KEY FOR SRMEEE-2010
VERSION – A

[PHYSICS, CHEMISTRY, MATHEMATICS & BIOLOGY]

Part 1 – Physics

1. A body starts from rest and moves with a uniform acceleration of 6 ms^{-2} …..

   Ans : 21 m

2. Dimensions are not same for the pair

   Ans : Power and strain

3. If L, C, R denote the inductance, capacitance and resistance respectively, …

   Ans : $M^{\circ}L^{\circ}T^{3}I^{\circ}$

4. Pick out the stranger in the group

   Ans : Magnetic moment

5. A scooter is going round a circular road of radius 200 m at a speed of 20 ms^{-1} ….

   Ans : 0.1 rad s^{-1}

6. In some region, the gravitational field is zero…

   Ans : Must be constant

7. Two spheres of mass m and M are situated in air and the gravitational force between them …

   Ans : f

8. The ratio of the lengths of two wires a and b of same material is 1 : 3 ….

   Ans : 1:27

9. Bernoulli's theorem is based on the principle of conservation of

   Ans : Energy

10. The ring of radius 1 m and mass 15 kg is rotating about its diameter ….

    Ans : 2343.7 J

11. The total energy of a body executing simple harmonic motion is E..

    Ans : $\frac{8}{9}E$

12. Pick out the stranger

    Ans : newton-meter

    Note : If considered as troque, will be a vector

13. A tunnel has been dug through the centre of the earth and a ball is ….

    Ans : 42 minute

14. Entropy of the universe tends to be

    Ans : Maximum

15. Heating of water at atmospheric pressure is considered under the …

    Ans : Isobaric

16. A Carnot engine working between 200 K and 500 K has a work output of 900 J…

    Ans : 1500 J

17. A heavenly body is receding from Earth such that the fractional change in …

    Ans : 2c

    Note : No matter can move even at a speed of light

18. The penetration of light into the region of geometrical shadow is called

    Ans : Diffraction

19. A man is 160 cm tall and his eyes are 15 cm below the top of his head…..

    Ans : 80 cm

20. Light of wavelength 5000 $\mathring{A}$ in air has wavelength in glass …

Ans : 3333 $\mathring{A}$

21. A charge Q is placed at the centre of the line joining two equal charges q …..

Ans : $\frac{-q}{4}$

22. A capacitor is kept connected to a battery and a dielectric slab is inserted between ….

Ans : Work is done at the cost of the battery

23. When two identical capacitors are in series, they have 4 μF capacitance …

Ans : 8 μF

24. A cell of emf 4 V and internal resistance 0.2 Ω is connected with the resistance of ….

Ans : 3.6 V

25. At certain place, horizontal component is $\frac{1}{\sqrt{3}}$ times the vertical component ….

Ans : 60°

26. In a tangent galvanometer, a current of 0.2 A produces a deflection of 30°.

Ans : 0.6 A

27. If we consider electrons and protons of the same wavelength, they will have the same …

Ans : Momentum

28. The momentum of a proton is 2.5×10^{-29} kg ms^{-1}.

Ans : 1.14×10^{13} Hz

Note : Must be photons and not protons

29. On the bombardment of neutron with boron, an α particle is emitted….

Ans : $_3Li^7$

30. When cathode rays enter into a uniform magnetic field perpendicular to the direction of …..

Ans : Circular

31. The pulleys and strings shown in figure are smooth and of negligible mass….

Ans : 45°

32. In the Boolean expression, which gate be expressed as $Y = \overline{A \bullet B}$?

Ans : NAND gate

33. The current gain of the transistor in the common base mode is 0.9….

Ans : 9

34. If the base and the collector of a transistor are in forward bias, then ….

Ans : All of these

35. The refractive index of the material of a prism is 2. What is the maximum possible …

Ans : 60°

Part 2 - Chemistry

36. Which one is diamagnetic molecule / ion ?

Ans : O_2^{2-}

37. Which of the following is called a polyamide ?

Ans : nylon

38. How many moles of magnesium phosphate $Mg_3(PO_4)_2$ will contain 0.25 mole of …..

Ans : 3.125×10^{-2}

39. A pressure cooker reduces cooking time for food because …

Ans : boiling point of water involved in cooking in increased

40. Consider the reaction $CaCO_{3(g)} \rightleftharpoons CaO_{(s)} + CO_{2(g)}$ in closed container at ….

Ans : remains unaffected

41. 25 ml of a solution of barium hydroxide on titration with a 0.1 molar solution ….

