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GTSE

GOAL TALENT SEARCH EXAM

GOAL TALENT SEARCH EXAM
Sample Paper

CLASS - 12th (PCB / PCM)

Time : 2.00 Hrs. **Max. Marks : 400**

INSTRUCTIONS

- This paper has 100 questions. All questions are compulsory.
- In this paper Question of Biology is from 71 to 100 which is only for PCB group and in same way Math from 71 to 100 for PCM group. You have to attempt only one segment as per your group.
- The maximum marks for each question is 4.
- 1 mark will be deducted against each negative response from the total marks.
- Use of calculator, slide rule, graph paper & trigonometric tables is NOT PERMITTED.
- In case of mismatch between English & Hindi language, question in English will be considered as the correct one.

Name of the Candidate : _____

Roll No. : _____ Class : _____

Exam Centre : _____

Centre Town : _____

GOAL TALENT SEARCH EXAM (GTSE)

[Time : 2.00 Hours] **CLASS : XII (PCB / PCM) (Sample Paper)** **Full Marks : 400**

01. The Electric field at a point is :
(Choose correct statements)
(a) always continuous.
(b) continuous if there is no charge at that point.
(c) discontinuous only if there is a negative charge at the point.
(d) discontinuous if there is a charge at the point.
(1) (a) only (2) (b) and (c) only
(3) (b) and (d) only (4) (b), (c) and (d)

02. Two identical thin rings, each of radius R are coaxially placed at separation R. Q_1 & Q_2 are uniformly distributed over these ring. What is the work done in moving a charge q from centre of ring having charge Q_1 to other ring :

(1) $\frac{K(Q_2 - Q_1)q}{\sqrt{2}R}$ (2) $\frac{K(\sqrt{2} - 1)(Q_2 - Q_1)q}{\sqrt{2}R}$

(3) Zero (4) $\frac{(Q_2 - Q_1)}{\sqrt{2}R^2}$

03. Calculate potential on the axis of a ring at a distance, 2R, due to charge Q uniformly distributed along the ring of radius R.

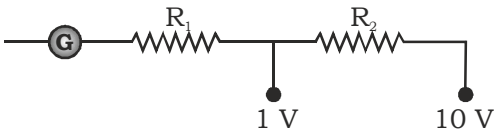
(1) $\frac{Q}{2\pi \in_0 R}$ (2) $\frac{Q}{4\sqrt{5}\pi \in_0 R}$

(3) $\frac{Q}{2\sqrt{3}\pi \in_0 R}$ (4) $\frac{Q}{2\sqrt{5}\pi \in_0 R}$

04. A carbon resistor (47 ± 4.7) kΩ is to be marked with rings of different colours for its identification. The colour code sequence will be
(1) Violet – Yellow – Orange – Silver
(2) Yellow – Violet – Orange – Silver
(3) Yellow – Green – Violet – Gold
(4) Green – Orange – Violet – Gold

05. Which of the following statements is false :
(1) Krichhoff's second law represents energy conservation
(2) Wheatstone bridge is the most sensitive when all the four resistance are of the same order of magnitude
(3) In a balanced wheatstone bridge if the cell and the galvanometer are exchanged, the null point is disturbed
(4) A rheostat can be used as a potential divider

06. The resistance of a galvanometer is 50 Ω and it shows full scale deflection for a current of 1mA. to convert it into a voltmeter to measure 1V and as well as 10 V (refer circuit diagram) the resistances R_1 and R_2 respectively are



(1) 950 Ω and 9150 Ω (2) 900 Ω and 9950 Ω
(3) 900 Ω and 9900 Ω (4) 950 Ω and 9000 Ω

07. An electron is moving in a circular path under the influence of a transverse magnetic field of 3.57×10^{-2} T. If the value of e/m is 1.76×10^{11} C/kg, the frequency of revolution of the electron is
(1) 6.82 MHz (2) 1 GHz
(3) 100 MHz (4) 62.8 MHz

08. The force between two parallel current carrying wires is independent of
(1) Their distance of separation
(2) The length of the wires
(3) The magnitude of currents
(4) The radii of the wires

09. Two magnets are held together in a vibration magnetometer and are allowed to oscillate in the earth's magnetic field. With like poles together, 12 oscillations per minute are made but for unlike poles together only 4 oscillations per minute are executed. The ratio of their magnetic moments is
(1) 3 : 1 (2) 1 : 3 (3) 3 : 5 (4) 5 : 4

10. The materials suitable for making electromagnets should have

(1) High retentivity and high coercivity

(2) Low retentivity and low coercivity

(3) High retentivity and low coercivity

(4) Low retentivity and high coercivity

11. A coil of resistance 400 Ω is placed in a magnetic field. If the magnetic flux ϕ (Wb) linked with the coil varies with time t (sec) as $\phi = 50t^2 + 4$. The current in the coil at t = 2 sec is

(1) 0.5 A (2) 0.1 A (3) 2 A (4) 1 A

12. A coil of N turns and mean cross-sectional area A is rotating with uniform angular velocity ω about an axis at right angle to uniform magnetic field B. The induced e.m.f., E in the coil will be :

(1) NBA sin ωt (2) NB ω sin ωt

(3) NB/A sinωt (4) NBA ω sin ωt

13. What is the frequency of power in an AC circuit connected to a capacitor ?

(Given f = 50 Hz, V = 220 V)

