the overall heat transfer co-efficient is 700 $W/m^2 K$, total heat transfered for counter current flow of two fluids is _____

(A) 60×10^6 W (B) 58.7×10^6 W

(C) 54.42×10^6 W (D) 40.2×10^6 W

102. Introduction of DNA into cells by exposing to high voltage electric pulse is

(A) electrofusion (B) electrofission

(C) electrolysis (D) electroporation

103. Among the two strands of DNA, the one that contains gene is called the coding strand. The other one, which is complementary to the coding strand is called the template strand. The template strand directs the synthesis of complementary strand of RNA, called the messenger RNA. This process is called

(A) translation (B) transcription

(C) replication (D) mutation

104. Which of the following is a thermostable DNA polymerase ?

(A) Taq polymerase (B) Vent polymerase

(C) Pfu polymerase (D) All of these

Space For Rough Work

105. Each of the following events involves recombination of DNA except

(A) Conjugation

(B) Transduction of a chromosomal gene

(C) Transposition of a mobile genetic element

(D) Integration of a temperate bacteriophage

106. Which of the following biomolecule has self repair mechanism ?

(A) DNA, RNA and Protein (B) DNA and RNA

(C) DNA only (D) DNA and proteins

107. Which of the following bacterium is considered as a 'natural genetic engineer' ?

(A) Agrobacterium tumefaciens (B) Agrobacterium radiobactor

(C) Pseudomonas putida (D) Thermus aquaticus

108. The role of a metabolite that controls a repressible operon is to

(A) bind to the promoter region and decrease the affinity of RNA polymerase for the promoter.

(B) bind to the operator region and block the attachment of RNA polymerase to the promoter.

(C) bind to the repressor protein and inactive it.

(D) bind to the repressor protein and activate it.

109. This protein is produced by a regulatory gene :

(A) Inducer (B) Promoter

(C) Repressor (D) Corepressor

110. Components with small 'k' value have greater affinity towards

(A) mobile phase (B) stationary phase

(C) no phase (D) both mobile & stationary phase

Space For Rough Work

111. In SDS-PAGE, separation is based on

(A) Molecular weight (B) Shape

(C) Charge (D) All of these

112. Technique electrophoresis for the separation of charged particles was developed by

(A) Tswett (B) Svedberg

(C) Tiselius (D) Sanger

113. Common type of gel used for DNA separation is

(A) Agar (B) Polyacrylamide

(C) Agarose (D) All of these

114. Electrophoresis of histones and myoglobin under denaturing conditions (pH=7) results in

(A) both proteins migrate to the anode.

(B) histones migrate to the anode & myoglobin migrates to the cathode.

(C) histones migrate to the cathode & the myoglobin migrates to the anode.

(D) both proteins migrate to the cathode.

115. Bacterial chromosome is

(A) single stranded and circular (B) double stranded and circular

(C) single stranded and linear (D) double stranded and linear

116. Which of the following methods will not sterilize ?

(A) Aqueous glutaraldehyde for 10 hours

(B) Dry heat at 171 °C for 1 to 2 hrs.

(C) 121 °C at 15 lb/in pressure for 15 to 20 minutes.