    Ans : 0.07

42. Which of the following is not a homogeneous mixture ?

    Ans : milk

43. An ionic compound has a unit cell constituting A ions at the corners of a cube …..

    Ans : AB_3

44. Benzene and toluene form nearly ideal solutions. At 20°C, the vapour pressure …

    Ans : 50

45. The number of moles of ions given on complete ionization of 1 mole ….

    Ans : 4

46. During the extraction of copper, the impurity (FeS) is removed as slag ….

    Ans : $FeSiO_3$

47. All monosaccharides _____ Tollens' reagent.

    Ans : reduce

48. Calculate ΔH (in joules) for $C_{(graphite)} \rightarrow C_{(diamond)}$ from the following data:

    Ans : 1900

49. In the following reaction ; A and B respectively are

    Ans : C_2H_4,alc.KOH/Δ

50. What is X in the following nuclear reaction ?

    Ans : γ ray (gamma ray)

51. The number of chiral centers in (±) glucose is

    Ans : 4

52. Action of $NaNO_2$ with dilute HCl on $ArNH_2$ yields

    Ans : cyclohexanol

53. What are the units of equivalent conductivity of a solution ?

    Ans : $mho.cm^2.equiv^{-1}$

54. The Incorrect statement among the following is

    Ans : The second ionization potential of Mg is greater than the second ionization potential of Na.

55. When a quantity of electricity is passed through $CuSO_4$ solution, 0.16 g of copper gets ….

    Ans : 56 cm^3

56. A distinctive and characteristic functional group of fats is …

    Ans : an ester group

57. The highest magnetic moment is shown by the transition metal …

    Ans : $3d^5$

58. Assertion A : Sb_2S_3 is not soluble in yellow ammonium sulphide

    Reason R : The common ion effect due to S^{2-} ions reduces the stability of Sb_2S_3

    Ans : both A and R are false statements

59. Potassium soaps are

    Ans : soft soaps

60. The IUPAC name of $CH_3 - CH_2 - COO - COCH_3$ is

    Ans : ethanoic propanoic anhydride

61. $C_6H_6 + CCl_4 \xrightarrow{AlCl_3} X \xrightarrow{H_2O} Z$

    Ans : $C_6H_5 - CO - C_6H_5$

62. Decrease in ionic size in a period is observed in

    Ans : Both (a) and (b)

63. Which of the following is not a chromophore ?

Ans : $-NH_2$

64. Which is used as food preservative ?

Ans : Sodium benzoate

65. Which one of the following is an analgesic ?

Ans : Aspirin

66. ΔS° will be highest for

Ans : $CaCO_{3(s)} \rightarrow CaO_{(s)} + CO_{2(g)}$

67. Philosopher's wool when heated with BaO at 1100°C gives a compound.

Ans : $BaZnO_2$

68. Match the lists I and II and pick the correct matching from the codes given below :

Ans : A–2, B–5, C–1, D–4, E–3

69. Which statement about enzymes is not correct

Ans : enzymes can catalyse any reaction

70. The molecular formula of dithionic acid is

Ans : $H_2S_2O_6$

Part 3 – Maths

71. The number of solutions of $\sqrt{4-x}+\sqrt{x+9}=5$

Ans : 2

72. The sum to n terms of the series ….

Ans : $\frac{2n}{(n+1)}$

Note : If the first term is read as $\frac{1}{1^3}$, then, the answer is $\frac{2n}{(n+1)}$. Otherwise there is no correct option.