(1) 50 Hz (2) 100 Hz

(3) zero (4) 25 Hz

14. The quality factor of LCR circuit having resistance (R) and inductance (L) at resonance frequency (ω) is given by

(1) $\frac{\omega L}{R}$ (2) $\frac{R}{\omega L}$

(3) $\left(\frac{\omega L}{R}\right)^{1/2}$ (4) $\left(\frac{\omega L}{R}\right)^{2}$

15. Which of the following components of an LCR circuit, with a.c. supply, dissipates energy

(1) L (2) R

(3) C (4) All of these

16. Same current is flowing in two a.c. circuit. First contains only inductance and second contains only capacitance. If frequency of a.c. is increased for both, the current will

(1) Increase in first circuit and decrease in second

(2) Increase in both circuits

(3) Decrease in both circuits

(4) Decrease in first circuit and increase in second

17. The de-Brogile wavelength of a neutron in thermal equilibrium with heavy water at a temperature T (Kelvin) and mass m, is

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

(3) $\frac{2h}{\sqrt{3mkT}}$ (4) $\frac{2h}{\sqrt{mkT}}$

18. The surface of a metal is illuminated with the light of 400 nm. The kinetic energy of the ejected photoelectrons was found to be 1.68 eV. The work function of the metal is (hc = 1240 eV.nm)

(1) 3.09 eV (2) 1.41 eV

(3) 1.51 eV (4) 1.68 eV

19. The wavelength λ_e of an electron and λ_p of a photon of same energy E are related by :

(1) $\lambda_p > \lambda_e^2$ (2) $\lambda_p^2 < \lambda_e$ (3) $\lambda_p^2 = \lambda_e$ (4) $\lambda_p = \lambda_e^2$

20. If an electron in hydrogen atom jumps from an orbit of level n = 3 to an orbit of level n = 2, the emitted radiation has a frequency (R = Rydberg constant, C = velocity of light)

(1) $\frac{RC}{25}$ (2) $\frac{5RC}{36}$

(3) $\frac{3RC}{27}$ (4) $\frac{8RC}{9}$

21. A nucleus ${}^{A}_{Z}X$ has mass represented by M(A, Z). If M_p and M_n denote the mass of proton and neutron respectively and B.E. is the binding energy in MeV, then

(1) $B.E = [M(A, Z) - ZM_p - (A - Z)M_n]C^2$

(2) $B.E = [ZM_p + (A - Z)M_n - M(A, Z)]C^2$

(3) $B.E = [ZM_p + AM_n - M(A, Z)]C^2$

(4) $B.E = M(A, Z) - ZM_p - (A - Z)M_n$

22. The half life of a radioactive isotope X is 50 years. It decays to another element Y which is stable. The two elements X and Y were found to be in the ratio of 1 : 16 in a sample of a given rock. The age of the rock was estimated to be

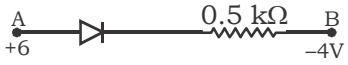
(1) 100 years (2) 150 years

(3) 200 years (4) 250 years

23. In a transistor if collector current is 25 mA and base current is 1 mA, then current amplification factor α is

(1) $\frac{25}{24}$ (2) $\frac{24}{25}$ (3) $\frac{25}{26}$ (4) $\frac{26}{25}$

24. Consider the junction diode as ideal. The value of current flowing through AB is :



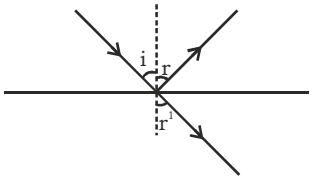
(1) 4 mA (2) 10 mA (3) 20 mA (4) 5 mA

25. A convex mirror of focal length f forms an image which is $\frac{1}{n}$ times the object. The distance of the object from the mirror is

(1) (n – 1)f (2) $\left(\frac{n-1}{n}\right)$f

(3) $\left(\frac{n+1}{n}\right)$f (4) (n + 1)f

26. A ray of light is incident at an angle i from denser to rare medium. The reflected and the refracted rays are mutually perpendicular. The angle of reflection and the angle of refraction are respectively r and r', then the critical angle will be



(1) $\sin^{-1}$ (sin r) (2) $\sin^{-1}$ (tan r')

(3) $\sin^{-1}$ (tan i) (4) $\sin^{-1}$ (sin i)

27. For an angle of incidence θ on an equilateral prism of refractive index $\sqrt{3}$, the ray refracted is parallel to the base inside the prism. The value of θ is

(1) 30° (2) 45° (3) 60° (4) 75°

28. The length of the compound microscope is 14cm. The magnifying power for relaxed eye is 25. If the focal length of eye lens is 5 cm, then the object distance for objective lens will be :

(1) 1.8 cm (2) 1.5 cm (3) 2.1 cm (4) 2.4 cm

29. The interference pattern is obtained with two coherent light sources of intensity ratio n. In the interference pattern, the ratio $\frac{I_{max} - I_{min}}{I_{max} + I_{min}}$ will be

(1) $\frac{2\sqrt{n}}{(n+1)^2}$ (2) $\frac{\sqrt{n}}{n+1}$

(3) $\frac{2\sqrt{n}}{n+1}$ (4) $\frac{\sqrt{n}}{(n+1)^2}$

30. For a parallel beam of monochromatic light of wavelength 'λ', diffraction is produced by a single slit whose width 'a' is of the wavelength of the light. If 'D' is the distance of the screen from the slit, the width of the central maxima will be

