104 MSC INTEGRATED COURSE - BIOLOGICAL SCIENCES

PHYSICS

(SHIFT I)

1. The density of a material in the form of a cube is measured using its dimensions and mass. If the error in measurement of length and mass is 0.6% and 1.2% respectively, the maximum error in calculation of density is

|  |  |
| --- | --- |
| (A) | 3.0% |
| (B) | 4.0% |
| (C) | 4.5% |
| (D) | 6.0% |

2. If m is the mass of a body and E its kinetic energy, then its linear momentum is

|  |  |
| --- | --- |
| (A) | m |
| (B) | 2 |
| (C) |  |
| (D) |  |

3. The separation between carbon and oxygen in CO molecule is 0.12 nm. What is the distance of the center of mass from the carbon atom?

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

4. In a Young’s double slit experiment, let S1 and S2 be two slits and C be the center of the screen. If angle S1CS2 = θ, and λ is the wavelength, the fringe width will be

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

5. For a series RLC circuit driven with voltage of amplitude Vm and frequency ωo = the current exhibits resonance. The quality factor, Q of the circuit is given by

|  |  |
| --- | --- |
| (A) | *ωoL/R* |
| (B) | *ωoR/L* |
| (C) | *R/*(*ωoL*) |
| (D) | *CR/ωo* |

6. The half-life of 215At is 100 μs. The time taken for the radioactivity decay of a sample of 215At to 1/16th of its initial value is

|  |  |
| --- | --- |
| (A) | 400 μs |
| (B) | 6.3 μs |
| (C) | 40 μs |
| (D) | 300 μs |

7. The shortest wavelength of X-rays emitted from an X-ray tube depends on

|  |  |
| --- | --- |
| (A) | the current in the tube |
| (B) | the voltage applied to the tube |
| (C) | the nature of the gas in the tube |
| (D) | the atomic number of the target material |

8. The electromagnetic waves detected using a thermopile and used in physiotherapy are

|  |  |
| --- | --- |
| (A) | X - rays |
| (B) | γ – rays |
| (C) | ultraviolet radiations |
| (D) | infrared radiations |

9. If the wavelength of an electromagnetic wave is about the diameter of an apple, the region of radiation is

|  |  |
| --- | --- |
| (A) | X-ray |
| (B) | UV |
| (C) | infrared |
| (D) | microwave |

10. In an AC circuit containing a pure resistor and an inductor in series, the phase lag between current and voltage is

|  |  |
| --- | --- |
| (A) | dependent on the AC frequency |
| (B) | independent of AC frequency |
| (C) | always zero |
| (D) | always 90° |

11. Kirchhoff’s junction rule is a reflection of

|  |  |
| --- | --- |
| (A) | conservation of energy |
| (B) | conservation of charges |
| (C) | conservation of momentum |
| (D) | conservation of current density |

12. If the carrier power of a 100% modulated AM wave is suppressed, the percentage saving in power will be

|  |  |
| --- | --- |
| (A) | 50% |
| (B) | 100% |
| (C) | 66.66% |
| (D) | 75% |

13. White X-rays are called “white” because

|  |  |
| --- | --- |
| (A) | they are produced most abundantly in X-ray tubes |
| (B) | they have a nature similar to visible white light |
| (C) | they have a continuous range of frequencies |
| (D) | they can be converted into visible light coated screens |

14. An antenna uses electromagnetic waves of frequency 5 MHz. For proper working, the size of the antenna should be

|  |  |
| --- | --- |
| (A) | 15 m |
| (B) | 3 km |
| (C) | 60 m |
| (D) | 300 m |

15. The rectangular Cartesian components of grad *ϕ* are

|  |  |
| --- | --- |
| (A) |  |
| (B) |  |
| (C) |  |
| (D) | *ϕ*2, *ϕ*3 |

16. An ideal gas undergoes a thermodynamic process such that *dW* = 0 and *dQ* < 0. Then for the gas

|  |  |
| --- | --- |
| (A) | the temperature will decrease |
| (B) | the temperature will increase |
| (C) | the volume will increase |
| (D) | there is no change in temperature |

17. Optical fibres transmit light signals from one place to another place by

|  |  |
| --- | --- |
| (A) | internal conical refraction |
| (B) | double refraction |
| (C) | interference of light signals |
| (D) | total internal reflection |

18. When the source and the listener move in the same direction with a speed equal to the half of the speed of sound, the change in frequency of the sound is

|  |  |
| --- | --- |
| (A) | zero |
| (B) | 25% |
| (C) | 50% |
| (D) | 75% |

19. Two vectors *A* and *B* are said to be parallel to each other if

|  |  |
| --- | --- |
| (A) | A × B ≠ 0 |
| (B) | A × B = 0 |
| (C) | A × B = B × A |
| (D) | A × B = AB |

20. Two protons are kept at a separation of 10 nm. If Fe and Fn represent the electromagnetic force and nuclear force, then

|  |  |
| --- | --- |
| (A) | Fe » Fn |
| (B) | Fe  and Fn differ only slightly |
| (C) | Fe = Fn |
| (D) | Fe  « Fn |

21. An inductor of inductance *L* and a resistor *R* are joined in series and connected to a source of frequency *ω*. The power dissipated in the circuit is

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

22. Find the odd one out

|  |  |
| --- | --- |
| (A) | silicon |
| (B) | gallium arsenide |
| (C) | barium titanate |
| (D) | Cadmium sulphide |

23. The two nearest harmonics of a tube closed at one end and open at other end are 220 Hz and 260 Hz. What is the fundamental frequency of the system?

|  |  |
| --- | --- |
| (A) | 10 Hz |
| (B) | 20 Hz |
| (C) | 30 Hz |
| (D) | 40 Hz |

24. If a stone and a pencil are dropped simultaneously in vacuum from the top of a tower, which of the two will reach the ground first?

|  |  |
| --- | --- |
| (A) | Pencil |
| (B) | Stone |
| (C) | Both will reach the ground simultaneously |
| (D) | Either stone or pencil depending on which is heavier |

25. A conductor AB = *r* carries a current *i* in a magnetic field B. The force on the conductor *F* is

|  |  |
| --- | --- |
| (A) | *F = r × B* |
| (B) | *F = i* (*r × B*) |
| (C) | *F = i* (*B × r*) |
| (D) | *| F* | *= i* (*r.B*) |

26. Three small identical spheres having charges –8.4 × 10–16 C, –7.2 × 10–16 C and 0.6 × 10–16 C are brought in contact and then separated. Now the number of electrons on each ball is

|  |  |
| --- | --- |
| (A) | 3375 |
| (B) | 3125 |
| (C) | 2925 |
| (D) | 2775 |

27. Nichrome wire has been used as heating element because of its

|  |  |
| --- | --- |
| (A) | low melting point |
| (B) | high conductivity |
| (C) | low specific resistance |
| (D) | high specific resistance |

