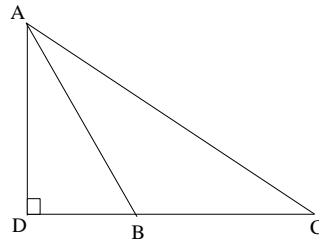


NTSE-WEST BENGAL-SAT**Mathematics**

1. If the algebraic expression $(3x^2 + px + 3)$ be always positive, then
(a) $-6 < p < 6$ (b) $p < -6$ (c) $p > 6$ (d) no such p exists
2. The sum of the roots of $ax^2 + bx + c = 0 (a \neq 0)$ is equal to the sum of the squares of the roots of the equation. Then
(a) $2ab = ac + be$ (b) $b^2 = ab + 2ae$ (c) $2ac = ab + b^2$ (d) $ab = 2ac + b^2$
3. The solution set for the equation $3^{2x^2} - 2 \cdot 3^{x^2+x+2} + 3^{2(x+2)} = 0$ is
(a) $\{-1, 2\}$ (b) $\{0, 2\}$ (c) $\{0, -1\}$ (d) $\{2, 4\}$
4. It is printed on a paper that "The length of a diagonal of a rectangle is 10 cm and its area is 62.5 sq. cm". Then which one of the following statements is true?
(a) The perimeter of the rectangle is 30 cm.
(b) The sum of the length and breadth is 20 cm.
(c) The difference of the length and breadth is 5 cm.
(d) No such rectangle can exist.
5. The ratio of the lengths of the corresponding sides of two similar triangles are in the ratio of 4 : 9. Then the ratio of their areas is
(a) 16 : 81 (b) 81 : 16 (c) 4 : 9 (d) 9 : 4
6. Father says to his son: "On the date of birth of yours, I was twice older than you are now." Then which one of the following statements is true?
(a) The present ages of the father and his son are 30 years and 10 years respectively.
(b) The present ages of the father and his son are 48 years and 12 years respectively.
(c) Nothing can be said about their ages.
(d) The ratio of the present ages of the father to the son is 3 : 1.
7. Taking at least one from the numbers 1,2,3, how many different sets can be formed?
(a) 8 (b) 7 (c) 3 (d) 3^3
8. $(18)^{23}$ is divided by remainder 17 to give the remainder
(a) 11 (b) 9 (c) 5 (d) 1
9. If $m^2 - 4m + 1 = 0$, then the value of $\left(m^3 + \frac{1}{m^3}\right)$ is
(a) 52 (b) 48 (c) 64 (d) 68
10. For $3^{x+y} = 81$, $81^{x-y} = 3$, we get
(a) no solution (b) $x = \frac{21}{2}$, $y = \frac{21}{2}$ (c) $x = 2$, $y = \frac{2}{3}$ (d) $x = \frac{17}{8}$, $y = \frac{15}{8}$

11. 125 identical cubes are cut from a big cube and all the smaller cubes are arranged in a row to form a long cuboid. What is the percentage of increase in total surface area of the cuboid over the total surface area of the cube?
 (a) $234\frac{2}{3}\%$ (b) $234\frac{1}{3}\%$ (c) $134\frac{2}{3}\%$ (d) None of the above
12. A bag contains 4 Red and 3 Black balls and a second bag contains 2 Red and 4 Black balls. After choosing a bag at random, a ball is also drawn at random. The probability that the ball is Red is
 (a) $\frac{23}{42}$ (b) $\frac{17}{42}$ (c) $\frac{19}{42}$ (d) $\frac{16}{39}$
13. If $[n]$ denotes the greatest integer n and (n) denotes the smallest integer n ; n being a real number, then $\left(1\frac{1}{5}\right) \times \left[1\frac{1}{5}\right] - \left(2 - \frac{1}{5}\right) \div \left[1\frac{1}{5}\right] + (1.5)$ is
 (a) 1.5 (b) 2 (c) 2.5 (d) 3.5
14. The value of $\frac{3}{1^2 \cdot 2^2} + \frac{5}{2^2 \cdot 3^2} + \dots + \frac{19}{9^2 \cdot 10^2}$ is
 (a) $\frac{99}{100}$ (b) $\frac{1}{100}$ (c) $\frac{101}{100}$ (d) 1
15. In a frequency distribution, Mean = 9.1 and $\sum f_i x_i = 132 + 5k$, $\sum f_i = 20$, then k is
 (a) 4 (b) 6 (c) 10 (d) 9
16. ABC is a triangle in which $\angle C > 90^\circ$ and AD \perp CB produced. Then



