104 MSC INTEGRATED BIOLOGICAL SCIENCES

SHIFT III

PHYSICS

1. A certain screw gauge has a pitch of 0.5 mm. If there are 50 divisions on the head scale, the dimension of the object can then be determined to an accuracy of

|  |  |
| --- | --- |
| (A) | 0.05 cm |
| (B) | 0.01 cm |
| (C) | 0.001 cm |
| (D) | 0.0001 cm |

2. The refractive index of glass measured by a given method by four independent measurements is found to have values of 1.54, 1.58, 1.52 and 1.56 respectively. The mean value of refractive index with percentage error is

|  |  |
| --- | --- |
| (A) | 1.55 ± 1.29 % |
| (B) | 1.55 ± 0 % |
| (C) | 1.56 ± 6 % |
| (D) | 1.56 ± 0 % |

3. A particle moves for 20 seconds with velocity 3 m/s and then with velocity 4 m/s for another 20 seconds and finally moves with velocity 5 m/s for next 20 seconds. Then the average velocity of the particle is

|  |  |
| --- | --- |
| (A) | 3 m/s |
| (B) | 4 m/s |
| (C) | 5 m/s |
| (D) | Zero |

4. An athlete completes one round of a circular track of radius *R* in 40 s. What will be his displacement at the end of 2 min 40 seconds?

|  |  |
| --- | --- |
| (A) | 8*R* |
| (B) | 8*R* |
| (C) | 2*R* |
| (D) | Zero |

5. A wheel having 1 m diameter makes 60 revolutions per minute. The linear speed of a point on its circumference is

|  |  |
| --- | --- |
| (A) | *π*/2 m/s |
| (B) | *π* m/s |
| (C) | 2*π*  m/s |
| (D) | 60*π* m/s |

6. A car starts from rest to cover a distance *s*. The coefficient of friction between the road and the tyres is *μ*. The maximum time in which the car can cover the distance is proportional to

|  |  |
| --- | --- |
| (A) | *μ* |
| (B) |  |
| (C) | 1/*μ* |
| (D) | 1/ |

7. A diesel engine pumps 40 kg of water in 1 second. The water comes out vertically upwards with a velocity of 3 m/s. What is the power of the engine in kilo Watt?

|  |  |
| --- | --- |
| (A) | 12 kW |
| (B) | 1.2 kW |
| (C) | 120 kW |
| (D) | 1200 kW |

8. Which one of the following is the S.I. unit of electric field strength?

|  |  |
| --- | --- |
| (A) | Am–1 |
| (B) | Nm–1 |
| (C) | Vm–1 |
| (D) | Coulomb s–1cm–1 |

9. If the distance between the two charged particles is reduced to half the original distance, then the force between them becomes

|  |  |
| --- | --- |
| (A) | doubled |
| (B) | one-forth |
| (C) | one-half |
| (D) | four times |

10. A metal sheet is placed between two charges separated by a distance. Then the force between them will

|  |  |
| --- | --- |
| (A) | increase |
| (B) | decrease |
| (C) | remains the same |
| (D) | be reduced to half the initial value |

11. If the separation between carbon and oxygen in CO molecule is 0.12 nm, then the distance of the center of mass from the carbon atom is

|  |  |
| --- | --- |
| (A) | 0.03 nm |
| (B) | 0.068 nm |
| (C) | 0.05 nm |
| (D) | 0.06 nm |

12. A hole is drilled along the earth’s diameter and a stone is dropped into it. When the stone is at the center of the earth, it has

|  |  |
| --- | --- |
| (A) | mass |
| (B) | weight |
| (C) | potential energy |
| (D) | zero mass |

13. Two wires of the same radius and material have lengths in the ratio 1:2. If these are stretched by the same force, the strain produced in the two cases will be in the ratio

|  |  |
| --- | --- |
| (A) | 1:2 |
| (B) | 2:1 |
| (C) | 1:1 |
| (D) | 4:1 |

14. The phase difference between the displacement and velocity of a particle executing SHM is

|  |  |
| --- | --- |
| (A) | *π*/2 |
| (B) | *π* |
| (C) | *π*/4 |
| (D) | 0 |

15. Standing waves are produced in a 10 m long stretched string. If the string vibrates in 5 segments and the wave velocity is 20 m/sec, the frequency is

|  |  |
| --- | --- |
| (A) | 2 Hz |
| (B) | 4 Hz |
| (C) | 5 Hz |
| (D) | 10 Hz |

16. A parallel plate condenser is charged and isolated. When a sheet of glass is interposed between the plates

|  |  |
| --- | --- |
| (A) | the charges on the plates will be reduced |
| (B) | the potential difference between the plates will be reduced |
| (C) | the potential difference between the plates will be increased |
| (D) | the charges on the plates will be increased |

17. If a capacitor of Capacitance 10 micro Farad (µF) is charged to a potential difference of 100 V, the energy stored in it is

|  |  |
| --- | --- |
| (A) | 0.5 J |
| (B) | 0.05 ergs |
| (C) | 10 J |
| (D) | 0.05 J |

18. With increase in altitude, the conductivity of the atmosphere

|  |  |
| --- | --- |
| (A) | first increases and then decreases |
| (B) | increases |
| (C) | decreases |
| (D) | remains constant |

19. An electric iron box has a heater coil of resistance 50 Ω. If it is connected to 230 V AC mains, the current flowing through the heater coil will be

|  |  |
| --- | --- |
| (A) | 4.6 mA |
| (B) | 5 A |
| (C) | 4.6 A |
| (D) | 15 A |

20. Glass has a resistivity of the order of

|  |  |
| --- | --- |
| (A) | 10–8 Ω m |
| (B) | 10–5 Ω m |
| (C) | 108 Ω m |
| (D) | 10 12 Ω m |

21. A long solenoid of *n* turns has a self inductance *L* and area of cross section *a*. When a current flows through the solenoid, it produces a magnetic field *B*. The current flowing through the solenoid is

|  |  |
| --- | --- |
| (A) | *B a n / L* |
| (B) | *BanL* |
| (C) | *Bn / aL* |
| (D) | *B / anL* |

22. A conductor of length *r* moves in a uniform magnetic field of induction *B* with a velocity ***v***. The emf induced across the conductor is

|  |  |
| --- | --- |
| (A) | (*v × B*) *. r* |
| (B) | *v.* (*r × B*) |
| (C) | *B .* (*r × v*) |
| (D) | *r ×* (*v × B*) |

23. The penetrating powers of *α*, *β* and *γ* radiation, in decreasing order are

|  |  |
| --- | --- |
| (A) | *α*, *β*, *γ* |
| (B) | *γ*, *α*, *β* |
| (C) | *β*, *γ*, *α* |
| (D) | *γ*, *β*, *α* |

24. A half-wave rectifier is being used to rectify an alternating voltage of frequency 50 Hz. The number of pulses of rectified current obtained in one second is

|  |  |
| --- | --- |
| (A) | 50 |
| (B) | 25 |
| (C) | 100 |
| (D) | 6 |

25. The voltage *V* and the current *I* flowing through an A.C circuit are given by *V =* 2 cos100 *πt* and *I =* 4 sin *100 πt*, where *t* represents time. The power dissipated in the circuit is

|  |  |
| --- | --- |
| (A) | zero Watt |
| (B) | 8 Watt |
| (C) | 4 Watt |
| (D) | 2 Watt |