(D) 100 °C boiling water for 30 minutes

117. Fungi are virtually the only organisms capable of breaking down

(A) Cellulose (B) Lignin

(C) Chitin (D) Starch

Space For Rough Work

118. Cell wall shows

(A) Semi permeability (B) Complete permeability

(C) Differential permeability (D) Impermeability

119. The formation of mating pair during the process of conjugation in E. coli requires

(A) Transfer of both strands of DNA (B) Sex pilus

(C) Restriction endonuclease (D) Lysis of the donor

120. Fungi are different from plants because fungi

(A) are heterotrophs (B) have cellwall made of chitin

(C) have filamentous bodies (D) All of these

121. Most light microscope contain a/an _____ that converges the light beam so that it passes through the specimen.

(A) ocular lens (B) objective lens

(C) condenser (D) iris diaphragm

122. Blue Green algae are used as biofertilizer in

(A) rice field (B) sugarcane field

(C) wheat field (D) coconut plants

123. The process of converting environmental pollutants into harmless products by naturally occurring microbes is called

(A) exsitu bioremediation (B) intrinsic bioremediation

(C) extrinsic bioremediation (D) None of these

124. Chemical substances used to destroy weeds in crops

(A) herbicides (B) monoxides

(C) carbo-oxides (D) pesticides

Space For Rough Work

125. The form of nitrogen that is most usable in plants is

(A) Nitrate (B) Nitrite

(C) Molecular nitrogen (D) Ammonia

126. All the following are examples of negative symbiosis except

(A) amensalism (B) competition

(C) predation (D) commensalism

127. Fluoride is also added to water, which helps prevent

(A) infection (B) sickness

(C) fever (D) tooth decay

128. Azolla is used as biofertilizer as it has

(A) Rhizobium (B) Cyanobacteria

(C) Mycorrhiza (D) Large quantity of humus

129. Mast cells have receptor for

(A) Ig E (B) Ig A

(C) Ig G (D) Ig M

130. Which antibody is known to responsible for allergic reaction ?

(A) Ig M (B) Ig A

(C) Ig E (D) Ig D

131. Haematopoietic stem cells are found in

(A) skin (B) spleen

(C) bone marrow (D) payers patches

132. Innate immunity involves all except

(A) Anatomic barriers (B) Phagocytic

(C) Inflammatory mechanism (D) Antibody production

Space For Rough Work

133. Kupffer cells are macrophages found on

(A) Lungs (B) Bones

(C) Nephrons (D) Liver

134. The bonds involved in Antigen-antibody reaction are

(A) weak hydrogen bonds and van der Waals forces

(B) strong covalent bonds

(C) strong disulphide bonds

(D) All of these

135. When energy depleted elements associated with a proton are accepted by an organic molecule, the process is known as _____

(A) Fermentation (B) Respiration

(C) Anabolism (D) Catabolism

136. Final electron acceptor in lactic acid fermentation is

(A) Oxygen (B) Lactic acid

(C) Pyruvate (D) NAD

137. Biomass determination methods includes

(A) Turbidometric method (B) Measurement of dry weight

(C) Estimation of cell constituents (D) All of these

138. Growth rate is the reciprocal of

(A) generation time (B) number of generations per time

(C) doubling rate (D) All of these

139. Erythromycin is produced by a strain of

(A) Streptomyces lincolensis (B) Streptomyces erythreus

(C) Streptococcus pyogenes (D) Streptococcus aureus

Space For Rough Work

140. Load cells are used for the measurement of

(A) stress (B) strain

(C) weight (D) velocity

141. Rate constant of a first order reaction depends on

(A) time (B) temperature

(C) concentration of reactant (D) concentration of product

142. Food spoilage is due to

(A) Growth of micro organisms like bacteria, fungus or insects

(B) Autolysis

(C) Oxidation by air that causes rancidity or colour changes

(D) All of these

143. Before drying, vegetables should be _____

(A) blanched (B) salted

(C) sulfured (D) autoclaved

144. Food additive that prevents colour and flavour loss

(A) enzyme (B) ascorbic acid

(C) yeast (D) fruit butter

145. Most spoilage bacteria grows at

(A) Acidic pH (B) Alkaline pH

(C) Neutral pH (D) Any of the pH

146. Yoghurt is made from

(A) Lactobacillus bulgaricus (B) Streptococcus thermophillus

(C) S. Cremoris (D) Mixed culture of (A) & (B)