(1) $\frac{D\lambda}{a}$ (2) $\frac{D\lambda}{a^2}$ (3) $\frac{2Da}{\lambda}$ (4) $\frac{2D\lambda}{a}$

31. If avogadro number (N_A) is change from 6.022×10^{23} mol^{-1} to 6.022×10^{20} mol^{-1}, this would be change :

(1) the mass of one mole of carbon

(2) the ratio of chemical species to each other in a balanced equation

(3) the ratio of elements to each other in compound

(4) the definition of mass in units of gram

32. Calculate the energy in joule corresponding to light of wavelength 45 nm: (Planck's constant $h = 6.63 \times 10^{-34}$ Js; speed of light $c = 3 \times 10^8$ ms^{-1})

(1) 4.42×10^{-15} (2) 4.42×10^{-18}

(3) 6.67×10^{15} (4) 6.67×10^{11}

33. What is the density of N_2 gas at 227°C and 5.00 atm. pressure (R = 0.082 L atm K^{-1} mol^{-1})

(1) 1.40 g/mL (2) 2.81 g/mL

(3) 3.41 g/mL (4) 0.29 g/mL

34. The correct thermodynamic conditions for the spontaneous reaction at all temperatures is :

(1) $\Delta H < 0$ and $\Delta S > 0$

(2) $\Delta H < 0$ and $\Delta S < 0$

(3) $\Delta H = 0$ and $\Delta S = 0$

(4) $\Delta H > 0$ and $\Delta S < 0$

35. The equilibrium constant for, $N_{2(g)} + O_{2(g)} \rightleftharpoons 2NO_{(g)}$ is K, the equilibrium constant for $1/2\, N_{2(g)} + 1/2 O_{2(g)} \rightleftharpoons NO_{(g)}$ will be :

(1) 1/2 K (2) K (3) K^2 (4) $K^{1/2}$

36. The values of K_{sp} of $CaCO_3$ and CaC_2O_4 are 4.7×10^{-9} and 1.3×10^{-9} respectively at 25°C. If the mixture of these two is washed with water, what is the concentration of Ca^{2+} ions in water?

(1) 5.831×10^{-5} M

(2) 6.856×10^{-5} M

(3) 3.606×10^{-5} M

(4) 7.746×10^{-5} M

37. AB is an ionic solid. If the ratio of ionic radius of A^+ and B^- is 0.52, what is the coordination number of B^- ?

(1) 2 (2) 3 (3) 6 (4) 8

38. The number of atoms in 50 g of an FCC crystal with density d = 10 gcm^{-3} and cell edge of 200 pm is equal to :

(1) 3×10^{25} (2) 5×10^{24}

(3) 1.25×10^{24} (4) 2.5×10^{24}

39. The system that forms maximum boiling azeotrope is :

(1) Carbon disulphide - acetone

(2) Benzene - toluene

(3) Acetone - chloroform

(4) n - hexane - n heptane

40. If 1 g of solute (molar mass = 50 g mol^{-1}) is dissolved in 50 g of solvent and the elevation in boiling point is 1 K. The molal elevation constant of the solvent is :

(1) 2 (2) 3 (3) 2.5 (4) 5

41. What will be the degree of dissociation of 0.1 M $Mg(NO_3)_2$ solution if Van't Hoff factor is 2.74 ?

(1) 75% (2) 87% (3) 100% (4) 92%

42. $E^0_{Cu^{2+}/Cu} = +0.34$ V, what will be reduction potential at pH = 14 for same couple. Given K_{sp} of $Cu(OH)_2 = 10^{-19}$:

(1) –0.22 V (2) –0.71 V

(3) +0.22 V (4) +0.71 V

43. When an electric current is passed through acidulated water, 112 mL of hydrogen gas at STP collects at the cathode in 965 second. The current passed, in ampere is :

(1) 1.0 (2) 0.5 (3) 0.1 (4) 2.0

44. For the reaction; $2NO + Br_2 \rightleftharpoons 2NOBr$; the mechanism is given in two steps

(I) $NO + Br_2 \overset{\text{Fast}}{\rightleftharpoons} NOBr_2$

(II) $NOBr_2 + NO \xrightarrow{\text{Slow}} 2NOBr$

The rate expression for the reaction is :

(1) $r = K[NO]^2[Br_2]$ (2) $r = K[NO][Br_2]$

(3) $r = K[NO]\,[Br_2]^2$ (4) $r = K[NOBr_2]$

45. At the equilibrium position in the process of adsorption :

(1) $\Delta H > 0$ (2) $\Delta H = T\Delta S$

(3) $\Delta H > T\Delta S$ (4) $\Delta H < T\Delta S$

46. Ellingham diagram represents change of :

(1) ΔG^o with temperature

(2) ΔH with pressure

(3) ΔG^o with pressure

(4) $\Delta G^o - T\Delta S^o$ with temperature

47. IBr_7 cannot exist but IF_7 exist. This fact can be explained in the basis of :
(1) Electronegativities
(2) Electron affinities
(3) Ratio of radii of atoms
(4) Reducing abilities