26. An alternating e.m.f. is given by *V =* 100 sin 314 *t*. Its frequency is

|  |  |
| --- | --- |
| (A) | 100 Hz |
| (B) | 50 Hz |
| (C) | 314 Hz |
| (D) | 60 Hz |

27. In a purely inductive circuit, the current

|  |  |
| --- | --- |
| (A) | is in phase with voltage |
| (B) | is out of phase with voltage |
| (C) | leads the voltage by 90° |
| (D) | lags behind the voltage by 90° |

28. The current and voltage in an A.C. circuit are given by and *E = Eo* sin *ωt*. Then the average power consumption *P* in the circuit is

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) | zero |

29. Two electric bulbs whose resistances are in the ratio 1:2, are connected in parallel to a constant voltage source. The power dissipated in them is in the ratio

|  |  |
| --- | --- |
| (A) | 1:2 |
| (B) | 2:1 |
| (C) | 1:1 |
| (D) | 1:4 |

30. The neutral temperature for a thermocouple is 270°C. If the temperature of the cold junction is 15°C, then the inversion temperature is

|  |  |
| --- | --- |
| (A) | 255°C |
| (B) | 285°C |
| (C) | 570°C |
| (D) | 525°C |

31. A source emits a sound of frequency 400 Hz but the listener hears it to be 390 Hz. Then

|  |  |
| --- | --- |
| (A) | the listener is moving towards the source |
| (B) | the source is moving toward the listener |
| (C) | the listener is moving away from the source |
| (D) | the listener has a defective ear |

32. The binding energy of the electron in a hydrogen atom is 13.6 eV, the energy required to remove the electron from the first excited state of Li++ is

|  |  |
| --- | --- |
| (A) | 122.4 eV |
| (B) | 30.6 eV |
| (C) | 13.6 eV |
| (D) | 3.4 eV |

33. Which of the following nuclei has lowest value of the binding energy per nucleon?

|  |  |
| --- | --- |
| (A) | 2He4 |
| (B) | 24Cr52 |
| (C) | 62Sm152 |
| (D) | 80Hg100 |

34. The average number of neutrons emitted during the fission of U235 is

|  |  |
| --- | --- |
| (A) | 3 |
| (B) | 2 |
| (C) | 1.5 |
| (D) | 2.5 |

35. The radioactive decay of uranium into thorium is represented by the equation 92U238 → 90Th234 + X, then X is

|  |  |
| --- | --- |
| (A) | an electron |
| (B) | a neutron |
| (C) | a proton |
| (D) | an alpha particle |

36. The same radioactive nucleus may emit

|  |  |
| --- | --- |
| (A) | all the three *α*, *β* and *γ* simultaneously |
| (B) | either *α* or *β* or *γ* at a time |
| (C) | all the three *α*, *β* and *γ* at a time |
| (D) | only *α* and *β* |

37. The radius of a nucleus of mass number A is proportional to

|  |  |
| --- | --- |
| (A) | A |
| (B) | A½ |
| (C) | A⅓ |
| (D) | A3 |

38. Which one of the statements about nuclear forces is INCORRECT?

|  |  |
| --- | --- |
| (A) | Nuclear forces are short range forces |
| (B) | Nuclear forces are charge independent forces |
| (C) | Nuclear forces are exchange forces |
| (D) | Nuclear forces are central forces |

39. Which one of the statements about neutron is INCORRECT?

|  |  |
| --- | --- |
| (A) | Neutron is a fundamental particle |
| (B) | Neutron has no charge |
| (C) | Nuclei of all elements in nature contain neutron |
| (D) | Neutron has a spin |

40. The ground state energy of the hydrogen atom is

|  |  |
| --- | --- |
| (A) | 13.6 eV |
| (B) | 0 eV |
| (C) | –3.4 eV |
| (D) | –13.6 eV |

41. Which one of the statements about matter waves is INCORRECT?

|  |  |
| --- | --- |
| (A) | Matter waves are not electromagnetic waves |
| (B) | Matter waves are also called probability waves |
| (C) | de Broglie waves are pilot waves i.e., these waves guide the particle |
| (D) | The phase velocity of the matter waves in vacuum is independent of wavelength |

42. Kinetic energy of the cathode rays (electrons) depend on

|  |  |
| --- | --- |
| (A) | voltage applied to the electrode |
| (B) | depend on work function |
| (C) | depend on both (A) and (B) |
| (D) | does not depend on any physical quantity |

43. A man cannot see objects clearly at a distance greater than 2 m. He is then suffering from

|  |  |
| --- | --- |
| (A) | short sight |
| (B) | long sight |
| (C) | astigmatism |
| (D) | presbyopia |

44. The magnifying power of a simple microscope can be increased by if we use eyepiece of

|  |  |
| --- | --- |
| (A) | higher focal length |
| (B) | smaller focal length |
| (C) | higher diameter |
| (D) | smaller diameter |

45. If the focal length of the objective and eyepiece lens of an astronomical telescope are  and ** respectively, then its magnifying power is

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) |  |

46. If and  stand for focal length of the lens for red colour and violet colour respectively, then the longitudinal chromatic aberration of the lens for parallel rays is given by

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) |  |

47. The deviation produced by a flint glass prism for violet and red light rays are 3.25° and 3.10° respectively. Then the angular dispersion is

|  |  |
| --- | --- |
| (A) | 6.35° |
| (B) | 3.175° |
| (C) | 0.15° |
| (D) | 6.35 radians |

48. Total internal reflection is NOT possible in the case when light travels from

|  |  |
| --- | --- |
| (A) | glass to air |
| (B) | glass to water |
| (C) | water to glass |
| (D) | water to air |

49. When the angle of incidence on a certain material is 60°, the reflected light is completely polarized. The angle of refraction is then

|  |  |
| --- | --- |
| (A) | 60° |
| (B) | 90° |
| (C) | 30° |
| (D) | 45° |

50. A sugar solution of length 15 cm has specific rotation of 65° and produces a optical rotation of 7°. Then the concentration of the solution is

|  |  |
| --- | --- |
| (A) | 0.7 g/cc |
| (B) | 13.9 g/cc |
| (C) | 0.0717 g/cc |
| (D) | 0.01g/cc |

51. To observe diffraction, the size of an obstacle

|  |  |
| --- | --- |
| (A) | should be of the order of wavelength |
| (B) | should be much larger than the wavelength |
| (C) | has no relation to wavelength |
| (D) | should be exactly *λ*/2. |

52. If the distance between the screen and the slit is doubled in Young’s double slit experiment, the fringe width will become

|  |  |
| --- | --- |
| (A) | four times |
| (B) | two times |
| (C) | one-half |
| (D) | one-fourth |

53. When light waves suffer reflection at the interface between air and glass, the change of phase of the reflected wave is

|  |  |
| --- | --- |
| (A) | zero |
| (B) | *π* |
| (C) | 2*π* |
| (D) | *π*/2 |

54. If a string of string constant *k* is stretched by a length *x* under tension *T*, the energy stored is

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) |  |

55. The Young’s modulus of a perfectly rigid body is

|  |  |
| --- | --- |
| (A) | zero |
| (B) | unity |
| (C) | infinite |
| (D) | may be any finite non-zero value |