- (a) $AB^2 = AC^2 + BC^2 + BC \times BD$ (b) $AB^2 = AC^2 + BC^2 + 2BC \times BD$
 (c) $AC^2 = AB^2 + BC^2 + 2BC \times BD$ (d) $AC^2 = AB^2 + BC^2 + BC \times BD$
17. Given : $0^\circ < \theta < 90^\circ$. then, if $\sin \theta + \cos \theta = x$, which one of the following is correct?
 (a) $x < 1$ (b) $x > 1.5$ (c) $1 \leq x \leq \sqrt{2}$ (d) $1 < x \leq \sqrt{2}$
18. If $\sin \theta + \cos \phi = 2$ and $0^\circ \leq \theta, \phi \leq 90^\circ$, then $2\theta + 2000 \cdot \phi =$
 (a) 180° (b) 90° (c) 2180° (d) Can not be found out
19. $\sec \theta + \tan \theta = a + \sqrt{b}$, $a, b \in \mathbb{Q}$ and $\sqrt{b} \in \mathbb{Q}$ and $\sec \theta$ is rational, then
 (a) $\bar{b}^2 = 1 + a$ (b) $a^2 = 1 + \bar{b}$ (c) $\bar{b}^2 = 1 + a$ (d) $a^2 = 1 - \bar{b}$
20. The ratio of in which $9x - 3y - 14 = 0$ divides the join of $(2, -4)$ and $(3, 7)$ is
 (a) 2 : 1 (b) 1 : 2 (c) 2 : 3 (d) 3 : 2

Physics

21. The mass, linear momentum and kinetic energy of a body are m , p and E respectively, then
(a) $p = \sqrt{2mE}$ (b) $E = \sqrt{2mp}$ (c) $p = \sqrt{2E}$ (d) $E = \sqrt{2p}$
22. A stone is allowed to fall freely downwards initially at rest from the top of a tower. The time taken by the stone to reach the bottom of the tower is 4 seconds. What is the height of the tower? Take, acceleration due to gravity = 32 ft/s^2
(a) 64 ft. (b) 32 ft. (c) 48 ft. (d) 256 ft.
23. The coefficient of linear expansion of a solid is x and the coefficient of volume expansion of the solid is y , then
(a) $x = \frac{y}{3}$ (b) $y = \frac{x}{3}$ (c) $x = \frac{y}{2}$ (d) $y = \frac{x}{2}$
24. In case of refraction of light from a medium to air the critical angle is found to be 45° . What is the refractive index of the medium with respect to air? .
(a) $\sqrt{2}$ (b) $\sqrt{3}$ (c) 2 (d) 3
25. Which of the following pair have same unit?
(a) Heat and Specific heat
(b) Thermal capacity and Water equivalent
(c) Specific heat and Thermal capacity
(d) Heat and Work
26. Which of the following is an electromagnetic wave?
(a) α -ray (b) β -ray (c) γ -ray (d) cathode ray
27. In case of a convex lens, what is the minimum distance between an object and its real image?
(a) 2.5 times of focal length (b) 2 times of focal length
(c) 4 times of focal length (d) equal to focal length
28. What will be the power consumed by a 50Ω wire if it is kept across a potential difference of 200V?
(a) 0.8 kW (b) 80 kW (c) 400 W (d) 8 Kw
29. 1 cm of main scale of a vernier callipers is divided into 10 divisions. The least count of the callipers is 0.005 cm, then what is the number of divisions in the vernier scale?
(a) 10 (b) 20 (c) 25 (d) 50
30. If an x-ray tube is operated at 20kV, what is the cut-off wave length? (Take, planks constant $h = 6.62 \times 10^{-34} \text{ J.S}$)
(a) 0.89 \AA (b) 0.75 \AA (c) 0.62 \AA (d) 0.31 \AA