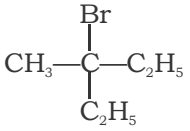
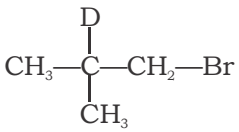
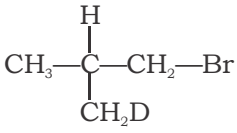
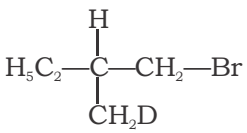
48. Which of the following is correct about V group Hydrides (from ammonia to Bismuthine) ?
(1) Their thermal stability gradually increase
(2) Their ease of preparation gradually increase
(3) The electron pair donating nature gradually decrease
(4) The bond energies gradually increase

49. Maximum oxidation state is shown by :
(1) Os (2) Mn
(3) Cr (4) Co

50. The complex $[Co(NH_3)_4(SCN)_2]Cl$ exhibits the isomerism which are :
(1) Linkage, ionization and geometrical
(2) Linkage, ionization and hydrate
(3) Ionization, geometrical and coordination
(4) Linkage, geometrical and polymerization

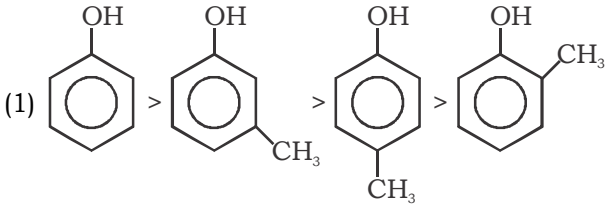
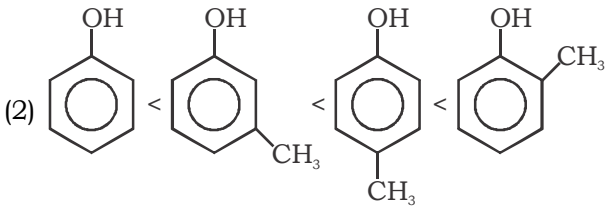
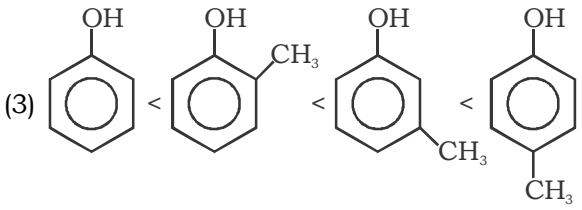
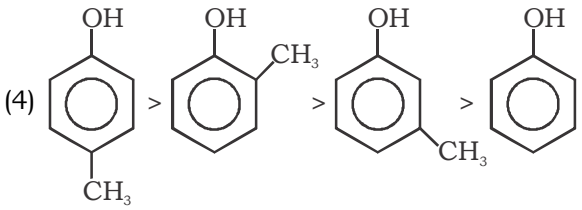
51. The complex, $[Ni(CN)_4]^{2-}$, is diamagnetic in nature, its geometry is :
(1) Tetrahedral (2) Square planar
(3) Octahedral (4) Unpredictable

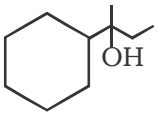
52. Which of the following alkyl halides on reaction with aq. KOH forms d/*l* mixture ?

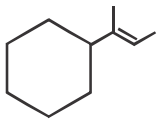
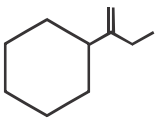
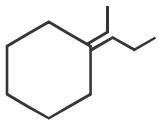
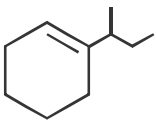
(1) 
(2) 
(3) 
(4) 

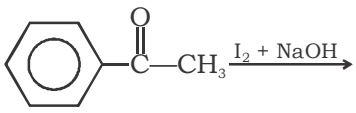
53. Of the following, which is an S_N1 reaction ?
(1) $(CH_3)_3CBr + H_2O \longrightarrow$
(2) $CH_3CH_2CH_2Cl + I^- \longrightarrow$
(3) $(CH_3)_3CBr + CN^- \longrightarrow$
(4) $CH_3CHBrCH_3 + \bar{O}H$ (alc.) $\longrightarrow$

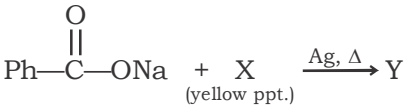
54. Correct acidic order of acidity is :

(1) 
(2) 
(3) 
(4) 

55. Which of the following is not the product of acid catalysed dehydration of  ?

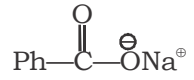
(1) 
(2) 
(3) 
(4) 

56. 



Identify final product 'Y' :

(1) CHI_3 (2) $HC \equiv CH$

(3)  (4) $H_2C = CH_2$

57. Which of the following compound on treatment with $LiAlH_4$ will give a product that will give positive iodoform test ?

(1) CH_3CH_2CHO (2) $CH_3CH_2CO_2CH_3$

(3) CH_3CH_2CN (4) CH_3COCH_3

58. The strongest base in aqueous solution among the following amines is :

(1) N-N-diethylethanamine

(2) N-ethylanamine

(3) N-methyl methanamine

(4) Ethanamine

59. Following reaction sequence is given :

$$A \xrightarrow[H_2O]{Br_2/} B \xrightarrow[HCl]{NaNO_2/} C \xrightarrow[H_2O]{H_3PO_2/} D$$

'D' is 1, 3, 5-tibromobenzene

Then, what is A :

(1)  (2) Phenol

(3) Aniline (4) None of these

60. Whic one of the following is an example of copolymer ?

(1) Buna – S (2) Teflon

(3) PVC (4) Polypropylene

61. Seven candidates were present in an interview. No two of them got equal marks. A scored more than B, and G scored more than A. Either D scored the highest and B or F scored the least, or alternately C scored the highest and E got the least.