56. A wire elongates by *l* mm when a load W is hanged at from it. If the wire goes over a pulley and the two weights W each are hung at the two ends, the elongation of the wire (in mm) will be

|  |  |
| --- | --- |
| (A) | *l*/2 |
| (B) | *l* |
| (C) | 2*l* |
| (D) | zero |

57. If two liquids of same masses but densities  and  respectively are mixed, then the density of the mixture is

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) |  |

58. A boy carries on his head an airtight box containing a bird resting on the floor of the box. When the bird starts flying inside the box, he will feel that the box is now

|  |  |
| --- | --- |
| (A) | lighter |
| (B) | heavier |
| (C) | same in weight as before |
| (D) | lighter in the beginning and heavier later |

59. A cork ball is floating on the surface of water in a beaker. The beaker is covered with a bell jar and the air is evacuated. What will happen to the ball?

|  |  |
| --- | --- |
| (A) | Sink a little |
| (B) | Rise a little |
| (C) | Remain unchanged |
| (D) | Sink completely |

60. The thermometer used as a reference standard is

|  |  |
| --- | --- |
| (A) | mercury thermometer |
| (B) | platinum resistance thermometer |
| (C) | gas thermometer |
| (D) | thermocouple thermometer |

61. If *α* is coefficient of linear expansion, *β* is coefficient of superficial expansion and *γ* is the coefficient of cubical expansion, then for the same rise in temperature, the percentage changes in *α*, *β* and *γ* are in the ratio

|  |  |
| --- | --- |
| (A) | 1:2:3 |
| (B) | 3:2:1 |
| (C) | 1:1:1 |
| (D) | 1:2:4 |

62. If *K* and *σ* respectively are the thermal and electrical conductivities of a metal at absolute temperature *T*, then

|  |  |
| --- | --- |
| (A) | = constant |
| (B) | = constant |
| (C) | = constant |
| (D) | = constant |

63. The velocity *V* of thermal radiation is (*C* = velocity of light in vacuum)

|  |  |
| --- | --- |
| (A) | *V < C* |
| (B) | *V > C* |
| (C) | *V = C* |
| (D) | dependent on the medium |

64. Which one of the following statements about electromagnetic waves is INCORRECT?

|  |  |
| --- | --- |
| (A) | They do not require material medium for propagation |
| (B) | They are not deflected in electric an magnetic fields |
| (C) | The waves are transverse in nature |
| (D) | They cannot be diffracted |

65. If  and  represent electric and magnetic field vectors of the electromagnetic waves, then the direction of propagation of the waves will be along

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) |  |

66. The area of *B-H* hysteresis loop in a ferromagnetic material is a measure of the

|  |  |
| --- | --- |
| (A) | net energy dissipated per unit volume per cycle of magnetization of the material |
| (B) | permeability of the material |
| (C) | susceptibility of the material |
| (D) | retentivity of the material |

67. The unit cubic cell of Al has an edge length equal to 4.5 × 10–10 m. The number of unit cells in an aluminium foil of volume 91 × 10–6 m3 is

|  |  |
| --- | --- |
| (A) | 1024 |
| (B) | 10–24 |
| (C) | 108 |
| (D) | 1023 |

68. The gate with the Boolean expression  for its output is

|  |  |
| --- | --- |
| (A) | AND |
| (B) | NAND |
| (C) | XOR |
| (D) | XNOR |

69. The Boolean expression for NOR gate is

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) |  |

70. What gate has the truth table given below?

|  |  |  |
| --- | --- | --- |
| A | B | Y |
| 0 | 0 | 0 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |

|  |  |
| --- | --- |
| (A) | NOT |
| (B) | AND |
| (C) | NAND |
| (D) | NOR |

71. A transistor amplifier is operated in common emitter configuration at constant collector voltage of *VC* = 1.5 V, such that the change in the base current from 100 μA to 150 μA produces a change in the collector current from 5 mA to 10 mA. The current gain *β* of the circuit is then

|  |  |
| --- | --- |
| (A) | 50 |
| (B) | 67 |
| (C) | 75 |
| (D) | 100 |

72. A two stage transistor amplifier has a gain of 10 for the first stage and a gain of 20 for the second stage. The overall gain of the cascade amplifier will be

|  |  |
| --- | --- |
| (A) | 30 |
| (B) | 10 |
| (C) | 200 |
| (D) | 2 |

73. Long range radio transmission is possible when the radio waves are reflected from the ionosphere. For this to happen, the frequency of the radio waves must be in the range

|  |  |
| --- | --- |
| (A) | 80-150 MHz |
| (B) | 8-25 MHz |
| (C) | 1-3 MHz |
| (D) | 150-1500 kHz |

74. The colour of a star is dependent on its

|  |  |
| --- | --- |
| (A) | radius |
| (B) | distance from the earth |
| (C) | temperature |
| (D) | structure |

75. Hubble constant *H* has the dimensions of

|  |  |
| --- | --- |
| (A) | mass |
| (B) | length |
| (C) | (time)–1 |
| (D) | temperature |

CHEMISTRY

76. Given the latent heat of vapouration of water as 40.7 kJ mol–1 at 373 K, ∆S for one mole of water converted to steam at 373 K is

|  |  |
| --- | --- |
| (A) | 109.1 JK–1 mol–1 |
| (B) | 40.7 kJ mol–1 |
| (C) | 81.4 kJ mol–1 |
| (D) | 218.2 JK–1 mol–1 |

77. For a non-linear triatomic gas the value of the ratio of Cp and Cv at laboratory temperature is (assuming no vibrational contribution)

|  |  |
| --- | --- |
| (A) | 7/5 |
| (B) | 9/7 |
| (C) | 8/3 |
| (D) | 4/3 |

78. 6 moles of SO2 and 6 moles of O2 are allowed to form SO3 in a closed vessel. At the equilibrium stage, 60% of SO2 is used up. The total number moles of the mixture at equilibrium is

|  |  |
| --- | --- |
| (A) | 10.2 |
| (B) | 9.8 |
| (C) | 7.2 |
| (D) | 11.2 |

79. pH of a solution obtained by mixing equal volumes of the solutions with pH 3 and pH 5 is

|  |  |
| --- | --- |
| (A) | 4.0 |
| (B) | 3.5 |
| (C) | 3.3 |
| (D) | 2.0 |

80. The Ksp of AgCl is 1 × 10–10, its solubility in pure water in 0.01 M NaCl is

|  |  |
| --- | --- |
| (A) | 2 × 10–10 |
| (B) | 1 × 10–8 |
| (C) | 2 × 10–8 |
| (D) | 1 × 10–10 |

81. The edge length of fcc unit cell is 508 pm. The radius of the atom is …………… pm.

|  |  |
| --- | --- |
| (A) | 180 |
| (B) | 200 |
| (C) | 618 |
| (D) | 288 |

82. Crystalline solids having the least enthalpy of fusion is

|  |  |
| --- | --- |
| (A) | Molecular solid |
| (B) | Metallic solid |
| (C) | Ionic solid |
| (D) | Covalent solid |

83. Vapour pressure of water at 298 K is 19.8 mm of Hg. 0.1 mole of glucose is dissolved in 172.8 g of water. The vapour pressure of the solution is

|  |  |
| --- | --- |
| (A) | 19.6 mm |
| (B) | 16.9 mm |
| (C) | 19.0 mm |
| (D) | 18.9 mm |