73. Let $f(x) = x^2$ and $g(x) = 2^x$ then the solution

Ans : {0, 2}

74. If the mean of a set of observations $x_1, x_2, \ldots$

Ans : 42

75. If $e^x = y + \sqrt{1+y^2}$ then the value of y is

Ans : None of these

76. If the curves $y^2 = 6x$, $9x^2 + by^2 = 16$ cut each other at right angles …

Ans : $\frac{9}{2}$

77. $\int \frac{e^x(1+\sin x)}{1+\cos x}\,dx$ is equal to

Ans : $e^x \tan\frac{x}{2} + C$

78. The value of $\int_0^{\pi/2} \frac{1+2\cos x}{(2+\cos x)^2}\,dx$ is

Ans : $\frac{1}{2}$

79. The solution of the differential equation $\frac{d^2x}{dt^2} + x = 0$; $x(0) = 1$, $x^1(0) = 0$

Ans : is a periodic function

80. If $|a| = 2$, $|b| = 3$, $|c| = 4$ and $a + b + c = 0$ then the value of b.c + c.a +a.b is equal to

Ans : $\frac{-29}{2}$

81. The lines $\frac{x-2}{1} = \frac{y-3}{1} = \frac{z-4}{-k}$ …

Ans : k = 0

82. The relation R : A → B, where A = {1, 2, 3, 4, 5} and B = {u, v, x, y, z} …

Ans : {(1, u), (2, v), (3, x), (4, z), (5, y)}

83. If the imaginary part of $\frac{2z+1}{iz+1}$ is –4, then the locus of the point representing z in the …..

Ans : a circle

84. If A, B, C are the angles of a triangle, then

Ans : 0

85. If $\sin\theta$, $\cos\theta$, $\tan\theta$ are in G.P then $\cos^9\theta + \cos^6\theta + 3\cos^5\theta - 1$ is equal to

Ans : 0

86. If $1-\frac{1}{3}+\frac{1}{5}-\frac{1}{7}+\frac{1}{9}-\frac{1}{11}+\ldots=\frac{\pi}{4}$, then ….

Ans : $\frac{\pi}{8}$

87. In a group of 8 girls, two girls are sisters. The number of ways in which the girls can sit so …

Ans : None of these

88. The number of ways of dividing 15 men and 15 women into 15 couples, ….

Ans : 1240

89. The equation $\Delta = \begin{vmatrix} x-a & x-b & x-c \\ x-b & x-c & x-a \\ x-c & x-a & x-b \end{vmatrix} = 0$ is satisfied when …

Ans : No correct option

Note : None of the printed options satisfy the given relation. The answer should be $x=\frac{(a+b+c)}{3}$

90. An equation of a straight line passing through the intersection of the straight lines …..

Ans : 23x + 23y = 11

91. The number of values of c such that the straight line y = 4x + c touches the ….

Ans : 2

92. An ellipse has OB as a semi-minor axis. F, F^1 are its foci, and the angle FBF^1 is a ….

Ans : $\frac{1}{\sqrt{2}}$

93. If ω is a complex cube root of unity, then the matrix $A = \begin{vmatrix} 1 & \omega^2 & \omega \\ \omega^2 & \omega & 1 \\ \omega & 1 & \omega^2 \end{vmatrix}$ is a

Ans : singular matrix

94. If $\lim_{x\to a}\frac{a^x - x^a}{x^x - a^a} = -1$, then the value of a is

Ans : 1

95. The slopes of the normals to the parabola $y^2 = 4ax$ intersecting at a point on the ….

Ans : A.P

96. The area of the figure bounded by $y^2 = 9x$

Ans : $\frac{1}{2}$

97. The area of the plane figure bounded by lines $y = \sqrt{x}$, $x \in [0, 1]$, $y = x^2$, $x \in [1, 2]$ …

Ans : $\frac{19}{3}$

98. A solution of $y = 2x\left(\frac{dy}{dx}\right) + x^2\left(\frac{dy}{dx}\right)^4$ is

Ans : $y = 2\sqrt{cx} + c^2$

99. If the vectors $AB = -3\hat{i} + 4\hat{k}$ and $AC = 5\hat{i} - 2\hat{j} + 4\hat{k}$ are the sides of a triangle ABC.

Ans : $\sqrt{18}$

100. An equation of the line passing through $3\hat{i} - 5\hat{j} + 7\hat{k}$ and perpendicular to the plane …

Ans : $\frac{x-3}{3} = \frac{y+5}{-4} = \frac{z-7}{5}$

Note : "passing through $3\hat{i} - 5\hat{j} + 7\hat{k}$" should be read as "passing through the point whose position vector is $3\hat{i} - 5\hat{j} + 7\hat{k}$"

101. If from each of the three boxes containing 3 white and 1 black , 2 white and 2 black, …..

Ans : $\frac{13}{32}$

102. If x and y are two sets, then $x \cap (y \cup x)^c$ equals

Ans : ϕ

103. If $Z = \frac{7-i}{3-4i}$, then Z^{14} equals

Ans : $-2^7 i$

104. Equation of the directrix of the parabola whose focus is (0, 0) …

Ans : $x - y + 2 = 0$

105. If a is real and the 4^{th} term in the expansion of $\left(ax + \frac{1}{x}\right)^n$ is $\frac{5}{2}$, then values of a and n are ..