If G ranked fifth, which of the following must be true?

(1) C was ranked second

(2) D was ranked first

(3) E was ranked third

(4) B was ranked fourth

62. Six students including P are sitting on two benches in two rows, three in each as the following :

Q is the neighbour of U, and R is the neighbour of T. S is second to the left of U. R is sitting diagonally opposite to S. T is not at the end of any row. Who is facing Q?

(1) T (2) S (3) Q (4) R

63. If 'M × N' means 'M is the daughter of N', 'M + N' means 'M is the father of N; '$M \div N$' means 'M is the mother of N' and 'M – N' means 'M is the brother of N', then in the expression '$P \div Q + R - T \times K$' how is P related to K?

(1) Mother-in-law

(2) Sister-in-law

(3) Aunt

(4) Daughter-in-law

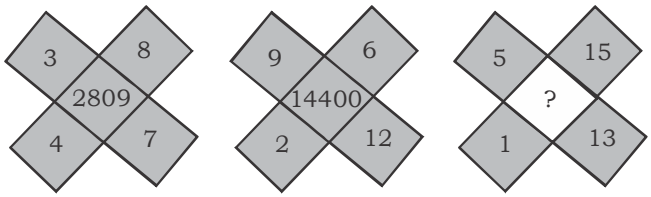
64. How many 5's are there in the following sequence such that the sum of the two immediately following digits is greater than the sum of the two immediately preceding digits?

3 7 6 5 8 3 2 4 5 5 4 8 7 9 1 5 3 4 8 7 5 9 8 7 6 4

(1) One (2) Two

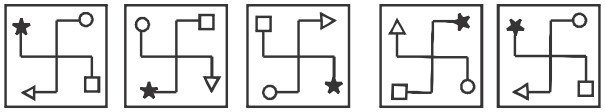
(3) Three (4) Four

65. Find the missing number from the options which will replace the question mark (?) in the given patterns.

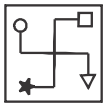


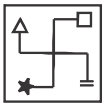
(1) 780 (2) 900 (3) 6400 (4) 8100

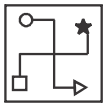
66. Choose the figure from the options which will continue the series.



(1) 

(2) 

(3) 

(4) 

67. Choose the correct water image of the given combination.

V A Y U 8 4 3 6

(1) ʌ∀ʎ∩8ϕƐ9 (2) ʌ∀ʎ∩8ϕƎϱ

(3) ʌ∀ʎ∩8ϕƎ9 (4) ʌ∀ʎ∩8ϕƐϱ

68. M is to the South-West of N, O is to the East of M and South-East of N and P is to the North of O on the line with MN. In which direction of N is P located?

(1) South (2) South-West

(3) North-East (4) North

69. The sheet of paper shown in Fig. (X) is to be folded to form a box. Choose from the boxes P, Q, R and S that are similar to the box so formed.

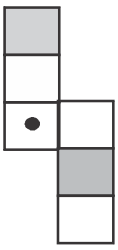
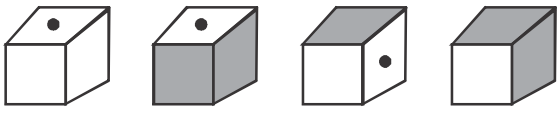


Fig. (X)

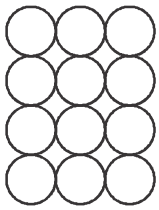


P Q R S

(1) Q and R only (2) P, R and S only

(3) Q and S only (4) P and S only

70. In the given figure, if the centres of all the circles are joined by horizontal and vertical lines, then find the number of squares that can be formed.



(1) 6 (2) 7 (3) 8 (4) 9

THIS SEGMENT IS ONLY FOR PCB GROUP STUDENTS

71. Which is not a unit of vegetative propagation–

(1) Gamete (2) Stolon

(3) Runner (4) Sucker

72. Liquid nitrogen occurs at temperature

(1) –19°C (2) –196°C (3) 96°C (4) 0°C

73. Semen– Sperm is

(1) Serum (2) Spermatozoa

(3) Seminal plasma (4) Spermatids

74. Incorrect statement is–

(1) In coitus interruptus male partner withdraws penis just after ejaculation

(2) Vaults are made of rubber that are inserted into female reproductive tract to cover cervix during coitus.

(3) Cu - T releases Cu to suppress sperm motility

(4) All of the above

75. If total number of alleles for a character are 5 then number of possible genotypes will be

(1) 5 (2) 10 (3) 6 (4) 15

76. RNA polymerase III in eukaryotes doesn't transcribe

(1) mRNA (2) tRNA

(3) 5srRNA (4) SnRNAs

77. (i) Sweet potato and potato are examples of analogy

(ii) The essence of Darwinian theory about natural selection is branching descent only

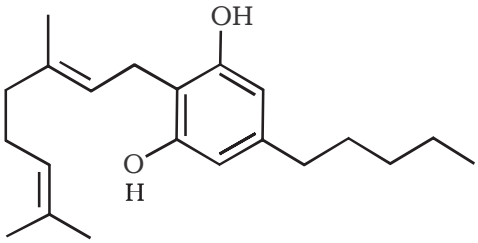
(iii) Lemur show convergent evolution with Numbat

(iv) Jawless fish probably evolved around 350 mya

(v) Ice age was around 75000–1,0000 years

How many statement are incorrect.