84. Osmotic pressure of blood is 8.21 atm at 37°C. Amount of glucose that should be used per litre of intravenous injection that is at the same osmotic pressure of blood is

|  |  |
| --- | --- |
| (A) | 58.4 g |
| (B) | 29.2 g |
| (C) | 5.84 g |
| (D) | 2.92 g |

85. The equitant conductance of 1 M benzoic acid is 12.8 Scm2 eq–1 and if the limiting equivalent conductance of benzoate ion and H+ ion are 42 and 288.42 Scm2 eq–1, respectively, its degree of dissociation is

|  |  |
| --- | --- |
| (A) | 39% |
| (B) | 3.9% |
| (C) | 0.35% |
| (D) | 0.039% |

86. Two half-cells of electrode potentials of E1 and E2 are combined to form a cell of potential E3, (n1, n2 and n3 are number of electrons involved in first electrode, second electrode and the cell) E3 is

|  |  |
| --- | --- |
| (A) | E3 = E2 – E1 |
| (B) | E3 = (E1n1 + E2n2)/n3 |
| (C) | E3 = (E1n1 – E2n2)/n32 |
| (D) | E3 = E1 + E2 |

87. The potential of half-cell consisting of zinc electrode in 0.01 M ZnSO4 solution at 25°C is (E° = –0.763 V)

|  |  |
| --- | --- |
| (A) | –0.8221 V |
| (B) | –0.704 V |
| (C) | –0.881 V |
| (D) | –0.645 V |

88. A dilute aqueous solution of CuSO4 is electrolyzed using Pt electrodes. The products at the anode and cathode are

|  |  |
| --- | --- |
| (A) | O2, H2 |
| (B) | H2, O2 |
| (C) | O2, Cu |
| (D) | S2O82–, H2 |

89. The half-life for radioactive decay of C14 is 5730 years. An archaeological artefact containing wood had only 80% of the C14 found in living tree. The age of the sample is

|  |  |
| --- | --- |
| (A) | 1845 years |
| (B) | 2865 years |
| (C) | 4584 years |
| (D) | 1146 years |

90. If the volume of the reaction vessel is halved, for the reaction, 2SO2(g) + O2(g) 2SO3(g), then the rate is

|  |  |
| --- | --- |
| (A) | 1/6th of its initial value |
| (B) | 1/4th of its initial value |
| (C) | 8 times of its initial value |
| (D) | 4 times of its initial value |

91. The rate equation for a reaction: A → B is r = k[A]0. If the initial concentration of the reactant is ‘a’ mol dm–3, then half-life period of reaction is

|  |  |
| --- | --- |
| (A) | a/k |
| (B) | 2a/k |
| (C) | a/2k |
| (D) | k/a |

92. The number of unit cells present in 39 g of potassium that crystallizes as body centered cubic structure is (NA = Avogadro number)

|  |  |
| --- | --- |
| (A) | NA |
| (B) | 0.25 NA |
| (C) | 0.5 NA |
| (D) | 0.75 NA |

93. Which one of the following is not correctly matched?

|  |  |
| --- | --- |
| (A) | [Ni(CN)4]2− – dsp2 hybridization, dia-magnetic |
| (B) | [Cu(NH3)4]2+ – sp3 hybridization, para-magnetic |
| (C) | [NiCl4]2− – sp3 hybridization, tetrahedral |
| (D) | [CuCl4]2− – sp3 hybridization, para-magnetic |

94. Which one of the following statements is not true according to Werner’s theory of coordination compounds?

|  |  |
| --- | --- |
| (A) | Both primary and secondary valencies can be satisfied by anions |
| (B) | Secondary valency is non-directional |
| (C) | Primary valency is ionic valency |
| (D) | Metal ions exhibit two types of valencies |

95. Which one of the following is true regarding the energies of d-orbitals of tetragonally distorted octahedral geometry?

|  |  |
| --- | --- |
| (A) | dyz > dxz > dxy |
| (B) |  |
| (C) | dxz > dyz |
| (D) |  |

96. In the estimation of Ca(II) ions, in the presence of ammonia-ammonium chloride buffer solution, EDTA acts as a …………… ligand.

|  |  |
| --- | --- |
| (A) | flexidentate |
| (B) | pi-donor |
| (C) | hexadentate |
| (D) | tetradentate |

97. How much amount of oxalic acid dihydrate crystals are required to prepare 1 L of a decinormal solution of it?

|  |  |
| --- | --- |
| (A) | 6.3 g |
| (B) | 12.6 g |
| (C) | 3.15 g |
| (D) | 9 g |

98. What is correct order of increasing acidic strength of oxides of nitrogen?

|  |  |
| --- | --- |
| (A) | NO < N2O3 < N2O4 < N2O5 |
| (B) | NO = N2O3 < N2O4 = N2O5 |
| (C) | NO > N2O3 < N2O4 > N2O5 |
| (D) | NO > N2O3 > N2O4 > N2O5 |

99. Regarding compounds of sulfur, which one of the following statements in not true?

|  |  |
| --- | --- |
| (A) | SF6 does not undergo hydrolysis |
| (B) | SF4 undergoes hydrolysis |
| (C) | SF6 is thermally stable and chemically inert |
| (D) | SF4 acts as Lewis acid |

100. Fluorine does not act as the central atom in interhalogen compounds, because

|  |  |
| --- | --- |
| (A) | it is highly electronegative |
| (B) | of absence of d-orbitals |
| (C) | of its small size |
| (D) | of its gaseous nature |

101. A hydrometallurgical process involves the following steps.

Ag2S + 4 NaCN → 2 Na[Ag(CN)2] + Na2S

2 Na[Ag(CN)2] + Zn → Na2[Zn(CN)4] + 2 Ag↓

Which one of the following statements is true?

|  |  |
| --- | --- |
| (A) | In the second step Zn(II) is reduced to Zn(0) |
| (B) | Dicyanoargentum(I) complex is insoluble in water |
| (C) | In the first step Ag(I) is reduced to Ag(0) |
| (D) | Tetracyanozinc(II) complex is soluble in water |

102. Transition metals exhibit variable oxidation states. This is because

|  |  |
| --- | --- |
| (A) | the outermost shell is empty |
| (B) | they are all metals |
| (C) | the energies of (*n* – 1)d and ns orbitals are almost equal |
| (D) | the ionization energy to remove electron from ns orbital is very low |

103. The general electronic configuration of inner-transition elements is

|  |  |
| --- | --- |
| (A) | (*n* – 2)f1–14 (*n* – 1)d0, 1 |
| (B) | (*n* – 2)f1–14 (*n* – 1)d0–1 *n*s2 |
| (C) | (*n* – 1)f1–14 (*n* – 1)d0–1 *n*s2 |
| (D) | (*n* – 2)f1–14 *n*s2 |

104. Which of the following species would be diamagnetic?

|  |  |
| --- | --- |
| (A) | Cr3+ |
| (B) | Co3+ |
| (C) | Br |
| (D) | Zn2+ |

105. Which orbital is designated by the quantum numbers: *n* = 5, *l* =1, *ml* = 0?

|  |  |
| --- | --- |
| (A) | 5s |
| (B) | 5p |
| (C) | 5d |
| (D) | 5f |

106. If travelling at equal speeds, which of the following matter waves have the longest wavelength?

|  |  |
| --- | --- |
| (A) | Electron |
| (B) | Proton |
| (C) | Neutron |
| (D) | α particle |