31. An ideal gas is found to obey the equation $p^2V = \text{constant}$ along with the ideal gas equation (here, $p =$ pressure and $V =$ volume). If initial temperature and volume are T_0 and V_0 respectively and it expands to a volume $3V_0$ then what is the final temperature?
- (a) $\sqrt{3}T_0$ (b) $\sqrt{2}T_0$ (c) $\frac{T_0}{\sqrt{3}}$ (d) $\frac{T_0}{\sqrt{2}}$
32. Specific heat (S) of a metal at low temperature varies according to $S = aT^3$, where 'a' is a constant and T is a absolute temperature. The amount of heat energy needed to raise the temperature of unit mass of the metal from $T = 1\text{K}$ to $T = 2\text{K}$ is
- (a) $3a$ (b) $\frac{15a}{4}$ (c) $\frac{2a}{3}$ (d) $\frac{13a}{4}$
33. An object of weight W and density ρ is submerged wholly in a liquid of density σ , its apparent weight will be
- (a) $(\rho - \sigma)$ (b) $(\rho - \sigma) / W$ (c) $W \left(1 - \frac{\sigma}{\rho}\right)$ (d) $W \left(1 - \frac{\rho}{\sigma}\right)$

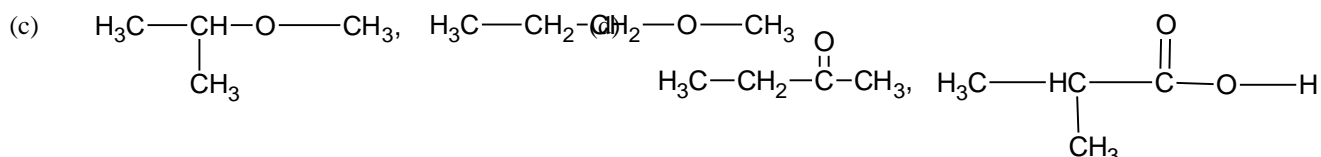
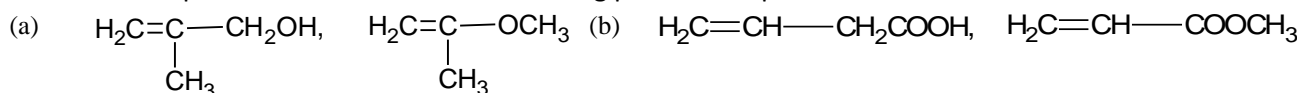
Chemistry

34. The ratio of σ and π bonds in propyne is
- (a) 1 : 3 (b) 3 : 1 (c) 2 : 3 (d) 3 : 2
35. The element having the lowest first ionization energy is
- (a) He (b) Cl (c) F (d) I
36. If the four tubes of a car are filled to the same pressure with $\text{N}_2, \text{O}_2, \text{H}_2$ and Ne gas separately then which will fill the tube first?
- (a) N_2 (b) O_2 (c) H_2 (d) Ne
37. At a given temperature what will be the percentage increase in pressure for a 5% decrease in the volume of the gas
- (a) 5% (b) 5.26 (c) 6.26% (d) 10.26%
38. O_2^- is isoelectronic with
- (a) H_2 (b) N_2 (c) F_2 (d) HF_2^-
39. Which of the following forms a homologous series?
- (a) Ethane, Ethylene, Acetylene (b) Ethane, Propane, Butanone
(c) Methanol, Ethanol, Propanoic acid (d) Butane, 2-Methyl Butane, 2, 3, dimethyl Butane.
40. The gas that gives a black precipitate with aqueous $\text{Pb}(\text{NO}_3)_2$ solution and a white precipitate with aqueous ZnCl_2 solution is
- (a) CO_2 (b) NO_2 (c) NH_3 (d) H_2S

41. The organic product that is obtained by absorbing Ethylene into concentrated HSO_4 and subsequently boiling the mixture with water is
 (a) an aldehyde (b) an amide (c) a ketone (d) an alcohol

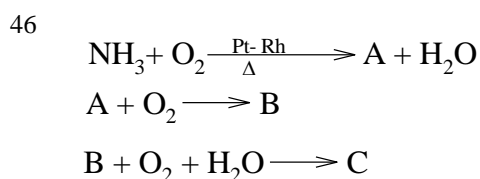
42. Equal volumes of two solutions of $\text{pH} = 4$ and $\text{pH} = 10$ are mixed. pH of the resultant solution will be
 (a) 6 (b) 7 (c) 8 (d) 9