Ans : 6, $\frac{1}{2}$

Note : Question should be corrected as "the values of n and a" are

Part 4 – Biology

71. With reference to the skeletal muscle myofilaments

Ans : troponin is a constituent of thin filaments

72. The pituitary gland is

Ans : the anterior lobe receives efferent fibres form the supra-opticohypophyseal tract

73. Urine volume is increased with

Ans : the damage to the posterior pituitary

74. The hypothalamus

Ans : is responsible for temperature regulation

75. Human immunodeficiency virus – 1 (HIV -1)

Ans : contains env gene which encodes the core nucleocapsid polypeptides

76. Staphylococcus aureus :

Ans : phage type I and II are the commonest cause of boils

77. Antibiotic resistance in bacteria occurs by …

Ans : phagocytosis

78. Following informations are true about ….

Ans : On global basis, it attracted many people as valuable food substance

79. IFN–γ is secreted by

Ans : Th 1 cells

80. For antigen presentation to CD4 + T lymphocytes:

Ans : specialized antigen presenting cells are required for the induction of the T cell immune response.

81. Hyperacute rejection is developed

Ans : Pre induction of Anti-HLA antibodies

82. The following are true about mitochondrial DNA

Ans : the sperm does not contain mitochondrial DNA

83. The following informations are true about …

Ans : 5% of the genome has been conserved by evolution around 200 million years ago

84. The following are the examples of Recombinant DNA product except

Ans : Hemocidin

85. The cell aggregation before it attaches the surface can be reduced …

Ans : All the above

86. Biological database

Ans : explains the structure of biomolecules and their interactions

87. Which of the following information are true except?

Ans : Longevity is much lesser than 40 years in under developed countries

88. Major Green house gases include the following

Ans : Water vapor, Carbon di oxide, Methan, Ozone

89. The following informations are true about the environmental impact on poverty

Ans : All the above

90. The following informations are true about water stress except

Ans : Canada and Brazil are facing high water stress

91. The cattle breed which yields around 5000 – 8000 litres of milk

Ans : Jersey

92. Stethoscope was invented by

Ans : Rene Theophile

93. Area of the at most least square of the central square …

Ans : 0.0025 sqmm

94. The pacemaker used during open heart surgery is

Ans : Transcutaneous pacing

95. According to the Lamarck theory of evolution,

Ans : Individuals inheriting the traits of their ancestors

96. Allopatric speciation is one in which

Ans : Geographically isolated sub-populations diverge

97. Name the Father of Taxonomy

Ans : Carolus Linnaeus

98. The basic unit of classification is

Ans : Species

99. Malvacea flower has _____ sepals

Ans : 5

100. Which following plant is involved in starch preparation ?

Ans : Cassava

101. Xylem conducts

Ans : Water

102. Palisade parenchyma cells are present in

Ans : Leaf

103. Plant age is identified by

Ans : Annual rings

104. Apical meristem is found usually in

Ans : Shoot tips and root tips

105. The Father of Genetics is

Ans : Mendel

106. Chiasma formation takes place in

Ans : Pachytene

107. Which one of the following cannot cause mutation ?

Ans : Infrared ray

108. DNA is a double helical structure proposed by

Ans : Watson and Crick

109. The alternative name for genetic engineering is

Ans : r-DNA technology

110. The enzyme involved in RNA – directed DNA synthesis is

Ans : Reverse transcriptase

111. Agrobacterium tumifaciens has the ___ plasmid

Ans : Ti

112. Protoplasmic fusion is performed by

Ans : PEG

113. An example of C_4 plant is

Ans : Sugarcane

114. The rate of growth of plants can be measured by a

Ans : Auxanometer

115. Which one of the following is Phytohormone ?

Ans : Indole acetic acid

116. Hormone promoting maleness in flowering plants is

Ans : Gibberellin

117. Name the micro organisms involved in biofertilizer preparation.

Ans : Cyanobacteria

118. Absence of magnesium causes

Ans : Chlorosis

119. Name the committee approves GM crops

Ans : GEAC

120. Name the botanical name of Groundnut

Ans : Arachis hypogea