28. The torque on a rectangular coil placed in an uniform magnetic field is large, when the

|  |  |
| --- | --- |
| (A) | number of turns is large |
| (B) | number of turns is less |
| (C) | plane of the coil is perpendicular to the field |
| (D) | area of the coil is small |

29. When a moving coil galvanometer is shunted with a resistance of 30 Ohms, then its deflection is reduced to half. The actual resistance of the galvanometer is

|  |  |
| --- | --- |
| (A) | 10 Ohms |
| (B) | 15 Ohms |
| (C) | 20 Ohms |
| (D) | 30 Ohms |

30. Canal rays were discovered by

|  |  |
| --- | --- |
| (A) | Neil Bohr |
| (B) | J.J. Thomson |
| (C) | Millikan |
| (D) | Eugen Goldstein |

31. Which of the following transition produces the spectral line of maximum wavelength in hydrogen atom?

|  |  |
| --- | --- |
| (A) | 4 → 3 |
| (B) | 3 → 2 |
| (C) | 5 → 4 |
| (D) | 6 → 5 |

32. The bandwidth of the amplitude modulation is

|  |  |
| --- | --- |
| (A) | equal to the signal frequency |
| (B) | twice the signal frequency |
| (C) | thrice the signal frequency |
| (D) | four times the signal frequency |

33. Which one of the following of carrier wave remains constant in amplitude modulation?

|  |  |
| --- | --- |
| (A) | amplitude and phase |
| (B) | frequency and phase |
| (C) | amplitude and frequency |
| (D) | phase and time |

34. What will be the input current when a step up transformer has a power input of 23 kW at 230 volts?

|  |  |
| --- | --- |
| (A) | 1 A |
| (B) | 10 A |
| (C) | 52.9 A |
| (D) | 100 A |

35. In an AC generator, the current from the coil is transferred to the external circuit through

|  |  |
| --- | --- |
| (A) | split rings |
| (B) | slip rings |
| (C) | O-rings |
| (D) | field magnet |

36. A long solenoid having N turns, length (Ɩ), area of cross section A, carrying a current I is placed in a magnetic field of inductance B. The total magnetic flux is

|  |  |
| --- | --- |
| (A) | φ = µo N I |
| (B) | φ = µo N I / Ɩ |
| (C) | φ = µo N I A / Ɩ |
| (D) | φ = µo N2I A / Ɩ |

37. In Raman spectrum, the intensity of Stokes lines will be \_\_\_\_\_ the intensity of corresponding anti Stokes lines.

|  |  |
| --- | --- |
| (A) | greater than |
| (B) | less than |
| (C) | equal to |
| (D) | greater or less than |

38. In an X-ray tube, when 35 kV is applied, the minimum wavelength of the emitted radiation is

|  |  |
| --- | --- |
| (A) | 3.0 Å |
| (B) | 1.5 Å |
| (C) | 0.821 Å |
| (D) | 0.333 Å |

39. The half-life period of a particle is 624 s. Its mean life is

|  |  |
| --- | --- |
| (A) | 11.3 s |
| (B) | 22.6 s |
| (C) | 90 s |
| (D) | 900 s |

40. What will be the energy of the thermal neutrons?

|  |  |
| --- | --- |
| (A) | few MeV |
| (B) | few keV |
| (C) | few eV |
| (D) | 0.025 eV |

41. Which one of the following is not purely an electrostatic accelerator?

|  |  |
| --- | --- |
| (A) | Betatron |
| (B) | Linear accelerator |
| (C) | Van de Graff generator |
| (D) | Cockcroft-Walton accelerator |

42. The moment of inertia of a disc of mass *M* and radius *R* about its diameter as axis is

|  |  |
| --- | --- |
| (A) | *MR*2/2 |
| (B) | *MR*2/4 |
| (C) | *MR*2 |
| (D) | (3/4) *MR*2 |

43. An electron beam is moving horizontally towards east. If this beam is passed through a uniform magnetic field directed vertically upwards, then the direction of the deflected beam is

|  |  |
| --- | --- |
| (A) | east |
| (B) | west |
| (C) | north |
| (D) | south |

44. A pn-junction diode works as insulator if it is connected

|  |  |
| --- | --- |
| (A) | in forward bias |
| (B) | in reverse bias |
| (C) | to a.c. |
| (D) | to d.c. |

45. A passenger is sitting in a fast moving car. The car blows horn with a frequency of *f* Hz. If the apparent frequency of the sound heard by the passenger is *f* ' Hz, then

|  |  |
| --- | --- |
| (A) | *f* '= *f* |
| (B) | *f* ' *< f* |
| (C) | *f* '> *f* |
| (D) | *f* '= 1/*f* |

46. Let *v*max and *a*max are the maximum velocity and maximum acceleration of a simple harmonic oscillator respectively, then its time period in terms of *v*max and *a*max is

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

47. A red paper illuminated by green light appears

|  |  |
| --- | --- |
| (A) | black |
| (B) | blue |
| (C) | green |
| (D) | yellow |

48. A thermodynamics system goes from state (i) *P*1, *V* to 2 *P*1, *V* (ii) *P*1, *V* to *P*1,2 *V*. Then the work done in the two cases will be

|  |  |
| --- | --- |
| (A) | zero and *P*1*V* |
| (B) | *P*1 *V* and zero |
| (C) | *P*1 *V* and *P*1 *V* |
| (D) | zero and zero |

49. Which one of the following pair of physical quantities do not have same dimension?

|  |  |
| --- | --- |
| (A) | Planck's constant and Angular momentum |
| (B) | Impulse and moment of force |
| (C) | Force and rate of change of linear momentum |
| (D) | Pressure and Young's modules |

50. The exponential law of radioactive decay is

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

51. Which of the following is the universal gate?

|  |  |
| --- | --- |
| (A) | NOT |
| (B) | OR |
| (C) | AND |
| (D) | NAND |

52. When metals combine with non-metals, then

|  |  |
| --- | --- |
| (A) | electrons of the outer shells are shared |
| (B) | electrons in the outer shells of non-metals are transferred to metals |
| (C) | electrons in the outer shells of metals are transferred to the non-metals atoms |
| (D) | hydrogen gas is given off |

53. The Compton shift is maximum for scattering angle of

|  |  |
| --- | --- |
| (A) | 0° |
| (B) | 45° |
| (C) | 90° |
| (D) | 180° |

54. A stone released with zero velocity from the top of a tower, reaches the ground in 4 s. The height of the tower is (*g* = 10 m/s2)

|  |  |
| --- | --- |
| (A) | 20 m |
| (B) | 40 m |
| (C) | 80 m |
| (D) | 120 m |