(1) 1 (2) 2 (3) 3 (4) 5

78. 

correct statement about figure.

(1) its receptors present in Gastrointestinal tract.

(2) Extracted from latex of poppy plant.

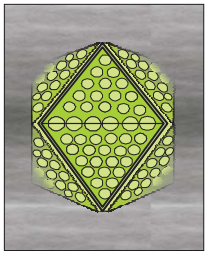
(3) Structure of Cannabinoid molecules.

(4) Structure of Morphine.

79. Which is not a variety of Okra ?

(1) Pusa Sawani (2) Pusa A-4

(3) Pusa Swarnim (4) All of the above

80. 

Correct statement about figure.

(1) Bacteriophase – infect bacteria

(2) Rhinovirus – cause common cold

(3) Adenovirus – cause respiratory infection

(4) Colonies of bacteria growing in petri dish

81. rop in pBR 322.

(1) Codes for the proteins involved in the replication of plasmid.

(2) Codes for the proteins involved in the transcription of DNA

(3) Both (1) and (2)

(4) Site for tetracycline

82. Ecology is a thread that

(1) Gives holistic perspective to biology

(2) Gives ridiculous perspective to biology

(3) Gives unauthorised perspective to biology

(4) Gives Irrelevant perspective to biology

83. Smoking is associated with increase incidence of cancers–

(1) Lung

(2) Throat

(3) Urinary bladder

(4) All of the above

84. Study of insulin like growth factor can be done by using.

(1) Transgenic animals

(2) Intergenic animals

(3) Intragenic animals

(4) Interspecific animals

85. Present population density is 2 million, birth rate is 10.5 and death rate is 10. Find the population density 2 years before (supposed growth exponential)–

(1) 735760 Approx

(2) 535760 Approx

(3) 635760 Approx

(4) 435760 Approx

86. _____ is potent force for organic evolution according to Darwin

(1) Intraspecific competition

(2) Interspecific competition

(3) Both (1) and (2)

(4) Intergeneric competition

87. In aquatic ecosystem _____a____ is major conduit for energy flow and in terrestrial ecosystem ____b____ is major conduit for energy flow.

	(a)	(b)
(1)	Grazing food chain,	Grazing food chain
(2)	Detritus food chain,	Detritus food chain
(3)	Grazing food chain,	Detritus food chain
(4)	Detritus food chain,	Grazing food chain

88. IUCN Red List (2004) documents extinction of _____ species of plants

(1) 77 (2) 67 (3) 97 (4) 87

89. Haryana kisan welfare–

(1) created by Ramesh Chandra Dagar

(2) presently has membership of 5000 farmers

(3) both (1) and (2)

(4) created by Ahmed Khan

90. Under unfavourable condition Amoeba undergoes

(1) Encystation

(2) Sporulation

(3) Fragmentation

(4) Pseudopodia formation

91. A, B, C are dominant form of genes controlling human skin colour then

(1) AABBCC is Mulatto (2) AaBbCc is Albino

(3) aabbcc is negro (4) None of the above

92. Drone in honeybees

(1) is produced by parthenocarpy

(2) is haploid

(3) has mother, both grand father but no father

(4) All of the above

93. HBB gene controlling thalasemia is located on

(1) Chromosome 7 (2) Chromosome 14

(3) Chromosome 11 (4) Chromosome 6

94. Embryological support for evolution was disapproved by–

(1) Karl Ernst Von Baer (2) Ernst Mayer

(3) Ernst Hackel (4) All of the above

95. Niche is comprised by

(1) invariable defined range of conditions that each organism can tolerate

(2) diversity in resources that each organism utilizes

(3) Functional role that each organism plays

(4) All of the above

96. _____ allows RNA polymerase access to promoter & hence transciption proceeds in lac operon

(1) Lactose (2) Fructose

(3) Allolactose (4) Both (1) & (3)

97. Threonine is not coded by–

(1) ACU (2) AAU (3) ACC (4) ACG

98. Which one is incorrect

(1) IVF – In Vivo Fertilization

(2) GIFT – Gamete Intrafallopian Transfer

(3) AI – Artificial Insemination

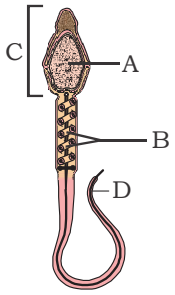
(4) ICSI – Intra Cytoplasmic Sperm Injection

99. Placenta does not produce–

(1) HCG (2) HPL

(3) Relaxin (4) None of the above

100.



Identify option that match with labelled parts and its function.

(1) A – Acrosome – Helps in enzyme secretion that helps in fertilization of ovum.