Space For Rough Work

147. Milk contains 87% water & rest is solids & fats. Which of the following is not included as milk solid ?

(A) Protein (B) Water

(C) Carbohydrate (D) Milk fat

148. Primary milk carbohydrate is

(A) Leucine (B) Sucrose

(C) Arginine (D) Lactose

149. Ocular administration involves the treatment of

(A) Skin (B) Eyes

(C) Ears (D) Lungs

150. Lactose is used as

(A) Diluent (B) Glidant

(C) Lubricant (D) Disintegrant

151. Name two different types of inhaler.

(A) MDI & API (B) IV & SC

(C) DPI & MDI (D) GIT & ATP

152. Nasal Administration is commonly used for the relief of

(A) Head ache (B) Cough

(C) Sore throat (D) Congestion

153. Which of the following polymer is widely used in film coating of tablets ?

(A) Acacia (B) Syrup

(C) HPMC (D) Starch

Space For Rough Work

154. Sweetening agent commonly used in chewable tablet formula is

(A) Sucrose (B) Mannitol

(C) Lactose (D) Saccharin Sodium

155. Lamination is

(A) separation of a tablet into two or more distinct layers

(B) process of sub-coating of tablets

(C) Both separation of a tablet into two or more distinct layers & process of sub-coating of tablets

(D) None of these

156. In sugar coating of tablets, sealcoat is done

(A) to prevent moisture deposition

(B) to round the edge & build tablet size

(C) to smoothen the surface

(D) to prevent the tablet from breaking due to vibration

157. Pure carbon monoxide with 100% excess air is completely burned at constant pressure. Reactants was initially at 400 K. Standard heat of reaction at 298 K is 283.028 kJ per mole carbon dioxide burned. Mean specific heats applicable in the temperature range are 29.1, 29.7, 29.1 & 41.45 J/mol K for CO, O_2, N_2 and CO_2. If the products leave at 600 K, difference in the heat is _____

(A) + 240.15 kJ (B) – 240.15 kJ

(C) + 250.14 kJ (D) – 250.14 kJ

158. A reactor is supplied with 10 moles of CH_4 and 10 moles of O_2, if the extent of reaction is 3, what is the moles of CO_2 produced ?

(A) 3 (B) 6

(C) 8 (D) 12

Space For Rough Work

159. 20 kg of sodium hydroxide is dissolved in 1000 kg of water, mole percent of sodium hydroxide is _____

(A) 1% (B) 0.5%

(C) 0.89% (D) 0.7%

160. Assuming that carbon dioxide obeys the perfect gas law, density of carbon dioxide in kg/ m^3 at 536 K & 202.6 kPa is

(A) 1 (B) 2

(C) 3 (D) 4

161. Ideal gas law is applicable at

(A) low T, low P (B) high T, high P

(C) low T, high P (D) high T, low P

162. Cell lysis is an important operation if product is

(A) Extracellular (B) Heat labile

(C) Toxic (D) Intracellular

163. In case of mammalian cell culture, transformation means

(A) uptake of new genetic material

(B) phenotypic modifications of cells in culture

(C) both uptake of new genetic material & phenotypic modifications of cells in culture