55. Swimming is possible on account of

|  |  |
| --- | --- |
| (A) | first law of motion |
| (B) | second law of motion |
| (C) | third law of motion |
| (D) | Newton’s law of gravitation |

56. A steel wire is stretched to double its length, then its Young’s modulus

|  |  |
| --- | --- |
| (A) | becomes half |
| (B) | becomes double |
| (C) | remains same |
| (D) | becomes one-fourth |

57. Thermoelectric thermometer is based on

|  |  |
| --- | --- |
| (A) | Photoelectric effect |
| (B) | Seebeck effect |
| (C) | Compton effect |
| (D) | Joule effect |

58. The number of degrees of freedom for each atom of a monatomic gas is

|  |  |
| --- | --- |
| (A) | 3 |
| (B) | 5 |
| (C) | 6 |
| (D) | 1 |

59. The capacity of parallel plate capacitor depends on

|  |  |
| --- | --- |
| (A) | metal used to make plates |
| (B) | thickness of plate |
| (C) | potential applied across the plate |
| (D) | area of plate |

60. A hydrogen atom is paramagnetic. A hydrogen molecule is

|  |  |
| --- | --- |
| (A) | diamagnetic |
| (B) | paramagnetic |
| (C) | ferromagnetic |
| (D) | ferrimagnetic |

61. 10 cm is a wavelength corresponding to the spectrum of

|  |  |
| --- | --- |
| (A) | infrared rays |
| (B) | ultraviolet rays |
| (C) | microwaves |
| (D) | X-rays |

62. In a semiconductor, the forbidden energy gap between the valance band and conduction band is of the order of

|  |  |
| --- | --- |
| (A) | 1 MeV |
| (B) | 0.1 MeV |
| (C) | 1 eV |
| (D) | 5 eV |

63. The mass of a ship is 2 × 107 kg. On applying a force of 25 × 105 N, it is displaced through 25 m. After the displacement, the velocity acquired by the ship will be

|  |  |
| --- | --- |
| (A) | 12.5 m/s |
| (B) | 5 m/s |
| (C) | 3.7 m/s |
| (D) | 2.5 m/s |

64. A system consists of 3 particles each of mass m located at points (1, 1), (2, 2) and (3, 3). The coordinates of the centre of mass are

|  |  |
| --- | --- |
| (A) | (6, 6) |
| (B) | (3, 3) |
| (C) | (1, 1) |
| (D) | (2, 2) |

65. If a spring extends by ‘x’ on loading, then the energy stored by the spring is (if T is tension in the spring and k is spring constant)

|  |  |
| --- | --- |
| (A) | T2/2x |
| (B) | T2/2k |
| (C) | 2x/T2 |
| (D) | 2T2/k |

66. A simple pendulum is executing simple harmonic motion with a time period T. If the length of the pendulum is increased by 21%, the percentage increase in the time period of the pendulum of increased length is

|  |  |
| --- | --- |
| (A) | 10% |
| (B) | 21% |
| (C) | 30% |
| (D) | 50% |

67. If a diamagnetic substance is brought near north or south pole of a bar magnet, it is

|  |  |
| --- | --- |
| (A) | attracted by the poles |
| (B) | repelled by the poles |
| (C) | repelled by the north pole and attracted by the south pole |
| (D) | attracted by north pole and repelled by south pole |

68. The inductive reactance of an inductor of 1/*π* Henry at 50 Hz frequency is

|  |  |
| --- | --- |
| (A) | 50/*π* Ohm |
| (B) | *π*/50 Ohm |
| (C) | 100 Ohm |
| (D) | 50 Ohm |

69. How fast a person should drive his car so that the red signal of light appears green (λred = 6200 Å, λgreen = 5400 Å)

|  |  |
| --- | --- |
| (A) | 1.5 × 108 m/s |
| (B) | 7 × 107 m/s |
| (C) | 3.9 × 107 m/s |
| (D) | 2 × 108 m/s |

70. The position of a particle is given by *x* = *a* sin *ωt*, *y* = *a* cos 2*ωt*. The trajectory is

|  |  |
| --- | --- |
| (A) | parabola |
| (B) | hyperbola |
| (C) | straight line |
| (D) | cycloid |

71. If an annular disc of radii r1 and r2 is heated, then

|  |  |
| --- | --- |
| (A) | r1 increases, r2 decreases |
| (B) | r2 increases, r1 decreases |
| (C) | both r1 and r2 increase |
| (D) | r1 increases, r2 remains unchanged |

72. Velocity of sound in air is 332 m/s. Its velocity in vacuum is

|  |  |
| --- | --- |
| (A) | > 332 m/s |
| (B) | 3 × 108 m/s |
| (C) | 332 m/s |
| (D) | zero |

73. A steady current flows in a metallic conductor of non-uniform cross-section. The quantity/quantities constant along the length of the conductor is/are

|  |  |
| --- | --- |
| (A) | current, electric field and drift velocity |
| (B) | drift speed only |
| (C) | current and drift speed |
| (D) | current only |

74. A convex lens is dipped in a liquid whose refractive index is equal to refractive index of the lens. Then its focal length will

|  |  |
| --- | --- |
| (A) | remain unchanged |
| (B) | be 0 |
| (C) | be infinity |
| (D) | be small but non zero |

75. AND gate can be produced using two gates of

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

CHEMISTRY UG

76. Iodine crystals are

|  |  |
| --- | --- |
| (A) | electrical conductors |
| (B) | insulators |
| (C) | semiconductors |
| (D) | high melting |

77. In an ionic solid with the larger anions and smaller cations, the ions that form close packed structure are

|  |  |
| --- | --- |
| (A) | anions |
| (B) | cations |
| (C) | half of total anions |
| (D) | half of total cations |

78. When a piece of copper is added to concentrated hydrochloric acid,

|  |  |
| --- | --- |
| (A) | it remains insoluble |
| (B) | it readily dissolves |
| (C) | it slowly dissolves |
| (D) | it dissolves with the release of hydrogen |

79. The electrode potential of a half cell

|  |  |
| --- | --- |
| (A) | does not vary with concentration of the solution |
| (B) | depends on the concentration of the solution |
| (C) | depends on the rate of diffusion of the cation |
| (D) | depends on the rate of diffusion of the anion |

80. A catalyst

|  |  |
| --- | --- |
| (A) | decreases the ΔG of a reaction |
| (B) | increases the ΔG of a reaction |
| (C) | does not alter the ΔG of a reaction |
| (D) | shifts the equilibrium of the reaction |