(2) B – Middle piece – Contains an elongated haploid nucleus

(3) C – Head– possesses numerous mitochondria which produce energy for movement

(4) D – Tail – helps in motility

THIS SEGMENT IS ONLY FOR PCM GROUP STUDENTS

71. Let $f(x) = \log\left(\frac{1+x}{1-x}\right)$ and $g(x) = \frac{3x + x^3}{1 + 3x^2}$ then, $f(g(x)) =$

(1) $2f(x)$ (2) $3f(x)$

(3) $[f(x)]^3$ (4) none of these

72. Set A has three elements and set B four elements. The number of injections that can be defined from A to B is

(1) 22 (2) 24

(3) 29 (4) none of these

73. If $\tan^{-1}x + \tan^{-1}y + \tan^{-1}z = \pi$, then value of $x + y + z =$

(1) xyz (2) 2xyz

(3) $\frac{1}{xyz}$ (4) none of these

74. If $a \le \sin^{-1}x + \cos^{-1}x + \tan^{-1}x \le b$ then

(1) $a = 0, b = 0$ (2) $a = 0, b = \pi$

(3) $a = 0, \beta = \frac{\pi}{2}$ (4) none

75. Let A, B, C, D be the matrices of order 2×3, 3×4, 4×4, 4×2 respectively. Let $x = (\alpha AB\gamma C^2D)^3$ where α and γ are scalars. Let $|x| = k|ABC^2D|^3$ then $k =$

(1) $\alpha\gamma$ (2) $\alpha^3\gamma^3$

(3) $\alpha^6\gamma^6$ (4) none of these

76. If c_{ij} is the co-factor of the element a_{ij} of the determinant $\begin{vmatrix} 2 & -3 & 5 \\ 6 & 0 & 4 \\ 1 & 5 & -7 \end{vmatrix}$

Then the value of $a_{32} \cdot c_{32} =$

(1) 100 (2) 110

(3) 22 (4) none of these

77. If $\sin y + e^{-x\cos y} = e$, then $\frac{dy}{dx}$ at $(1, \pi)$ is equal to

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

(3) $e^x \cos y$ (4) none of these

78. A point on the hypotenuse of a right triangle is at distance a and b from the sides of the triangle. The minimum length of the hypotenuse is

(1) $\left(a^{2/3} + b^{2/3}\right)$ (2) $\left(a^{2/3} + b^{2/3}\right)^{\frac{3}{2}}$

(3) $(a + b)^{3/2}$ (4) none of these

79. If $f(x) = \lim_{y \to x} \frac{\sin^2 y - \sin^2 x}{y - x}$, then $\int 4 \cdot f(x)dx = ?$

(1) $\cos 2x + c$ (2) $2\cos 2x + c$

(3) $-\cos 2x + c$ (4) $-2\cos 2x + c$

80. $\int \cos(\log x)dx = f(x) + c$, where c is an arbitrary constant. Here $f(x) =$

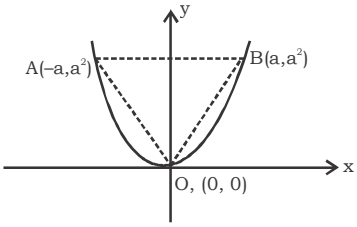
(1) $x[\cos(\log x) + \sin(\log x)]$

(2) $x[\cos(\log x) - \sin(\log x)]$

(3) $\frac{x}{2}[\cos(\log x) + \sin(\log x)]$

(4) $\frac{x}{2}[\cos(\log x) - \sin(\log x)]$

81. The figure shows as triangle AOB and the parabola $y = x^2$. The ratio of the area of the triangle AOB to the area of the region AOB of the parabola $y = x^2$ is equal to



(1) $\frac{3}{5}$ (2) $\frac{3}{4}$ (3) $\frac{7}{8}$ (4) $\frac{5}{6}$

82. The area in the first quadrant between $x^2 + y^2 = \pi^2$ and $y = \sin x$ is—

(1) $\frac{\pi^3 - 8}{4}$ (2) $\frac{\pi^3}{4}$

(3) $\frac{\pi^3 - 16}{4}$ (4) $\frac{\pi^3 - 8}{2}$

83. The differential equation representing the family of curves $y^2 = 2c(x + \sqrt{c})$, where c is a positive parameter, is of _____.

(1) order 1, degree 2 (2) order 1, degree 3

(3) order 2, degree 3 (4) order 1, degree 1

84. If m and n denote respectively the order and degree of differential equation

$$\left[a + \left(\frac{dy}{dx}\right)^6\right]^{7/5} = b\frac{d^2y}{dx^2}$$

then the value of (m, n) will be

(1) (1, 7) (2) (1, 6) (3) (2, 5) (4) (2, 6)

85. Let $\vec{a} = -\hat{i} - \hat{k}, \vec{b} = -\vec{i} + \vec{j}$ and $\vec{c} = \hat{i} + 2\hat{j} + 3\hat{k}$ be three given vectors. If $\vec{r}$ is a vector such that $\vec{r} \times \vec{b} = \vec{c} \times \vec{b}$ and $\vec{r} \cdot \vec{a} = 0$ then the value of $\vec{r} \cdot \vec{b}$ is

(1) 3 (2) 6 (3) 9 (4) 12

86. Three non-zero vectors $\vec{a}, \vec{b}$ and $\vec{c}$ are related as $\vec{c} = 2\vec{a}$ and $\vec{b} = -5\vec{c}$ then the angle between $\vec{a}$ and $\vec{b}$ is —

(1) 0° (2) 45° (3) 90° (4) 180°

87. A line makes the same angle θ with each of the x and z axis. If it makes the angle β with y-axis such that $\sin^2\beta = 3\sin^2\theta$, then $\cos^2\theta$ equals