107. Number of angular nodes for 4d orbital is

|  |  |
| --- | --- |
| (A) | 4 |
| (B) | 3 |
| (C) | 2 |
| (D) | 1 |

108. Which of the following will not show deflection from the path on passing through electric field?

|  |  |
| --- | --- |
| (A) | Electron |
| (B) | Neutron |
| (C) | Cathode rays |
| (D) | Proton |

109. Complete the following nuclear equation:



|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) |  |

110. Which among the following sequence is best suited for selective transformation on 2-methylbutane to 2-methylbutan-2-ol?

|  |  |
| --- | --- |
| (A) | Treatment with Cl2 in the presence of UV light followed by hydrolysis with potassium hydroxide in water |
| (B) | Treatment with Cl2 in the presence of UV light followed by hydrolysis with potassium hydroxide in ethanol |
| (C) | Treatment with Br2 in the presence of UV light followed by hydrolysis with potassium hydroxide in water |
| (D) | Treatment with I2 in the presence of UV light followed by hydrolysis with potassium hydroxide in a 1:1 mixture of water and ethanol |

111. Ozone depletion in Antartica is due to

|  |  |
| --- | --- |
| (A) | sulphur containing gases |
| (B) | peroxy acetyl nitrate |
| (C) | chlorine nitrate |
| (D) | fluorine |

112. When an organic compound ‘A’ was treated sequentially with ammonia and Br2/KOH, methanamine was obtained. Then ‘A’ is an

|  |  |
| --- | --- |
| (A) | ethanol |
| (B) | ethyl acetate |
| (C) | acetonitrile |
| (D) | acetic acid |

113. How many structural isomers are possible for C3H9N?

|  |  |
| --- | --- |
| (A) | 3 |
| (B) | 4 |
| (C) | 5 |
| (D) | 6 |

114. Which is a non-reducing sugar?

|  |  |
| --- | --- |
| (A) | Glucose |
| (B) | Sucrose |
| (C) | Maltose |
| (D) | Fructose |

115. 0.200 g of an organic compound contains 71% carbon. What is the mass of CO2 produced when it is subjected to complete combustion?

|  |  |
| --- | --- |
| (A) | 0.142 |
| (B) | 0.039 |
| (C) | 0.521 |
| (D) | 0.733 |

116. Consider the following compounds:

|  |  |
| --- | --- |
| (i) | hydrazine |
| (ii) | paracetamol |
| (iii) | chlorophyll |
| (iv) | saccharin |

How many among them will test negative for nitrogen in Lassaigne’s test ?

|  |  |
| --- | --- |
| (A) | 1 |
| (B) | 2 |
| (C) | 3 |
| (D) | 4 |

117. Which among the following is more reactive towards nitration using nitrating mixture?

|  |  |
| --- | --- |
| (A) | *tertiary*-Butylbenzene |
| (B) | Toluene |
| (C) | Benzene |
| (D) | Chlorobenzene |

118. Which among the following is antiaromatic?

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) |  |

119. Hydrogenation of acetyl chloride in the presence of Pd-BaSO4 as catalyst to obtain ethanal is

|  |  |
| --- | --- |
| (A) | Clemmensen reduction |
| (B) | Rosenmund reduction |
| (C) | Schmidt reaction |
| (D) | Dakin reaction |

120. Which among the following compounds will selectively give the same addition product with HBr under both Markonikkoff’s and anti-Markonikkoff’s addition conditions?

|  |  |
| --- | --- |
| (A) | CH3-CH=CH-CH2-CH3 |
| (B) | CH3-CH=CH-C(CH3)2 |
| (C) | CH3-CH=CH-CH(CH3)2 |
| (D) | C6H5-CH=CH2 |

121. Among the following, the organic compound that gives propyne on treatment with sodamide with minimal side products is

|  |  |
| --- | --- |
| (A) | CH3CH2CHCl2 |
| (B) | CH3CCl=CH2 |
| (C) | CH3CCl=CH2Cl |
| (D) | CH3CCl2-CH3 |

122. Which among the following tests is useful to differentiate between styrene and phenol?

|  |  |
| --- | --- |
| (A) | Lucas test |
| (B) | Test with bromine water |
| (C) | Test with bromine in dry chloroform |
| (D) | Test with KMnO4 |

123. Identify the **incorrect** statement about natural rubber.

|  |  |
| --- | --- |
| (A) | Double bonds are located between C2 and C3 of each isoprene unit |
| (B) | Has mostly trans double bonds |
| (C) | Intermolecular forces are quite weak |
| (D) | Has a randomly coiled structure |

124. The monomer unit/units in cellulose is/are

|  |  |
| --- | --- |
| (A) | *α*-D-glucose |
| (B) | *β*-D-glucose |
| (C) | Alternating *α*-D­-glucose and D-fructose units |
| (D) | Alternating *β*-D-fructoseandD-fructose units |

125. Which among the following vitamins is the most efficient antioxidant?

|  |  |
| --- | --- |
| (A) | Vitamin D |
| (B) | Vitamin C |
| (C) | Vitamin B |
| (D) | Vitamin A |

BIOLOGY

126. The relationship between the moth *Tegeticula yuccasella* and *Yucca* is an example for

|  |  |
| --- | --- |
| (A) | obligate mutualism |
| (B) | facultative mutualism |
| (C) | trophic mutualism |
| (D) | defensive mutualism |

127. The growth of any microbial cell will be high at

|  |  |
| --- | --- |
| (A) | exponential phase |
| (B) | lag phase |
| (C) | death phase |
| (D) | stationary phase |

128. In plants like Elodes and Hydrilla, pollination takes place through

|  |  |
| --- | --- |
| (A) | anemophily |
| (B) | epihydrophily |
| (C) | zoophily |
| (D) | myrmecophily |

129. Human appendix and wings of Ostrich represent the organs which

|  |  |
| --- | --- |
| (A) | have same anatomy but different functions |
| (B) | have different anatomy but same functions |
| (C) | present in reduced form with no function |
| (D) | None of the above |

130. Assertion: The person vaccinated by Covishield got some side-effects.

Reason: This is due to the activation of Active immune system.

|  |  |
| --- | --- |
| (A) | both the assertion and the reason are true and the reason is a correct explanation of the assertion |
| (B) | both the assertion and reason are true but the reason is not a correct explanation of the assertion |
| (C) | assertion is true but reason is false |
| (D) | assertion is false but reason is true |

131. The racemose inflorescence is seen in

|  |  |
| --- | --- |
| (A) | *Mangifera indica* (Mango) |
| (B) | *Azadirachta indica* (Neem) |
| (C) | *Delonix regia* (Gulmohar) |
| (D) | All the above |

132. The urine of a person undergoing prolonged fasting has abundant quantities of

|  |  |
| --- | --- |
| (A) | glucose |
| (B) | ketones |
| (C) | amino acids |
| (D) | fats |

133. …………… is the oldest national park established for the protection of Bengal tigers.

|  |  |
| --- | --- |
| (A) | Gir National Park |
| (B) | Kaziranga National Park |
| (C) | Corbett National Park |
| (D) | Bandhavgarh National Park |