81. As per the Freundlich's adsorption isotherm, the amount adsorbed per gram of the adsorbent is independent of pressure, when

|  |  |
| --- | --- |
| (A) | n = 0 |
| (B) | n > 1 |
| (C) | n = 1 |
| (D) | 1/n = 0 |

82. When an ideal solution is formed from pure n-hexane and n-heptane, the wrong statement is

|  |  |
| --- | --- |
| (A) | no heat is evolved |
| (B) | no volume change occurs |
| (C) | large quantity of heat is evolved |
| (D) | it obeys Raoult’s law |

83. If cells placed in sodium chloride solution shrink, the solution is called

|  |  |
| --- | --- |
| (A) | hypertonic |
| (B) | hypotonic |
| (C) | isotonic |
| (D) | azeotropic |

84. The van’t Hoff’s factor for ethanoic acid in benzene is equal to

|  |  |
| --- | --- |
| (A) | zero |
| (B) | close to 0.5 |
| (C) | unity |
| (D) | two |

85. When a dilute solution of KI is added to a dilute solution of AgNO3,

|  |  |
| --- | --- |
| (A) | a positively charged sol results |
| (B) | a negatively charged sol results |
| (C) | a neutral sol results |
| (D) | both the positive and negative sol particles result |

86. Hardy – Schulze rule states that the ease of coagulation of a negatively charged colloid with the cations varies in the order

|  |  |
| --- | --- |
| (A) | Fe3+ > Mg2+ > K+ |
| (B) | K+ > Mg2+ > Fe3+ |
| (C) | Mg2+ > Fe3+ > K+ |
| (D) | Fe3+ > K+ > Mg2+ |

87. For the following reaction, the initial concentration of HI (0.005 mol L–1) becomes half of it after 25 min. The rate of decomposition of HI is equal to

2HI(g)→ H2(g) + I2(g)

|  |  |
| --- | --- |
| (A) | –0.0005 mol L–1 min–1 |
| (B) | 0.00005 mol L–1 min–1 |
| (C) | –0.0001 mol L–1 min–1 |
| (D) | +0.000.2 mol L–1 min–1 |

88. When acetone is added to ethanol, the solution shows

|  |  |
| --- | --- |
| (A) | positive deviation from Raoult’s law |
| (B) | negative deviation from Raoult’s law |
| (C) | no deviation from Raoult’s law |
| (D) | ideal behavior |

89. For the Daniel cell of emf 1.1 V, if an external emf of 1.5V is applied,

|  |  |
| --- | --- |
| (A) | the copper electrode will dissolve |
| (B) | the zinc electrode will dissolve |
| (C) | the electrode reactions will be ceased |
| (D) | copper will be deposited |

90. The material that shows increase in conductivity with increase in temperature is

|  |  |
| --- | --- |
| (A) | copper |
| (B) | silver |
| (C) | alumina |
| (D) | titania |

91. One mole of a gas expands from 6 m3 to 8 m3 in a container against a constant external pressure of 3 Pa at 300 K. The work done on the gas, w, is

|  |  |
| --- | --- |
| (A) | –2 J |
| (B) | –6 J |
| (C) | +575 J |
| (D) | –575 J |

92. The latent heat of phase change from ice to water is 80 cal per gram at 0 °C. Then change in entropy (in eu) for the surrounding, when 1 mole water freezes at 0 °C

|  |  |
| --- | --- |
| (A) | ≈ –5.3 eu |
| (B) | ≈ 5.3 eu |
| (C) | ≈ 0.3 eu |
| (D) | zero |

93. At 25 °C, *p*Kw is 14. The degree of dissociation of water is nearly

|  |  |
| --- | --- |
| (A) | 10–4 |
| (B) | 1.8 × 10–9 |
| (C) | 10–7 |
| (D) | 5.6 × 10–6 |

94. Which one of the following uranium isotopes is used as atomic fuel?

|  |  |
| --- | --- |
| (A) | 233U92 |
| (B) | 235U92 |
| (C) | 236U92 |
| (D) | 238U92 |

95. Most abundant element in the earth crust is

|  |  |
| --- | --- |
| (A) | O |
| (B) | Al |
| (C) | Fe |
| (D) | Si |

96. Soda acid type fire extinguishers contain H2SO4 and

|  |  |
| --- | --- |
| (A) | NaHCO3 + Na2CO3 |
| (B) | NaHCO3 solution |
| (C) | Na2CO3 |
| (D) | CaCO3 |

97. The correct order of electronegativity of N, O, F and P is

|  |  |
| --- | --- |
| (A) | F > O > N > P |
| (B) | F > N > P > O |
| (C) | F > O > P > N |
| (D) | N > O > P > F |

98. Find the correct order of electron affinity on the following elements.

S, O and Se

|  |  |
| --- | --- |
| (A) | S > O > Se |
| (B) | O > S > Se |
| (C) | S > Se > O |
| (D) | Se > O > S |

99. The solution of sodium metal in liquid ammonia acts as a strong reducing agent due to the presence of

|  |  |
| --- | --- |
| (A) | Sodium atoms |
| (B) | Solvated electrons |
| (C) | Sodium hydroxide |
| (D) | Sodium azide |

100. The isostructural group with I3– ion is

|  |  |
| --- | --- |
| (A) | NO2–, XeF2, N3– |
| (B) | ICl2–, XeF2, N3– |
| (C) | NH2–, NO2–, ICl2- |
| (D) | BH3, CO2, ICl2– |

101. The diamagnetic metal complex ion is

|  |  |
| --- | --- |
| (A) | [NiCl4]2– |
| (B) | [CoCl4]2– |
| (C) | [CoF6]3– |
| (D) | [Ni(CN)4]2– |

102. The CFSE of cobalt(II) in complex ion [CoCl4]2–  is

|  |  |
| --- | --- |
| (A) | 0.6∆t |
| (B) | 1.2∆t |
| (C) | 1.8∆t |
| (D) | 2.4∆t |

103. The species in which the colour is not due to d-d transitions is

|  |  |
| --- | --- |
| (A) | [Ti(H2O)6]3+ |
| (B) | [CoF6]3– |
| (C) | [Cu(NH3)4]2+ |
| (D) | [CrO4]2– |

104. Per ton of the material consumed, which is expected to produce the greatest quantity of SO2(g)?

|  |  |
| --- | --- |
| (A) | Burning coal |
| (B) | Burning natural gas |
| (C) | Smelting zinc sulphide |
| (D) | Smelting lead sulphide |

105. The acceptable value for the missing quantum number in the following set of quantum numbers is:

*n* = 3, *l* = ?, *ml* = 2, *ms* = +½

|  |  |
| --- | --- |
| (A) | *l* = 3 |
| (B) | *l* = 1 |
| (C) | *l* = 2 |
| (D) | *l* = 0 |