(1) $\frac{3}{5}$ (2) $\frac{1}{2}$ (3) $\frac{2}{5}$ (4) $\frac{2}{3}$

88. The cosine of the angle between any two diagonals of a cube is—

(1) $\frac{1}{3}$ (2) $\frac{1}{2}$ (3) $\frac{2}{3}$ (4) $\frac{1}{\sqrt{3}}$

89. Consider the linear programming problem max. $Z = 4x + y$

Subject to $x + y \le 50; x + y \ge 100; x, y \ge 0$

The max. value of z is

(1) 0 (2) 50

(3) 100 (4) does not exist

90. If $P(A) = \frac{1}{4}, P(B) = \frac{1}{5}$ and $P(AB) = \frac{1}{8}$ then $P\left(\frac{A^C}{B^C}\right) =$

(1) $\frac{21}{32}$ (2) $\frac{25}{32}$ (3) $\frac{27}{32}$ (4) $\frac{29}{32}$

91. The derivative of $\sin^{-1}\left(\frac{2x}{1+x^2}\right)$ w.r.t. $\cos^{-1}\left(\frac{1-x^2}{1+x^2}\right)$ is —

(1) 1 (2) 1/2

(3) –1 (4) none of these

92. The point on the curve $y = x^2 - x - 8$ at which the tangent is parallel to x-axis is—

(1) $\left(\frac{1}{2}, \frac{33}{4}\right)$ (2) $\left(\frac{1}{2}, -\frac{33}{4}\right)$

(3) $\left(\frac{1}{4}, \frac{33}{2}\right)$ (4) none of these

93. The value of $\int \frac{\tan(\sin^{-1} x)}{\sqrt{1-x^2}} dx$

(1) $\log|\sec(\sin^{-1}x)|$ (2) $\log(\sin^{-1}x)$

(3) $\log \sec x$ (4) none of these

94. If $\int_a^b \frac{x^n}{x^n + (16 - x)^n} dx = 6$, then :

(1) $a = 3, b = 2, n \in R$

(2) $a = 2, b = 14, n \in R$

(3) $a = 7, b = 118, n \in R$

(4) none of these

95. The area of the region bounded by the curve $y = \sin x$ between the ordinates $x = 0$, $x = \frac{\pi}{2}$ and x-axis is

(1) 1 sq. unit (2) 3 sq. unit

(3) 11 sq. unit (4) none of these

96. If $A = \begin{pmatrix} 1 & 5 \\ 0 & 2 \end{pmatrix}$, then

(1) $A^2 - 2A + 2I = 0$ (2) $A^2 - 3A + 2I = 0$

(3) $A^2 - 5A + 2I = 0$ (4) $2A^2 - A + I = 0$

97. If a, b, c are distinct positive real number then the value of the determinant $\begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix}$ is

(1) < 0 (2) > 0 (3) 0 (4) ≥ 0

98. $\int \cos^3 x \cdot e^{\log \sin x} dx = \int \cos^3 x \sin x \, dx =$

(1) $\frac{\cos^4 x}{4x} + c$ (2) $-\frac{\cos^4 x}{4x} + c$

(3) $-\frac{\cos^4 x}{4} + c$ (4) none of these

99. If $|\vec{a}| = 3, |\vec{b}| = 4$, then the value of α for which $\vec{a} + \alpha \vec{b}$ is perpendicular to $\vec{a} - \alpha \vec{b}$, is

(1) $\frac{2}{3}$ (2) $\frac{3}{4}$ (3) $\frac{5}{8}$ (4) none of these

100. If $\tan^{-1}\left(\frac{x+1}{x-1}\right) + \tan^{-1}\left(\frac{x-1}{x}\right) = \tan^{-1}(-7)$, then x =

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

(3) 4 (4) none of these

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PHY + CHEM + REAS.				BIO	MATH
1. (3)	31. (1)	61. (2)		71. (1)	71. (2)
2. (2)	32. (2)	62. (1)		72. (2)	72. (2)
3. (2)	33. (3)	63. (1)		73. (3)	73. (1)
4. (2)	34. (1)	64. (3)		74. (1)	74. (2)
5. (3)	35. (4)	65. (3)		75. (4)	75. (3)
6. (4)	36. (4)	66. (2)		76. (1)	76. (2)
7. (2)	37. (3)	67. (2)		77. (2)	77. (2)
8. (4)	38. (4)	68. (3)		78. (3)	78. (2)
9. (4)	39. (3)	69. (2)		79. (3)	79. (4)
10. (2)	40. (3)	70. (3)		80. (3)	80. (3)
11. (1)	41. (2)			81. (1)	81. (2)
12. (4)	42. (1)			82. (1)	82. (1)
13. (2)	43. (1)			83. (4)	83. (2)
14. (1)	44. (1)			84. (1)	84. (3)
15. (2)	45. (2)			85. (1)	85. (3)
16. (4)	46. (1)			86. (2)	86. (4)
17. (2)	47. (3)			87. (3)	87. (1)
18. (2)	48. (3)			88. (4)	88. (1)
19. (1)	49. (1)			89. (3)	89. (4)
20. (2)	50. (1)			90. (1)	90. (3)
21. (2)	51. (2)			91. (4)	91. (1)
22. (3)	52. (4)			92. (2)	92. (2)
23. (3)	53. (1)			93. (3)	93. (1)
24. (3)	54. (1)			94. (1)	94. (2)
25. (1)	55. (4)			95. (4)	95. (1)
26. (3)	56. (2)			96. (4)	96. (2)
27. (3)	57. (4)			97. (2)	97. (1)
28. (1)	58. (2)			98. (1)	98. (3)
29. (3)	59. (3)			99. (4)	99. (2)
30. (4)	60. (1)			100. (4)	100. (2)

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