



**UNIFIED COUNCIL**

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## NATIONAL LEVEL SCIENCE TALENT SEARCH EXAMINATION

### Solutions for Class : 12 PCB

#### BIOLOGY

1. (C) Condition reflexes are also known as acquired reflexes because these reflexes are first learned (experienced) and then cause reflex action. Conditional reflexes were first demonstrated by Russian scientist, Pavlov on dogs. This type of reflex is controlled by both brain and spinal cords.
2. (B) Biological Oxygen Demand (BOD) is a measure of polluting organic matter present in a sample of water. BOD is higher in polluted sewage water and is connected with both microbes and organic matter. When larger amount of sewage is dumped into water, the BOD will increase.
3. (A) Mosses and ferns require presence of water for fertilization that is why they are found in moist and shady habitat. Other similarities between both these groups are:
  - (i) Development of embryo occurs within the archegonium.
  - (ii) Presence of heterogenous alternation of generation.
  - (iii) presence of cuticle.
  - (iv) Presence of multicellular sex organs with a jacket of sterile cells.
  - (v) Presence of multicellular sporangia.
  - (vi) Presence of flagellated male gametes.
4. (B) Being dioecious, a dog cannot be self-fertilized.

5. (A) Aurochs was the extinct wild ox of Europe.

#### PHYSICS

6. (A) A parallel plate capacitor is charged and the battery used for charging is then disconnected. The voltage across the plates increases.
7. (C) The magnitude of the e.m.f. across the secondary of a transformer depends upon.
  - (a) the magnitude of the emf applied across the primary.
  - (b) the number of turns in the primary and the secondary.
$$\therefore e_s = \frac{N_s}{N_p} \cdot e^2 p$$
8. (B) There will be no loss of energy if the potential of spheres is the same i.e., if
$$V = \frac{q}{4\pi \epsilon_0 r} = \frac{Q}{4\pi \epsilon_0 R} \text{ (or) } \frac{q}{r} = \frac{Q}{R}, qR = QR$$
9. (C) If the plane of the coil makes an angle with the magnetic field, the magnitude of the torque exerted on it is given by  $\tau = nIAB \sin \theta$ . For the given value of  $\theta$ , when A is doubled  $\tau$  value doubles.
10. (A) A thermistor is a heat sensitive resistor, whose value varies appreciably with temperature more so than in standard resistors. Therefore, its temperature coefficient of resistivity should be high. Thermistors are usually made up of metal oxides.

#### CHEMISTRY

11. (B) In the addition of HCN to carbonyl group of a ketone, microphic nitrite or cyanide

ion attacks the carbonyl atom with simultaneous transfer of  $\pi$ -electrons to the oxygen atom of the carbonyl group.

12. (A) The ideal conditions for the manufacture of  $H_2SO_4$  by contact process are low temperature, high pressure and high concentration of reactants.
13. (B) Benzoic acid in benzene exists as dimer.
14. (A) Two ' $\alpha$ ' Amino acids on condensation between COOH and  $NH_2$  groups form dipeptide which further reacts with other amino acids forming polypeptides which are called proteins when there are 100 or more amino acids.

15. (C) Amorphous solids do not melt. They simply soften on heating, and gradually begin to flow on further heating. These solids are, therefore considered as super cooled liquids.

**CRITICAL THINKING**

16. (D)
17. (D)
18. (C)
19. (B)
20. (C)