106. Which must possess greater velocity to produce matter waves of same wavelength?

|  |  |
| --- | --- |
| (A) | protons |
| (B) | neutrons |
| (C) | electrons |
| (D) | *α*-particles |

107. Which of the following ions has a trigonal planar shape?

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

108. Number of angular nodes for 4*d* orbital is

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

109. What type of radioactive decay causes the atomic number of a nucleus to increase by one unit?

|  |  |
| --- | --- |
| (A) | Electron capture |
| (B) | *α*-emission |
| (C) | *β*-emission |
| (D) | *γ*-ray emission |

110. The type of hybridization of each carbon in the compound, H3C−CH=C=CH−CH3 is

|  |  |
| --- | --- |
| (A) | *sp3, sp2, sp2, sp2, sp3* |
| (B) | *sp3, sp2, sp, sp2, sp3* |
| (C) | *sp3, sp, sp, sp, sp3* |
| (D) | *sp3, sp, sp2, sp, sp3* |

111. If the sodium fusion extract of an organic compound gives violet colour upon treatment with sodium nitroprusside, then which of the following statement is correct?

|  |  |
| --- | --- |
| (A) | Nitrogen is present in the compound and the violet colour is due to the formation of [Fe(CN)6]4− |
| (B) | Both nitrogen and bromine are present in the compound and the violet colour is due to the formation of (NH4)2MoO4 |
| (C) | Sulfur is present in the compound and the violet colour is due to the formation of [Fe(CN)5NOS]4− |
| (D) | Both nitrogen and sulfur are present in the compound and the violet colour is due to the formation of [Fe(SCN)]2+ |

112. Major product of the following reaction is



Dry ether

|  |  |
| --- | --- |
| (A) | CHEMISTRY ORGANIC UG SET IV 001.jpg |
| (B) | CHEMISTRY ORGANIC UG SET IV 002.jpg |
| (C) | CHEMISTRY ORGANIC UG SET IV 003.jpg |
| (D) | CHEMISTRY ORGANIC UG SET IV 004.jpg |

113. When propyne is treated with mercuric sulphate and dilute sulfuric acid at 60 °C, it forms

|  |  |
| --- | --- |
| (A) | acetone through anti-Markovnikov addition of water |
| (B) | propionaldehyde through Markovnikov addition of water |
| (C) | acetone through Markovnikov addition of water |
| (D) | propionaldehyde through anti-Markovnikov addition of water |

114. Major product formed in the following reaction is



|  |  |
| --- | --- |
| (A) | *n*-propylbenzene |
| (B) | isopropylbenzene (cumene) |
| (C) | 1-phenylpropene |
| (D) | 1,3-di-(*n*-propyl)benzene |

115. The product(s) of the following bimolecular nucleophilic substitution reaction is (are)



|  |  |
| --- | --- |
| (A) | CHEMISTRY ORGANIC UG SET IV 013.jpg |
| (B) | CHEMISTRY ORGANIC UG SET IV 014.jpg |
| (C) | CHEMISTRY ORGANIC UG SET IV 015.jpg |
| (D) | CHEMISTRY ORGANIC UG SET IV 016.jpg |

116. A compound P with molecular formula C9H12 upon air oxidation gives compound Q, which upon treatment with dilute acid gives compounds R and S. R gives violet colour when treated with neutral FeCl3. S gives an yellow precipitate on reaction with iodine in the presence of NaOH. The compounds P and S are

|  |  |
| --- | --- |
| (A) | P = *n*-propylbenzene and S = acetone |
| (B) | P = *n*-propylbenzene and S = phenol |
| (C) | P = isopropylbenzene (cumene) and S = acetone |
| (D) | P = 1,2,4-trimethylbenzene and S = phenol |

117. The major product formed in the nitration of anisole (methoxybenzene) is

|  |  |
| --- | --- |
| (A) | *o*-nitroanisole |
| (B) | *p*-nitroanisole |
| (C) | *m*-nitroanisole |
| (D) | 3,4-dinitroanisole |

118. Suitable reagents to perform the following transformations are



|  |  |
| --- | --- |
| (A) | For step-1: SOCl2 and for step-2: H2, Pd-BaSO4 |
| (B) | For step-1: SOCl2 and for step-2: NaBH4 |
| (C) | For step-1: Cl2 and for step-2: H2, Pd-BaSO4 |
| (D) | For step-1: PCl5 and for step-2: LiAlH4 |

119. A compound P with molecular formula C6H10 decolorizes bromine water and undergoes oxidation with acidified KMnO4 to give a dicarboxylic acid with the same number of carbon atoms. The dicarboxylic acid serves as an important precursor in the manufacture of nylon-6,6. The compound P is

|  |  |
| --- | --- |
| (A) | CHEMISTRY ORGANIC UG SET IV 049.JPG |
| (B) | CHEMISTRY ORGANIC UG SET IV 050.JPG |
| (C) | CHEMISTRY ORGANIC UG SET IV 051.JPG |
| (D) | CHEMISTRY ORGANIC UG SET IV 052.JPG |

120. Which one of the following carboxylic acids would undergo Hell-Volhard-Zelinsky reaction?

|  |  |
| --- | --- |
| (A) | CHEMISTRY ORGANIC UG SET IV 053.JPG |
| (B) | CHEMISTRY ORGANIC UG SET IV 054.JPG |
| (C) | CHEMISTRY ORGANIC UG SET IV 055.JPG |
| (D) | CF3CO2H |

121. Major product formed in the following reaction is



|  |  |
| --- | --- |
| (A) | CHEMISTRY ORGANIC UG SET IV 069.JPG |
| (B) | CHEMISTRY ORGANIC UG SET IV 070.JPG |
| (C) | CHEMISTRY ORGANIC UG SET IV 071.JPG |
| (D) | CHEMISTRY ORGANIC UG SET IV 072.JPG |

122. Gabriel phthalimide synthesis cannot be used for introducing the NH2 group in

|  |  |
| --- | --- |
| (A) | *n*-butylamine |
| (B) | benzylamine |
| (C) | aniline |
| (D) | 2-aminopropanoic acid |

123. In amylose,

|  |  |
| --- | --- |
| (A) | α-D-(+)-glucose units are linked through C1-C4 glycosidic linkage |
| (B) | α-D-(+)-glucose units are linked to β-D-(−)-fructose through C1-C2 glycosidic linkage |
| (C) | α-D-(+)-glucose units are linked through C1-C2 glycosidic linkage |
| (D) | β-D-(+)-glucose units are linked through C1-C4 glycosidic linkage |

124. The Ziegler-Natta catalyst is

|  |  |
| --- | --- |
| (A) | Et2Zn and TiCl4 |
| (B) | Et3Al and SnCl4 |
| (C) | Et2Zn and SnCl4 |
| (D) | Et3Al and TiCl4 |

