MHT CET 2026 Biology Answer Key PDF

Biology

1. **Option (b) Lichens**
Explanation:
Lichens act as the pioneer species in a lithosere succession. By secreting organic acids, they slowly weather the bare rock surface, facilitating soil formation and allowing mosses to establish.

2. **Option (a) Fragmentation**
Explanation:
Detritivores such as earthworms feed on detritus and break it down into smaller, simpler particles. This initial physical breakdown process is known as fragmentation.

3. **Option (a) 1, 2, and 3**
Explanation:
The pyramid of energy is strictly upright, the marine biomass pyramid is inverted due to rapid phytoplankton turnover, and the grassland numbers pyramid is upright. Saprophytes are excluded from ecological pyramids.

4. **Option (c) Statement I is correct but Statement II is incorrect.**
Explanation:
Net Primary Productivity is equal to Gross Primary Productivity minus respiratory loss. However, energy flow in any ecosystem is strictly unidirectional, from producers to higher trophic levels, rather than bidirectional.

5. **Option (a) i-b, ii-a, iii-d, iv-c**
Explanation:
Mutualism is a $(+,+)$ interaction; Commensalism is $(+,0)$; Amensalism represents a $(-,0)$ relationship; and Competition is mutually harmful, denoted as $(-,-)$.

8. **Option (a) Both Statement I and Statement II are correct.**
Explanation:
Allen's Rule is an adaptation where colder-climate mammals minimize heat loss through shorter ears and limbs. Similarly, *Opuntia* adapts to dry conditions by modifying leaves into spines to prevent transpiration.

9. **Option (a) i-b, ii-a, iii-d, iv-c**
Explanation:
Amoebiasis is caused by *Entamoeba histolytica*; Filariasis is caused by *Wuchereria bancrofti*; Syphilis is caused by *Treponema pallidum*; and AIDS is caused by HIV.

10. **Option (c) Sporozoite**
Explanation:
The infective stage of the *Plasmodium* parasite for humans is the sporozoite. These are stored in the salivary glands of female *Anopheles* mosquitoes and injected during a bite.

11. **Option (a) i-b, ii-a, iii-d, iv-c**
Explanation:
Photoreceptors detect light; gustatoreceptors are responsible for the sensation of taste; phonoreceptors detect sound waves; and nociceptors are specialized pain receptors.

Chemistry

12. **Option (b) Benzene**
Explanation:
Chlorobenzene reacts with magnesium in dry ether to form phenylmagnesium chloride (Grignard reagent). Its subsequent reaction with ethanol abstracts an active proton, yielding benzene.

13. **Option (d) d^4 (in strong ligand fields)**
Explanation:
A spin-only magnetic moment of 2.84 BM corresponds to two unpaired electrons ($\mu = \sqrt{n(n+2)}$). In a strong ligand field, a d^4 configuration undergoes pairing to yield $t_{2g}^4 e_g^0$, containing exactly two unpaired electrons.

14. **Option (c) $FCH_2COOH > ClCH_2COOH > BrCH_2COOH > CH_3COOH$**
Explanation:
The presence of electronegative halogen atoms increases acidity via the electron-withdrawing negative inductive ($-I$) effect. The relative strength of this effect follows the electronegativity order F > Cl > Br > H.

15. **Option (a) HCHO**
Explanation:
Primary alcohols like ethyl alcohol are prepared by reacting a Grignard reagent (such as CH_3MgBr) with formaldehyde (HCHO), followed by acid hydrolysis of the adduct.

16. **Option (d) m-chlorophenol**
Explanation:
Phenols are more acidic than alcohols due to resonance stabilization of the phenoxide ion. The electron-withdrawing chlorine atom in m-chlorophenol further stabilizes the conjugate base through inductive effects.

17. **Option (a) Cyanide ion**
Explanation:
The cyanide ion (CN^-) acts as a monodentate ligand because it coordinates to the central metal through only a single donor atom at any given time.

18. **Option (a) High density polythene**
Explanation:
High density polythene (HDPE) consists of linear, unbranched hydrocarbon chains that pack closely together, whereas low density polythene (LDPE) is highly branched.

19. **Option (a) 0.011 Ω^{-1} cm^{-1}**
Explanation:
Conductivity (κ) is calculated from molar conductivity (Λ_m) and concentration (C) using $\kappa = \frac{\Lambda_m \times C}{1000}$. Substituting $220 \times \frac{0.05}{1000}$ yields 0.011 Ω^{-1} cm^{-1}.

20. **Option (b) Buna-S**
Explanation:
Buna-S is a copolymer of 1,3-butadiene and styrene that exhibits highly elastic properties, classifying it as a synthetic elastomeric polymer.

Physics

26. **Option (a) $\pi e f r^2$**
Explanation:
The revolving electron creates an equivalent current $I = ef$. The magnetic dipole moment is the product of current and orbit area ($M = I \times A = ef \times \pi r^2 = \pi e f r^2$).

27. **Option (a) Attractive, magnitude $\frac{\mu_0 eIv}{2\pi d}$**
Explanation:
The magnetic field of the wire is $B = \frac{\mu_0 I}{2\pi d}$. Applying Lorentz force $F = evB$ and right-hand rules shows the force is directed towards the wire, making it attractive.

28. **Option (a) $\frac{q\lambda}{2\pi\varepsilon_0} \ln 2$**
Explanation:
The electric field of the line charge is $E = \frac{\lambda}{2\pi\varepsilon_0 r}$. The work done in moving a charge q is $W = \int_a^{2a} qE\, dr = \frac{q\lambda}{2\pi\varepsilon_0}[\ln r]_a^{2a} = \frac{q\lambda}{2\pi\varepsilon_0} \ln 2$.

29. **Option (a) $\frac{2K}{K+1}C$**
Explanation:
Introducing a dielectric slab of thickness $d/2$ splits the system into two capacitors in series: one with air ($C_1 = 2C$) and one with dielectric ($C_2 = 2KC$). Their equivalent series capacitance is $C' = \frac{C_1 C_2}{C_1 + C_2} = \frac{2K}{K+1}C$.