134. Sea urchin belong to the class of

|  |  |
| --- | --- |
| (A) | echinoida |
| (B) | holothuroidea |
| (C) | ophiuroidea |
| (D) | asteroidea |

135. LSD is a/an

|  |  |
| --- | --- |
| (A) | synthetic hallucinogen |
| (B) | opioid |
| (C) | natural hallucinogen |
| (D) | angel dust |

136. The gland located at the anterior wall of vagina is called as

|  |  |
| --- | --- |
| (A) | bartholins glands |
| (B) | skenes glands |
| (C) | cowpers glands |
| (D) | None of the above |

137. The automated species identification cyber tool DAISY is the abbreviation of

|  |  |
| --- | --- |
| (A) | Digital Automated Identification System |
| (B) | Digital Automatic Identification System |
| (C) | Digital Automatic Identifiable System |
| (D) | Digitally Automated Identification System |

138. Which one of the following statements is true for class Amphibian?

|  |  |
| --- | --- |
| (i) | Body is divisible into head and trunk |
| (ii) | Respiration is through gills only |
| (iii) | Heart is three chambered – two auricles and one ventricle |
| (iv) | Fertilization is internal |

|  |  |
| --- | --- |
| (A) | only (iv) |
| (B) | only (i) and (iii) |
| (C) | only (ii) and (iii) |
| (D) | All are correct |

139. Fats Diglycerides

|  |  |
| --- | --- |
| (A) | Amylase |
| (B) | Chymotrypsin |
| (C) | Carboxypeptidase |
| (D) | Lipase |

140. In the dividing cell of an animal, the two poles of the spindle bears asters which is referred as

|  |  |
| --- | --- |
| (A) | amphiaster |
| (B) | centric |
| (C) | Both (A) and (B) |
| (D) | None of the above |

141. Colchicine affects

|  |  |
| --- | --- |
| (A) | DNA synthesis |
| (B) | Doubling of chromosome |
| (C) | Cytokinesis |
| (D) | Formation of spindles |

142. A condition called Erythroblastosis Foetalis had caused the termination of second pregnancy in a woman. The reason for this may be

|  |  |
| --- | --- |
| (A) | husband is +ve for Rh factor |
| (B) | woman is -ve for Rh factor |
| (C) | Both (A) and (B) |
| (D) | None of the above |

143. The blood group B will have the genotype

|  |  |
| --- | --- |
| (A) | IAIA |
| (B) | IAIB or IBIO |
| (C) | IOIO |
| (D) | IBIB or IBIO |

144. Duration of erythrocytic cycle of mild tertian malaria is

|  |  |
| --- | --- |
| (A) | 48 hrs |
| (B) | 72 hrs |
| (C) | 50 hrs |
| (D) | 36 hrs |

145. Match the following systematic position of *Hibiscus rosa-sinensis* in the Column I with that of column II.

|  |  |  |  |
| --- | --- | --- | --- |
| **Column I** | | **Column II** | |
| (1) | Class | (i) | Plantae |
| (2) | Family | (ii) | Magnoliopsida |
| (3) | Kingdom | (iii) | Malvales |
| (4) | Order | (iv) | Malvaceae |

|  |  |
| --- | --- |
| (A) | (1) - (iv), (2) - (ii), (3) - (iii), (4) - (i) |
| (B) | (1) - (ii), (2) - (iv), (3) - (i), (4) - (iii) |
| (C) | (1) - (i), (2) - (ii), (3) - (iv), (4) - (iii) |
| (D) | (1) - (iii), (2) - (iv), (3) - (i), (4) - (ii) |

146. The ATP synthesis during light reaction is

|  |  |
| --- | --- |
| (A) | Photolysis |
| (B) | Phosphorylation |
| (C) | Oxidative phosphorylation |
| (D) | Photophosphorylation |

147. Acentric or Anastral form of mitosis refers to

|  |  |
| --- | --- |
| (A) | Presence of asters in mitotic apparatus |
| (B) | Equational division in mitosis |
| (C) | Absence of asters in mitotic apparatus |
| (D) | None of the above |

148. An example of polycyclic stele with vascular tissues present in the form of two or more concentric cylinders is

|  |  |
| --- | --- |
| (A) | Monocot stem |
| (B) | Pteridium |
| (C) | Dicot stem |
| (D) | Adiantum pedatum |

149. The factor that does not lead to alteration of Hardy-Weinberg law is

|  |  |
| --- | --- |
| (A) | natural selection |
| (B) | mutation |
| (C) | random mating |
| (D) | migration |

150. Heparin, the anti-coagulant is produced by

|  |  |
| --- | --- |
| (A) | interstitial cells |
| (B) | platelets |
| (C) | mast cells |
| (D) | eosinophils |

151. The Plymouth rock variety is a/ an

|  |  |
| --- | --- |
| (A) | American breed of chicken |
| (B) | Asiatic breed of chicken |
| (C) | Mediterranean breed of chicken |
| (D) | English breed of cow |

152. The potential that describes the alteration between water and the hydrating colloid or gel like organic molecule in the cell wall is

|  |  |
| --- | --- |
| (A) | Solute potential |
| (B) | Pressure potential |
| (C) | Matric potential |
| (D) | None of the above |

153. The four kingdom system of classification was proposed by

|  |  |
| --- | --- |
| (A) | Ernst Haeckel |
| (B) | Copeland |
| (C) | R.H.Whittaker |
| (D) | Carl Linnaeus |

154. In Fabaceae, the gynoecium is

|  |  |
| --- | --- |
| (A) | Unicarpellary |
| (B) | Bicarpellary |
| (C) | Tetracarpellary |
| (D) | Multicarpellary |

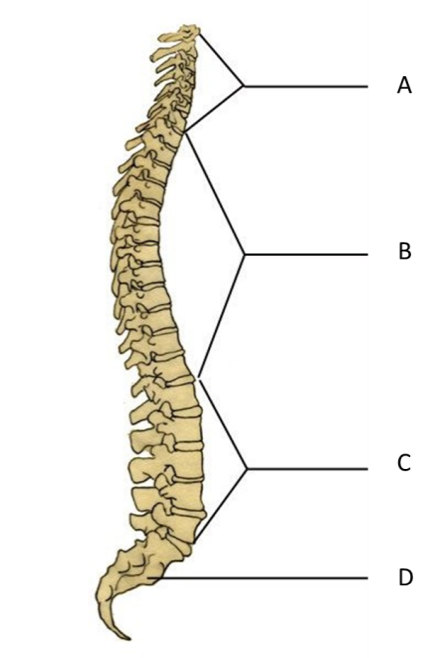
155. In a dihybrid test cross experiment of the garden pea, the resultant individual is crossed with recessive parent of the F1 generation. The resulting phenotypic ratio will be

|  |  |
| --- | --- |
| (A) | 1:2:1 |
| (B) | 1:3 |
| (C) | 1:1:1:1 |
| (D) | 9:3:3:1 |

156. DPT vaccine is given for

|  |  |
| --- | --- |
| (A) | Tetanus, Plague, whooping cough |
| (B) | Diphtheria, Pertussis, Tetanus |
| (C) | Diphtheria, Pneumonia, Tetanus |
| (D) | Plague, Polio, Tetanus |

157. The figure shows the parts of lateral view of the vertebral column of the human being. Identify the parts labeled from A to D and select the correct option.