125. Which one of the following is not a tranquilizer?

|  |  |
| --- | --- |
| (A) | Meprobamate |
| (B) | Ranitidine |
| (C) | Valium |
| (D) | Serotonin |

BIOLOGY

126. The term ‘meristem’ was coined by

|  |  |
| --- | --- |
| (A) | N. Grew |
| (B) | K. Esau |
| (C) | C. Nageli |
| (D) | Hofmeister |

127. The balloon-like ingrowths blocking the lumen of xylem vessels from the neighbouring parenchymatous cells in many dicotyledons are called

|  |  |
| --- | --- |
| (A) | tylosoids |
| (B) | tyloses |
| (C) | filling tissue |
| (D) | thylakoids |

128. Conversion of glucose into pyruvic acid in a cell is known as

|  |  |
| --- | --- |
| (A) | Kreb’s cycle |
| (B) | TCA cycle |
| (C) | glycolysis |
| (D) | glyoxalation |

129. If the stamens are adnate to the tepals, the condition is known as

|  |  |
| --- | --- |
| (A) | epiphyllous |
| (B) | episepalous |
| (C) | epipetalous |
| (D) | epibracteolous |

130. The cell components are made of a collection of molecules consisting of inorganic and organic compounds called

|  |  |
| --- | --- |
| (A) | whirl pool |
| (B) | cellular pool |
| (C) | polymer pool |
| (D) | glycans |

131. *Pistia stratiotes* is a good example for

|  |  |
| --- | --- |
| (A) | sucker |
| (B) | stolon |
| (C) | runner |
| (D) | offset |

132. A sticky covering found on the surface of the pollen that attracts insects is called

|  |  |
| --- | --- |
| (A) | nectar |
| (B) | pollenkitt |
| (C) | sporopollenin |
| (D) | tapetum |

133. …………… is a phenomenon where a single gene affects multiple traits altering the phenotype of an organism.

|  |  |
| --- | --- |
| (A) | Pleiotropy |
| (B) | Epistasis |
| (C) | Polygenic inheritance |
| (D) | Atavism |

134. Loss of one chromosome from the diploid set is known as

|  |  |
| --- | --- |
| (A) | nullisomy |
| (B) | monosomy |
| (C) | autosomy |
| (D) | aneuploidy |

135. Some endonuclease enzymes cut the DNA strand resulting in protruding and recessed ends known as

|  |  |
| --- | --- |
| (A) | palindromic ends |
| (B) | blunt ends |
| (C) | cohesive ends |
| (D) | flush ends |

136. G. Haberlandt cultured plant cells in artificial conditions using the cells of

|  |  |
| --- | --- |
| (A) | *Laminaria digitata* |
| (B) | *Lamium album* |
| (C) | *Lamium purpureum* |
| (D) | *Lamium maculatum* |

137. The phenomenon of the reversion of mature cells to meristematic state to form callus is known as

|  |  |
| --- | --- |
| (A) | dedifferentiation |
| (B) | redifferentiation |
| (C) | differentiation |
| (D) | totipotency |

138. *Catharanthus roseus* produces the secondary metabolite

|  |  |
| --- | --- |
| (A) | codeine |
| (B) | vincristine |
| (C) | capsaicin |
| (D) | digoxin |

139. *Utricularia* is commonly known as

|  |  |
| --- | --- |
| (A) | liverwort |
| (B) | stonewort |
| (C) | bladderwort |
| (D) | hornwort |

140. If the petiole is modified into a leaf-like structure, it is known as a

|  |  |
| --- | --- |
| (A) | cladode |
| (B) | phylloclade |
| (C) | cladophyll |
| (D) | phyllode |

141. Seeds that germinate only in the presence of sunlight are said to be

|  |  |
| --- | --- |
| (A) | helioblastic |
| (B) | thermoblastic |
| (C) | photoblastic |
| (D) | All the three |

142. The movement of decomposed water-soluble organic and inorganic compounds from the surface to lower layers of soil is known as

|  |  |
| --- | --- |
| (A) | mineralization |
| (B) | humification |
| (C) | fragmentation |
| (D) | eluviation |

143. Species that indicate the health of an ecosystem are called

|  |  |
| --- | --- |
| (A) | Keystone species |
| (B) | Dominant species |
| (C) | Flagship species |
| (D) | Indicator species |

144. A good example of an alien invasive species is

|  |  |
| --- | --- |
| (A) | *Helicteres isora* |
| (B) | *Santalum album* |
| (C) | *Calotropis procera* |
| (D) | *Parthenium hysterophorus* |

145. Protecting a species in its own habitat is called …………… conservation.

|  |  |
| --- | --- |
| (A) | *ex situ* |
| (B) | *in vitro* |
| (C) | *in situ* |
| (D) | *in vivo* |

146. World’s first cotton hybrid was developed by

|  |  |
| --- | --- |
| (A) | B.P. Pal |
| (B) | T.S. Venkataraman |
| (C) | C.R. Dhan |
| (D) | C.T. Patel |

147. Tea is a native of

|  |  |
| --- | --- |
| (A) | Brazil |
| (B) | Malaysia |
| (C) | Mongolia |
| (D) | China |

148. …………… is a frog with a pig-nose.

|  |  |
| --- | --- |
| (A) | *Nasikabatrachus bhupathi* |
| (B) | *Nyctibatrachus major* |
| (C) | *Rana keralensis* |
| (D) | *Rhacophorus malabaricus* |

149. The mesodermal epithelium is called

|  |  |
| --- | --- |
| (A) | pleurobium |
| (B) | peristome |
| (C) | periblem |
| (D) | peritoneum |

150. Lateral appendages in Nereis are called

|  |  |
| --- | --- |
| (A) | pseudopodia |
| (B) | parapodia |
| (C) | cylindropodia |
| (D) | claspopodia |

151. Kidneys are mesonephric in

|  |  |
| --- | --- |
| (A) | Pisces |
| (B) | Amphibia |
| (C) | Reptilia |
| (D) | Aves |

152. Pneumatic bones are seen in

|  |  |
| --- | --- |
| (A) | Pisces |
| (B) | Amphibia |
| (C) | Reptilia |
| (D) | Aves |

153. …………… enhances night vision in nocturnal animals such as cats.

|  |  |
| --- | --- |
| (A) | rods |
| (B) | cones |
| (C) | vitreous humor |
| (D) | tapetum lucidum |

154. The protective lubricating mucus in human intestine is secreted by

|  |  |
| --- | --- |
| (A) | microvilli |
| (B) | Goblet cell |
| (C) | epithelial cells |
| (D) | None of the above |