(D) release of genetic information

164. Application of extraction in bioprocessing

(A) Purification of antibodies (B) Lipids

(C) DNA (D) All of these

165. Ethanol is oxidized to acetic acid aerobically by

(A) Acetobacter

(B) Gluconobacter

(C) Both Acetobacter & Gluconobacter

(D) Lactobacillus

Space For Rough Work

166. Rate of centrifugation is specified by

(A) Angular velocity (B) Linear velocity

(C) Downward velocity (D) None of these

167. Product enrichment techniques includes

(A) Use of salts (B) Organic solvents

(C) Polyelectrolytes (D) All of these

168. Purification and recovery of product after fermentation is by

(A) upstream processing (B) downstream processing

(C) surface fermentation (D) submerged fermentation

169. Methods of precipitation follows

(A) Polyethylene glycol (B) Triazine dyes

(C) Ammonium & sodium sulphate (D) All of these

170. Enzyme that joins the ends of two strands of nucleic acid is

(A) Polymerase (B) Ligase

(C) Synthetase (D) Helicase

171. Which of the following is employed for the repeated use of enzymes in bioprocess ?

(A) Polymerization (B) Immobilization

(C) Ligation (D) Isomerization

172. After electrophoresis, protein or peptide bonds are visualized using

(A) Coomassive Brilliant blue (B) FC reagent

(C) DNS reagent (D) All of these

173. Adsorption of cell or enzyme on supporting medium is due to

(A) Electrostatic force (B) Hydrophobic interactions

(C) Bonding to specific ligand (D) All of these

Space For Rough Work

174. Rate of chemical reaction generally doubles for every _____ increase in temperature.

(A) 10 °C (B) 20 °C

(C) 30 °C (D) 40 °C

175. Enzymes are

(A) Thermophile (B) Thermolabile

(C) Thermostable (D) All of these

176. Specificity of protein in enzyme action depends on

(A) active site (B) K_m constant

(C) linear sequence of amino acids (D) turn over number

177. Factors affecting velocity of enzymatic reactions

(A) Enzyme concentration (B) Temperature & pH

(C) Viscosity (D) All of these

178. The first published completed gene sequence was of

(A) M_{13} phage (B) T_4 phage

(C) $\Psi \times 174$ (D) Lambda phage

179. BLAST programme is used in

(A) DNA sequencing (B) Amino acid sequencing

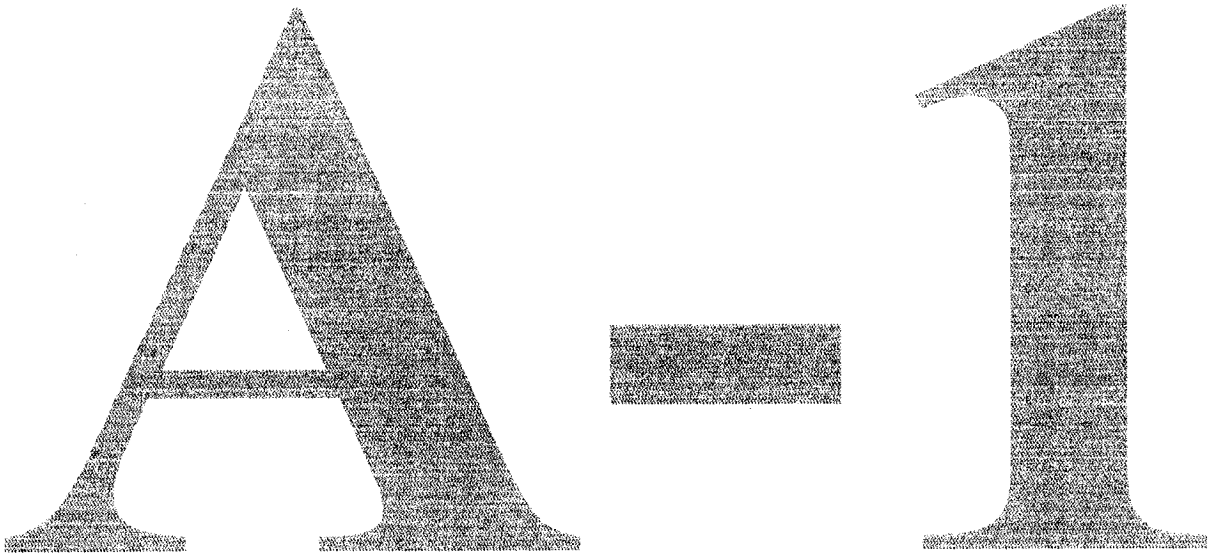
(C) DNA barcoding (D) Bioinformatics

180. Which of the following is a nucleotide sequence data base ?

(A) EMBL (B) SWISS PROT

(C) PROSITE (D) TREMOL

Space For Rough Work


A-1