43. Find out the position isomers from the following pairs of compounds



44. Egg albumin in water is a
 (a) True solution (b) Colloid (c) Suspension (d) Supersaturated Solution

45. Lithium is generally used as an electrode in high energy density batteries. This is because
 (a) Lithium is the lightest of all metals (b) Lithium has quite high negative reduction potential
 (c) Lithium is quite reactive (d) Lithium does not corrode easily



A, B and C respectively are

- (a) N_2O , NO_2 and HNO_3 (b) NO , NO_2 and HNO_3
 (c) NO_2 , NO and HNO_3 (d) N_2O , NO and HNO_3

BIOLOGY

47. The main plant body of pteridophyte is
(a) Sporophyte (b) Prothallus (c) Spore (d) Gametophyte
48. In human eye, at the blind spot
(a) Only rod cells are present. (b) Only cone cells are present.
(c) Both rod and cone cells are present. (d) Neither rod nor cone cells are present.
49. Percentage of O_2 present in inhaled air in human beings is approximately
(a) 21% (b) 77% (c) 0.04% (d) 3%
50. The disease which usually spreads through cuts and wounds is
(a) Chicken pox (b) Malaria (c) Tuberculosis (d) Tetanus
51. Lysosome stores
(a) ATP (b) Hydrolytic enzymes
(c) Carbohydrate (d) Protein
52. Which muscle separates thoracic and abdominal cavity?
(a) Abdominal muscle (b) Smooth muscle (c) Diaphragm (d) Cardiac muscle
53. Which one of the following hormones helps in contraction of uterine muscles during parturition?
(a) Vasopressin (b) Oxytocin (c) Prolactin (d) Relaxin
54. Glomerulus and Bowman's capsule together form
(a) Malpighian tubule (b) Malpighian corpuscle
(c) Collecting tubule (d) Renal tubule
55. Cardiac muscle is
(a) striated and voluntary (b) smooth and voluntary
(c) striated and involuntary (d) smooth and involuntary
56. In which of the following subphases of meiosis crossing over takes place?
(a) Leptotene (b) Pachytene (c) Zygotene (d) Diplotene
57. The part of human alimentary canal where no enzyme secretion takes place is
(a) Mouth (b) Oesophagus (c) Stomach (d) Ileum
58. Marine fish when placed in tap water bursts because of
(a) Endosmosis (b) Exomosis (c) Diffusion (d) Plasmolysis
59. "Penicillin" obtained from a fungus is an
(a) Antiseptic (b) Antiserum (c) Antibody (d) Antibiotic
60. The immunoglobulin which is transported to the foetus through placenta from mother is
(a) IgG (b) IgA (c) IgE (d) IgM

SST

61. France was named as “n museum of economic errors” by
(a) Rousseau (b) Adam Smith (c) Montesquieu (d) Quesnay
62. Who was known as the “Tsar the Liberator”?
(a) Tsar Nicholas I (b) Tsar Nicholas II (c) Tsar Alexander I (d) Tsar Alexander II
63. The day 24th October, 1929 was marked as 'Black Thursday' in U.S.A. because
(a) Terrorist Attack (b) Natural Calamity
(c) The Great Economic Depression (d) Change of Political Background
64. The father of British Socialism
(a) Louis Blanc (b) Karl Marx (c) Robert Owen (d) Saint Simon
65. Jagannath Singh Dhol was the leader of
(a) Kol Rebellion (b) Santhal Rebellion (c) Munda Rebellion (d) Chuar Rebellion Ans
66. The editor of the ‘Samachar Chandrika’ was
(a) Rammohan Roy (b) Iswar Gupta
(c) Bhabani Charan Bandyopadhyay (d) Gangakishore Bhattacharya
67. Madari Pasi was the leader of
(a) Santhal Rebellion (b) Munda Uprising (c) Bhil Revolt (d) Eka Movement
68. 'May Day' was celebrated for the first time in India at
(a) Bombay (b) Calcutta (c) Madras (d) Kanpur
69. The M2ahad Satyagraha was organised by
(a) Dayananda Saraswati (b) Swami Vivekananda
(c) Sree Narayan Guru (d) Dr. B. R. Ambedkar
70. The incident of Chauri Choura took place in
(a) 1919 AD (b) 1920 AD (c) 1922 AD (d) 1925 AD
71. The first language state was formed in Independent India:
(a) Andhra Pradesh (b) West Bengal (c) Tamil Nadu (d) Gujarat
72. The writer of the book named “Chhere Asha Gram” was
(a) Manikuntala Sen (b) Dakshina Ranjan Basu
(c) Sankha Ghosh (d) Selina Hossain
73. The time difference between Greenwich Mean Time and the Indian Standard Time is
(a) 6 hours (b) 5 hours 30 minutes
(c) 5 hours 15 minutes (d) 5 hours
74. By nature, the Western Ghat is a/an
(a) Old fold mountain (b) Young fold mountain
(c) Block mountain (d) Igneous mountain