****

|  |  |
| --- | --- |
| (A) | (A) – Cervical, (B) – Lumbar, (C) – Thoracic, (D) – Sacral |
| (B) | (A) – Lumbar, (B) – Thoracic, (C) – Coccyx, (D) – Cervical |
| (C) | (A) – Cervical, (B) – Thoracic, (C) – Lumbar, (D) – Sacral |
| (D) | (A) – Thoracic, (B) – Cervical, (C) – Lumbar, (D) – Coccyx |

158. What kind of cell division occurs in cancer cells?

|  |  |
| --- | --- |
| (A) | Mitotic division |
| (B) | Meiotic division |
| (C) | Either mitotic or meiotic |
| (D) | Cell division does not occurs |

|  |  |  |  |
| --- | --- | --- | --- |
| 159. | Statement A: | Taq polymerase has been isolated from the bacterium *Thermus aquaticus* | |
|  | Statement B: | Taq polymerase enzyme is easily degraded in high temperature |

|  |  |
| --- | --- |
| (A) | A and B is Correct |
| (B) | A is wrong and B is correct |
| (C) | A and B is wrong |
| (D) | A is correct and B is wrong |

160. The secondary metabolite caffeine is produced by the plants for the purpose of

|  |  |
| --- | --- |
| (A) | nutritive value |
| (B) | defense action |
| (C) | growth response |
| (D) | reproduction |

161. Who is considered as the father of genetic engineering?

|  |  |
| --- | --- |
| (A) | Steward Linn |
| (B) | Stanley Cohen |
| (C) | Paul Berg |
| (D) | Kary Mullis |

162. Choose which of the following flowers stands for the below floral diagram.



|  |  |
| --- | --- |
| (A) | *Hibiscus rosa-sinensis* |
| (B) | *Datura metel* |
| (C) | *Ricinus communis* |
| (D) | *Musa paradisiaca* |

163. Which one of the following is an example of housekeeping gene?

|  |  |
| --- | --- |
| (A) | Glyceraldehyde 3-phosphate dehydrogenase |
| (B) | RNA polymerase |
| (C) | r-RNA genes |
| (D) | All the above |

164. The location of the Bartholin’s glands in human are

|  |  |
| --- | --- |
| (A) | either side of the fallopian tube |
| (B) | either side of the penis |
| (C) | either side of the vas deferens |
| (D) | either side of the vagina |

165. If the DNA content at G1 phase is 1C, what will be the DNA content of the cells at S, G2, and M phase respectively?

|  |  |
| --- | --- |
| (A) | 2C, 2C, and 2C |
| (B) | 2C, 1C, and 1C |
| (C) | 1C, 1C, and 1C |
| (D) | 1C, 2C, and 2C |

166. Lichens are

|  |  |
| --- | --- |
| (A) | fungi |
| (B) | bizarre organisms |
| (C) | algae |
| (D) | bryophytes |

167. Which among the following is not a correct step in the DNA recombination during crossing over?

|  |  |
| --- | --- |
| (A) | Homologous DNA molecules are paired side by side with their duplicated copies of DNAs |
| (B) | One strand of both DNAs cut in one place by the enzyme endonuclease |
| (C) | DNA strands cut along the vertical (V) line |
| (D) | The vertical cut will result in hetero duplexes with recombinants |

168. The plasmids that are designed to replicate in cells of two different species are

|  |  |
| --- | --- |
| (A) | YAC vector |
| (B) | Shuttle vector |
| (C) | BAC vector |
| (D) | Phagemid vector |

169. Match the column I with column II and find the correct option.

|  |  |  |  |
| --- | --- | --- | --- |
| **Column I** | | **Column II** | |
| (1) | Nephridia | (i) | Annelida |
| (2) | Choanocytes | (ii) | Porifera |
| (3) | Flame cells | (iii) | Ctenophora |
| (4) | Comb plates | (iv) | Platyhelminthes |

|  |  |
| --- | --- |
| (A) | (1) - (i), (2) - (ii), (3) - (iv), (4) - (iii) |
| (B) | (1) - (iii), (2) - (ii), (3) - (iv), (4) - (i) |
| (C) | (1) - (iv), (2) - (i), (3) - (ii), (4) - (iii) |
| (D) | (1) - (ii), (2) - (iii), (3) - (iv), (4) - (i) |

170. The double tetrasomy condition involves

|  |  |
| --- | --- |
| (A) | (2*n* + 2) |
| (B) | (2*n* + 2 + 2) |
| (C) | (2*n* + 2 + 2 + 2) |
| (D) | (2*n* + 3) |

171. The books ‘Systema Naturae’ and ‘Species Plantarum’ were written by

|  |  |
| --- | --- |
| (A) | Carolous Linnaeus |
| (B) | Aristotle |
| (C) | Theophrastus |
| (D) | John ray |

172. The invasive species *Prosopis juliflora* was first introduced in …………… to counter desertification and later in Tamil Nadu as a source of firewood.

|  |  |
| --- | --- |
| (A) | Maharashtra |
| (B) | Gujarat |
| (C) | Andhra Pradesh |
| (D) | Uttar Pradesh |

173. The cell organelle that has hydrolytic enzymes are

|  |  |
| --- | --- |
| (A) | Lysosome |
| (B) | Ribosome |
| (C) | Microsome |
| (D) | Mesosome |

174. A typical coral polyp is a small organism of about

|  |  |
| --- | --- |
| (A) | 0.5 mm |
| (B) | 2 mm |
| (C) | 5 mm |
| (D) | 10 mm |

175. Match column I with column II and find the correct option.

|  |  |  |  |
| --- | --- | --- | --- |
| **Column I** | | **Column II** | |
| (1) | Xylem | (i) | Photosynthesis, Secretion, Storage |
| (2) | Sclerenchyma | (ii) | Transports food |
| (3) | Parenchyma | (iii) | Conducts water from roots to stem and leaves |
| (4) | Collenchyma | (iv) | Present in the seed coat, pulp and walls of fruits |
| (5) | Phloem | (v) | Mechanical support |

|  |  |
| --- | --- |
| (A) | (1) - (iii), (2) - (iv), (3) - (i), (4) - (v), (5) - (ii) |
| (B) | (1) - (iii), (2) - (ii), (3) - (iv), (4) - (i), (5) - (v) |
| (C) | (1) - (iv), (2) - (i), (3) - (ii), (4) - (v), (5) - (iii) |
| (D) | (1) - (ii), (2) - (iv), (3) - (i), (4) - (v), (5) - (iii) |

176. Identify the ‘mismatch’ pair among the following.

|  |  |
| --- | --- |
| (A) | *i* gene - Repressor |
| (B) | *z* gene - Lactosidase |
| (C) | *a* gene - Transacetylase |
| (D) | *y* gene - Permease |

177. The fibrous joint in our body exists between

|  |  |
| --- | --- |
| (A) | phalanges |
| (B) | vertebrae |
| (C) | skull bones |
| (D) | atlas and axis |

178. Galapagos finches is an example of

|  |  |
| --- | --- |
| (A) | convergent evolution |
| (B) | divergent evolution |
| (C) | parallel evolution |
| (D) | All the above |