155. A cartilage cell is known as

|  |  |
| --- | --- |
| (A) | chondrocyte |
| (B) | osteocyte |
| (C) | fibroblast |
| (D) | dendrites |

156. In Cockroach, the hardened plates of the dorsal side are called

|  |  |
| --- | --- |
| (A) | sclerites |
| (B) | tergites |
| (C) | sternites |
| (D) | pleurites |

157. The infundibulum of the fallopian tube leads to a wider central portion called

|  |  |
| --- | --- |
| (A) | fundus |
| (B) | cervix |
| (C) | ampulla |
| (D) | tunica |

158. Gonadotropin Releasing Hormone (GnRH) is released by the

|  |  |
| --- | --- |
| (A) | brain |
| (B) | thalamus |
| (C) | hypothalamus |
| (D) | pituitary |

159. …………… hormone is crucial during childbirth.

|  |  |
| --- | --- |
| (A) | Gonadotropin |
| (B) | Somatomammotropin |
| (C) | Lucin |
| (D) | Oxytocin |

160. …………… refers to immunogenetic D antigen of the Rh blood group system in humans.

|  |  |
| --- | --- |
| (A) | Rhesus factor |
| (B) | Immunoglobulin |
| (C) | Erythroblastosis |
| (D) | Platyrrhina |

161. Phages are

|  |  |
| --- | --- |
| (A) | viruses |
| (B) | bacteria |
| (C) | virions |
| (D) | proteobacteria |

162. Modern birds emerged during …………… period.

|  |  |
| --- | --- |
| (A) | Cretaceous |
| (B) | Triassic |
| (C) | Carboniferous |
| (D) | Permian |

163. If the dead remains of an organism is replaced by minerals the type of fossilization is known as

|  |  |
| --- | --- |
| (A) | Casts |
| (B) | Natural moulds |
| (C) | Petrifaction |
| (D) | Putrefaction |

164. Mutation that leads to a change in the structure of a gene is called …………… mutation.

|  |  |
| --- | --- |
| (A) | deletion |
| (B) | translocation |
| (C) | point |
| (D) | chromosomal |

165. Changes in allele frequencies within a population is known as

|  |  |
| --- | --- |
| (A) | microevolution |
| (B) | gene-evolution |
| (C) | genetic drift |
| (D) | natural selection |

166. Mosquirix is a vaccine used to prevent

|  |  |
| --- | --- |
| (A) | Dengue |
| (B) | Malaria |
| (C) | Chikungunya |
| (D) | Filariasis |

167. …………… coagulates milk protein and converts lactose to lactic acid.

|  |  |
| --- | --- |
| (A) | *Streptococcus thermophilus* |
| (B) | *Saccharomyces cerevisiae* |
| (C) | *Streptomyces griseus* |
| (D) | *Streptomyces aureofaciens* |

168. The first bioherbicide was developed from

|  |  |
| --- | --- |
| (A) | *Phytophthora infestans* |
| (B) | *Phytophthora palmivora* |
| (C) | *Bacillus thuringiensis* |
| (D) | *Phytophthora ricini* |

169. …………… are undifferentiated cells found in most higher animals.

|  |  |
| --- | --- |
| (A) | Stem cells |
| (B) | Root cells |
| (C) | Red Blood Cells |
| (D) | White Blood Cells |

170. Organisms that can tolerate only a narrow range of temperature are called

|  |  |
| --- | --- |
| (A) | Homeotherms |
| (B) | Poikilotherms |
| (C) | Stenotherms |
| (D) | Heliotherms |

171. Choose the CORRECT order

|  |  |
| --- | --- |
| (A) | Phylum-Kingdom- Order-Class-Family-Genus-Species |
| (B) | Kingdom-Class-Division-Family-Order- Species-Genus |
| (C) | Kingdom- Division- Order- Class-Family-Genus-Species |
| (D) | Kingdom-Phylum-Class-Order-Family-Genus-Species |

172. A typical embryo sac of angiosperms consists of

|  |  |
| --- | --- |
| (A) | 2 antipodals, 3 synergids, 2 polar nuclei and 1 egg cell |
| (B) | 3 antipodals, 3 synergids, 1 polar nucleus and 1 egg cell |
| (C) | 3 antipodals, 2 synergids, 2 polar nuclei and 1 egg cell |
| (D) | 1 synergid, 3 antipodals, 3 polar nuclei and 1 egg cell |

173. Which of the following is a non-membrane bound organelle?

|  |  |
| --- | --- |
| (A) | Golgi complex |
| (B) | Lysosome |
| (C) | Ribosome |
| (D) | Vacuole |

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

|  |  |  |  |
| --- | --- | --- | --- |
| **Column I (organism)** | | **Column II (reproductive structure)** | |
| (I) | *Penicillium* | (a) | Gemmules |
| (II) | *Chlamydomonas* | (b) | Buds |
| (III) | Sponge | (c) | Conidia |
| (IV) | *Hydra* | (d) | Zoospores |

Choose the answer

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

175. Most of the minerals present in soil can enter plants through roots. Which of the following is NOT a criterion for essentiality of an element?

|  |  |
| --- | --- |
| (A) | The element must be absolutely necessary for supporting normal growth and reproduction |
| (B) | Deficiency of any one element cannot be met by supplying some other element |
| (C) | The requirement of the element must be specific and replaceable by another element |
| (D) | The element must be directly involved in the metabolism of the plant |

176. The process of excreting ammonia is ammonotelism. Which one of the following is ammonotelic organism?

|  |  |
| --- | --- |
| (A) | Marine fishes |
| (B) | Mammals |
| (C) | Marine amphibians |
| (D) | Aquatic amphibians |

177. The amount of carbon fixed annually in the biosphere through photosynthesis is

|  |  |
| --- | --- |
| (A) | 4 × 1013 mg |
| (B) | 4 × 1013 kg |
| (C) | 4 × 1013 metric ton |
| (D) | 4 × 1013 g |

178. *Spirulina*, an alga belongs to

|  |  |
| --- | --- |
| (A) | chlorophyceae |
| (B) | cyanophyceae |
| (C) | xanthophyceae |
| (D) | bacillariophyceae |

179. Match the following diseases with their causative organism.

|  |  |  |  |
| --- | --- | --- | --- |
| **Column I** | | **Column II** | |
| (1) | Malaria | (i) | Varicella zoster virus (VZV) |
| (2) | Chicken pox | (ii) | 2019-nCoV |
| (3) | Pertussis | (iii) | Plasmodium *spe.* |
| (4) | COVID-19 | (iv) | *Bordetella Spe.* |

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

180. Identify the wrongly mismatched pair regarding the asexual reproduction.

|  |  |
| --- | --- |
| (A) | Water hyacinth - Runner |
| (B) | Bryophyllum - Leaf bud |
| (C) | Agave - Bulbils |
| (D) | Penicillium - Conidia |