75. The process by which, the height of the earth surface increases is
 (a) Aggradation (b) Degradation (c) Weathering (d) Denudation
76. Deep cracks on the surface of the mountain glacier are called
 (a) Nunatak (b) Arete (c) Crevasse (d) Cirque
77. The climate which is found in the Cape Town of South Africa is
 (a) Equatorial climate (b) Tropical Monsoon climate
 (c) Mediterranean climate (d) Hot Desert climate
78. New South wales current flows along the _____ of Australia.
 (a) northern side (b) southern side (c) eastern side (d) western side
79. Which of the following, parallel of latitude, passes through middle of India?
 (a) Equator (b) Tropic of Capricorn (c) Prime Meridian (d) Tropic of Cancer
80. The lake located, in between the deltas of the Godavari river and the Krishna river is
 (a) Kolleru (b) Pulicat (c) Chilka (d) Vembanad
81. Salty sea breeze is needed for
 (a) Sugarcane cultivation (b) Tea cultivation
 (c) Jute cultivation (d) Coffee cultivation
82. Which of the following industry is called Foot loose Industry?
 (a) Iron and Steel Industry (b) Engineering Industry
 (c) Automobile Industry (d) Cotton textile Industry
83. Diamond Quadrilateral project is related to
 Air Transport (b) Rail Transport (c) Road Transport (d) Water Transport
84. The colour used for drawing of contour lines in a topographical map is
 (a) Black (b) Brown (c) Red (d) Blue
85. A candidate for Bidhan Sabha and Lok Sabha Election must not be less than _____ years.
 (a) 25 (b) 26 (c) 27 (d) 29
86. 'MONEY BILL' is first introduced in the
 (a) Lok Sabha (b) Rajya Sabha (c) Supreme Court (d) High Court
87. The number of judges of International Court of Justice is
 (a) 9 (b) 10 (c) 15 (d) 16
88. The age of retirement of the judges of the High Court is
 (a) 65 years (b) 60 years (c) 62 years (d) 70 years
89. The headquarter of World Health Organization is
 London (b) Manchester (c) Geneva (d) Paris

90. The minimum age for the citizen to exercise their right to vote has been reduced to 18 years from 21 years through the
(a) 42nd Amendment Act (b) 44nd Amendment Act
(c) 61nd Amendment Act (d) 74nd Amendment Act
91. The Panch-Sheel Agreement was signed between
a) India and China (b) India and Nepal (c) India and Pakistan (d) Pakistan and China
92. The World Trade Organization was founded in _____.
(a) 1990 (b) 1995 (c) 2000 (d) 2005
93. Which of the following is not a function of Commercial Banks?
(a) Collecting deposits from public (b) Lending loans
(c) Issuing Notes (d) Working as an agent of Client.
94. Stagflation is a situation where
(a) production increases and price level increases
(b) production decreases and price level increases.
(c) production decreases and price level decreases.
(d) production increases and price level decreases.
95. Which of the following is a direct tax?
(a) Sales Tax (b) Income Tax (c) Entertainment Tax (d) Service Tax
96. In which economy is the policy of Laissez faire adopted?
(a) Capitalist Economy (b) Socialist Economy
(c) Mixed Economy (d) Any Economy
97. Exclusion principle is not applicable in the case of _
(a) Capital goods (b) Consumer goods
(c) Public goods (d) Private goods
98. Railway in India are highlighted by which of the following market form?
(a) Perfect competition (b) Monopolistic competition
(c) Monopoly (d) Oligopoly
99. Which of the following taxes follows the ability to pay principle?
(a) Wealth Tax (b) Entertainment Tax
(c) Goods and Services Tax (d) Excise Duty
100. In underdeveloped countries most of the labour force are generally engaged in
(a) Industrial sector (b) Service sector
Agricultural sector (d) Banking sector