179. Which one of the following characters does not come under Dicotyledonous Stem?

|  |  |
| --- | --- |
| (A) | Pith is large and no secondary growth |
| (B) | The outermost layer is the epidermis with cuticle |
| (C) | Trichomes and stomata may be present on the epidermis |
| (D) | The cortex consists of three layers; outermost hypodermis (collenchymatous), middle parenchymatous cortical layer and the endodermis containing starch grains |

180. Numerical taxonomy developed between

|  |  |
| --- | --- |
| (A) | 1950-1954 |
| (B) | 1957-1961 |
| (C) | 1972-1976 |
| (D) | 1980-1984 |

181. Energy plantations are specifically meant for

|  |  |
| --- | --- |
| (A) | Oil |
| (B) | Fuel |
| (C) | Food |
| (D) | Wood |

182. The enzyme necessary for the synthesis of melanin from dihydroxyphenyl-alanine is

|  |  |
| --- | --- |
| (A) | Catalase |
| (B) | Fructokinase |
| (C) | Tyrosinase |
| (D) | Xanthine oxidase |

183. Match column I with column II.

|  |  |  |  |
| --- | --- | --- | --- |
| **Column I** | | **Column II** | |
| (1) | Ocean warming | (i) | Reduced water quality |
| (2) | Ocean acidification | (ii) | Coral bleaching |
| (3) | Cyclones | (iii) | Reduced reef calcification |
| (4) | Rise in sea level | (iv) | Loss of structure habitat |

|  |  |
| --- | --- |
| (A) | (1) - (ii), (2) - (iii), (3) - (iv), (4) - (i) |
| (B) | (1) - (iv), (2) - (ii), (3) - (i), (4) - (iii) |
| (C) | (1) - (i), (2) - (ii), (3) - (ii), (4) - (iv) |
| (D) | (1) - (iii), (2) - (i), (3) - (i), (4) - (ii) |

184. What are the causes of seed dormancy?

|  |  |
| --- | --- |
| (A) | Hard and impermeable seed coat |
| (B) | Immature embryo |
| (C) | Both (A) and (B) |
| (D) | Only (A) |

185. Pteridophytes belong to

|  |  |
| --- | --- |
| (A) | Phanerogams |
| (B) | Cryptogams |
| (C) | Thallophyta |
| (D) | Spermatophyta |

186. Hydroponics involves

|  |  |
| --- | --- |
| (A) | plant culture in solid medium |
| (B) | culture of plants |
| (C) | plant culture in liquid medium |
| (D) | culture of genetically modified plants |

187. Main purpose of chemotaxonomy is

|  |  |
| --- | --- |
| (a) | To improve the existing system of plant classification |
| (b) | To develop the present day knowledge of natural relationship of plants |
| (c) | To improve the nutrient value of plants |
| (d) | To develop the research |

|  |  |
| --- | --- |
| (A) | (a) and (b) |
| (B) | (b) and (d) |
| (C) | (a) and (c) |
| (D) | (c) and (d) |

188. Which one of the following organisms is not a eukaryote?

|  |  |
| --- | --- |
| (A) | *Paramecium caudatum* |
| (B) | *Escherichia coli* |
| (C) | *Euglena viridis* |
| (D) | *Amoeba proteus* |

189. Acharya Jagadish Chandra Bose Indian Botanical garden is situated at

|  |  |
| --- | --- |
| (A) | Howrah |
| (B) | New Delhi |
| (C) | Lucknow |
| (D) | Dehradun |

190. Rachel Carson’s book ‘Silent Spring’ is related to

|  |  |
| --- | --- |
| (A) | noise pollution |
| (B) | population explosion |
| (C) | ecosystem management |
| (D) | pesticide pollution |

191. A foreign DNA and plasmid cut by the same restriction endonuclease can be joined to form a recombinant plasmid using

|  |  |
| --- | --- |
| (A) | Eco R1 |
| (B) | Taq polymerase |
| (C) | Polymerase III |
| (D) | Ligase |

192. The Book ‘Anatomy of Seed Plants’ was written by

|  |  |
| --- | --- |
| (A) | Ernst Mayr |
| (B) | Katherine Esau |
| (C) | Carolus Linnaeus |
| (D) | Stephen Hales |

193. All the enzymes involved in TCA cycle are available in the mitochondrial matrix, except

|  |  |
| --- | --- |
| (A) | isocitrate dehydrogenase |
| (B) | ketoglutarate dehydrogenase |
| (C) | succinate dehydrogenase |
| (D) | malate dehydrogenase |

194. Which of the following statements is incorrect regarding the decomposition of detritus in soil?

|  |  |
| --- | --- |
| (A) | Decomposition is largely an oxygen-requiring process. |
| (B) | The rate of decomposition is controlled by chemical composition of detritus and climatic factors. |
| (C) | Decomposition rate is slower if detritus is rich in nitrogen, and water-soluble substances like sugars. |
| (D) | Warm and moist environment favours decomposition whereas low temperature inhibits decomposition. |

195. Choose the WRONG statement about pollen grain.

|  |  |
| --- | --- |
| (A) | The hard outer layer is made up of sporopollenin |
| (B) | In over 60 per cent of angiosperms, pollen grains are shed at 2-celled stage |
| (C) | The vegetative cell is smaller than the generative cell |
| (D) | Germ pore located in intine |

196. Match the following (column I with column II)

|  |  |  |  |
| --- | --- | --- | --- |
| **Column I** | | **Column II** | |
| (I) | Asymmetrical | (a) | Aschelminthes |
| (II) | Pseudocoelomates | (b) | Porifera |
| (III) | Acoelomata | (c) | Platyhelminthes |
| (IV) | Coelomates | (d) | Arthropoda |

Choose the answer

|  |  |
| --- | --- |
| (A) | (I) - (a), (II) - (b), (III) - (d), (IV) - (c) |
| (B) | (I) - (b), (II) - (a), (III) - (c), (IV) - (d) |
| (C) | (I) - (c), (II) - (d), (III) - (a), (IV) - (b) |
| (D) | (I) - (d), (II) - (c), (III) - (b), (IV) - (a) |

197. Which of the following depicts the correct sequence of cell division stages?

|  |  |
| --- | --- |
| (A) | Prophase-Anaphase-Metaphase-Cytokinesis-Telophase |
| (B) | Prophase- Metaphase- Anaphase-Cytokinesis-Telophase |
| (C) | Prophase- Metaphase- Anaphase-Telophase –Cytokinesis |
| (D) | Anaphase-Metaphase-Prophase-Telophase-Cytokinesis |

198. Nitrogen exists as two nitrogen atoms joined by a very strong bond known as

|  |  |
| --- | --- |
| (A) | double covalent bond |
| (B) | covalent single bond |
| (C) | ionic bond |
| (D) | triple covalent bond |

199. The pancreatic juice contains inactive enzymes. Which of the following is NOT present in pancreatic juice?

|  |  |
| --- | --- |
| (A) | Trypsinogen |
| (B) | Nucleases |
| (C) | Procarboxypeptidases |
| (D) | Papain |

200. The limbic system is concerned with

|  |  |
| --- | --- |
| (A) | Regulation of sexual behaviour, expression of emotional reactions, and motivation |
| (B) | Controls the body temperature, eating and drinking |
| (C) | Respiration, cardiovascular reflexes, and gastric secretions |
| (D) | Auditory system |