181. Choose the factor affecting Hardy-Weinberg law.

|  |  |
| --- | --- |
| (A) | Genetic Drift |
| (B) | Mutation |
| (C) | Gene Migration |
| (D) | All the above |

|  |  |  |
| --- | --- | --- |
| 182. | Assertion: | Rod cells are for colour vision. Cone cells are for night vision. |
|  | Reason: | Rod cells are highly sensitive to light & cone cells are insensitive to light. |

|  |  |
| --- | --- |
| (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 |

183. Which phylum follows the process of metagenesis?

|  |  |
| --- | --- |
| (A) | Cnidaria |
| (B) | Protozoa |
| (C) | Porifera |
| (D) | Arthropoda |

184. Name the ion responsible for unmasking of active sites for myosin to cross bridge activity during muscle contraction.

|  |  |
| --- | --- |
| (A) | Calcium |
| (B) | Magnesium |
| (C) | Sodium |
| (D) | Potassium |

185. Which one is the most abundant protein in the animal world?

|  |  |
| --- | --- |
| (A) | Haemoglobin |
| (B) | Collagen |
| (C) | Insulin |
| (D) | Trypsin |

186. An example of edible underground stem is

|  |  |
| --- | --- |
| (A) | potato |
| (B) | carrot |
| (C) | groundnut |
| (D) | sweet potato |

187. Depletion of which gas in the atmosphere can lead to an increased incidence of skin cancer?

|  |  |
| --- | --- |
| (A) | Ozone |
| (B) | Ammonia |
| (C) | Methane |
| (D) | Nitrous oxide |

188. *Monascus purpureus* is a yeast used commercially in the production of

|  |  |
| --- | --- |
| (A) | streptokinase for removing clots from the blood vessels |
| (B) | citric acid |
| (C) | blood cholesterol lowering statins |
| (D) | ethanol |

189. A disease caused by an autosomal primary non-disjunction is

|  |  |
| --- | --- |
| (A) | Down’s syndrome |
| (B) | Klinefelter’s syndrome |
| (C) | Turner’s syndrome |
| (D) | Sickle cell anaemia |

190. Which one is not a placental hormone?

|  |  |
| --- | --- |
| (A) | hcG |
| (B) | hpL |
| (C) | Progesterone |
| (D) | Melatonin |

191. Cocci, bacilli, vibrio and spirilla have the structure, respectively, of

|  |  |
| --- | --- |
| (A) | spherical, comma, rod, and spiral |
| (B) | comma, spherical, rod, and spiral |
| (C) | spherical, spiral, rod and comma |
| (D) | spherical, rod, comma, and spiral |

192. Which of the following organisms exhibit haplo-diplontic and diplontic life cycle respectively?

|  |  |
| --- | --- |
| (A) | *Fucus, Pteris* |
| (B) | *Ectocarpus, Fucus* |
| (C) | *Fucus, Ectocarpus* |
| (D) | *Ulothrix* and *Volvox* |

193. Which of the following muscles is/are not under the voluntary control of nervous system?

|  |  |
| --- | --- |
| (A) | Skeletal muscles |
| (B) | Visceral muscles |
| (C) | Cardiac muscles |
| (D) | Visceral muscles and cardiac muscles |

194. Match the column I with column II regarding the name of the scientists who coined the term for the listed plant tissues; and choose the correct answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Column I** | | **Column II** | |
| (a) | Nageli | (i) | Parenchyma |
| (b) | Schleiden | (ii) | Collenchyma |
| (c) | Grew | (iii) | Sclerenchyma |
| (d) | Mettenius | (iv) | Xylem |

|  |  |
| --- | --- |
| (A) | (a)-(ii), (b)-(iv), (c)-(iii), (d)-(i) |
| (B) | (a)-(ii), (b)-(i), (c)-(iii), (d)-(iv) |
| (C) | (a)-(iv), (b)-(ii), (c)-(i), (d)-(iii) |
| (D) | (a)-(iv), (b)-(ii), (c)-(iii), (d)-(i) |

195. The osmotic potential and pressure potential of four cells, a, b, c and d, are given below. Arrange them in ascending order based on values of their water potential

|  |  |  |
| --- | --- | --- |
| Cell | Osmotic potential (atm) | Pressure potential (atm) |
| (a) | –5.8 | 4.7 |
| (b) | –7.2 | 6.7 |
| (c) | –6.1 | 5.8 |
| (d) | –9.3 | 7.2 |

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

196. Sperms are formed in the

|  |  |
| --- | --- |
| (A) | Epididymis |
| (B) | Seminiferous tubules |
| (C) | Prostate gland |
| (D) | Vas deferens |

197. Hyposecretion of hormones of adrenal cortex results in

|  |  |
| --- | --- |
| (A) | Gull’s disease |
| (B) | Graves' disease |
| (C) | Cushing’s disease |
| (D) | Addison’s disease |

198. Most contraceptive pills contain

|  |  |
| --- | --- |
| (A) | Oestrogen and Progesterone |
| (B) | Oestrogen and FSH |
| (C) | FSH and LH |
| (D) | Progesterone and LH |

199. Match column I with column II regarding developmental events of human embryo and choose the correct answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Column I: Development of organs** | | **Column II: Time** | |
| (a) | Limbs and digits | (i) | After 4 weeks |
| (b) | Heart | (ii) | After 8 weeks |
| (c) | External genital organs | (iii) | After 12 weeks |
| (d) | Appearance of hair on the head | (iv) | After 16 weeks |

|  |  |
| --- | --- |
| (A) | (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv) |
| (B) | (a)-(ii), (b)-(i), (c)-(iii), (d)-(iv) |
| (C) | (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii) |
| (D) | (a)-(i), (b)-(ii), (c)-(iv), (d)-(iii) |

200. Match column I with column II regarding sexually transmitted diseases and their symptoms; and choose the correct answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Column I: STD** | | **Column II: Symptom** | |
| (a) | Trichomoniasis | (i) | Pain and pus discharge in the genital tract |
| (b) | Gonorrhoea | (ii) | Ulcer on genitals |
| (c) | Syphilis | (iii) | Vaginitis associated with yellow vaginal discharge |
| (d) | Genital herpes | (iv) | Painful blisters on prepuse and penile shaft |

|  |  |
| --- | --- |
| (A) | (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv) |
| (B) | (a)-(ii), (b)-(i), (c)-(iii), (d)-(iv) |
| (C) | (a)-(iii), (b)-(i), (c)-(ii), (d)-(iv) |
| (D) | (a)-(i), (b)-(ii), (c)-(iv), (d)-(iii) |

