1. Two charge particles of charges +4 μC and +9 μC are fixed at A and B separated by a distance 20 cm. Where should be a third point charge 1 μC placed such that net electrostatic force on third charge becomes zero?
   (1) 12 cm from +4 μC
   (2) 8 cm from +4 μC
   (3) 9 cm from +9 μC
   (4) Mid-point of the point A and B

2. An electric dipole with dipole moment \( \vec{p} = (2\hat{i} + 3\hat{j}) \text{ C m} \) is kept in electric field \( \vec{E} = 4\hat{i} \text{ N/C} \). Potential energy of electric dipole is
   (1) 8 J
   (2) 12 J
   (3) −8 J
   (4) −12 J

3. Each of the plates shown in figure has surface area \( A \) on one side and the separation between the consecutive plates is \( d \). The emf of the battery connected is \( E \). The magnitude of charge transferred through the battery is
   \[
   \frac{3 \varepsilon_0 AE}{2d} \quad \frac{\varepsilon_0 AE}{3d} \quad \frac{\varepsilon_0 AE}{2d} \quad \frac{2 \varepsilon_0 AE}{3d}
   \]

4. Figure shows a closed Gaussian surface. The surface encloses a point charge \( q_1 \). One more point charge \( q_2 \) is placed outside the Gaussian surface. If \( E \) is the electric field at any point on the Gaussian surface and \( \phi \) is the flux of electric field through the Gaussian surface, then
   (1) \( \phi \) depends on \( q_1 \)
   (2) If \( q_1 = 0 \) then \( \phi = 0 \) but \( E \neq 0 \)
   (3) If \( q_2 = 0 \) then \( \phi \neq 0 \) but \( E = 0 \)
   (4) Both (1) & (2) are correct

5. The value of current \( I \) in the circuit shown in the figure is
   (1) 3 A
   (2) 5 A
   (3) 10 A
   (4) 8 A

6. Two cells each of emf \( E \) and internal resistance \( r \), are connected in series across a resistance \( R \). The power dissipated in the resistor \( R \) is maximum if
7. The reading of ideal voltmeter (V) in the following circuit is

![Circuit Diagram]

(1) 5 V  (2) 20 V
(3) 10 V  (4) 15 V

8. A crystalline solid forming cubic lattice is made of two elements ‘A’ and ‘B’. Atoms of ‘A’ are present at corner and atoms of ‘B’ at face-centres. If all atoms along one of the body diagonal are missing, then the simplest formula of the solid is

(1) A₄B₃  (2) A₂B₃  (3) AB₄  (4) AB₃

9. 30 g of urea is dissolved in 45 g of water. The relative lowering of vapour pressure is

(1) 0.5  (2) 2.5  (3) 0.33  (4) 0.167

10. For the given reactions

\[ \text{Sn}^{4+} + 2e^- \rightarrow \text{Sn}^{2+}, \quad E^\circ = x \text{ volt} \]

\[ \text{Sn} \rightarrow \text{Sn}^{2+} + 2e^-, \quad E^\circ = y \text{ volt} \]

The value of \( E^\circ \) (in volts) for the reaction

\[ \text{Sn}^{4+} + 4e^- \rightarrow \text{Sn} \] will be

(1) \( \frac{x - y}{2} \)  (2) \( \frac{x + y}{2} \)
(3) \( 2x + 2y \)  (4) \( 2x + \frac{y}{2} \)

11. For a reaction \( A \rightarrow B \), having first order

\[ \begin{array}{c|cccc} \text{Time} (t) & 0 & 10 & 20 & 30 \\
\hline \text{[A]} & 100 & 60 & 36 & x \end{array} \]

The value of \( x \) will be

(1) 12  (2) 35.4  (3) 28  (4) 21.6

12. If few drops of KI are added to AgNO₃(aq), the colloid form will be

(1) AgI / Ag⁺  (2) AgI / NO₃⁻
(3) AgI / K⁺  (4) AgI / I⁻

13. Which of the following acts as depressant in Froth flotation process of galena ore?

(1) Cresol  (2) NaCN  (3) Xanthate  (4) ZnS

14. Facial-meridional isomerism is associated with which one of the following complexes?

(1) \([\text{Co(NH}_3]_3\text{Cl}_3]\)  (2) \([\text{Co(en)}_2\text{Cl}_2]\)Cl
(3) \([\text{Cr(gly)}_3]\)  (4) \([\text{Pt(py)}_2(\text{NH}_3)_2\text{Cl}_2]\)SO₄

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**SECTION-B : CHEMISTRY**

11. For a reaction \( A \rightarrow B \), having first order

\[ \begin{array}{c|cccc} \text{Time} (t) & 0 & 10 & 20 & 30 \\
\hline \text{[A]} & 100 & 60 & 36 & x \end{array} \]

The value of \( x \) will be

(1) 12  (2) 35.4  (3) 28  (4) 21.6

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Space for Rough Work
15. Select the **correct** option w.r.t. *Opuntia* and pear plants.
   (1) Both show adventive embryony
   (2) Both show recurrent agamospermy
   (3) *Opuntia* shows adventive embryony but pear shows recurrent agamospermy
   (4) *Opuntia* shows recurrent agamospermy but pear shows adventive embryony

16. **Statement-A:** Zygote is a vital link between two successive generations which ensures the continuity of race from generation to generation.
**Statement-B:** Asexual reproduction does not involve meiosis.
   (1) Only statement A is incorrect
   (2) Only statement B is incorrect
   (3) Both statements A & B are incorrect
   (4) Both statements A & B are correct

17. The given pedigree represents inheritance of

   ![Pedigree Diagram]

   (1) Autosomal recessive disorder
   (2) Y-linked disorder
   (3) X-linked dominant disorder
   (4) X-linked recessive disorder

18. Which of the following sequences of RNA is transcribed from a hypothetical sequence of DNA given below?
   3’-ATGCATGCATGCATGC-5’
   5’-TACGTACGTACGTACG-3’
   (1) 3’-UACGUACGUACGUACG-5’
   (2) 5’-AUGCAUGCAUGCAUGC-3’
   (3) 5’-UACGUACGUACGUACG-3’
   (4) 3’-AUCGAUCGAUCGAUCG-5’

19. In a cross between pure round-yellow and wrinkled-green seeded pea plants, total 16 seeds were obtained in F$_2$ generation after selfing the F$_1$ generation. The probabilities of RRYy and RrYy genotypes are respectively
   (1) $\frac{1}{2}$ and $\frac{3}{4}$
   (2) $\frac{2}{16}$ and $\frac{9}{16}$
   (3) $\frac{4}{16}$ and $\frac{4}{16}$
   (4) $\frac{2}{16}$ and $\frac{4}{16}$

20. Select the **odd** one w.r.t. lysine rich maize variety.
   (1) Protina
   (2) Ratna
   (3) Shakti
   (4) Rattan

21. The bioactive substance which removes clots from blood vessels is
   (1) Gluconic acid
   (2) Cyclosporin A
   (3) Statins
   (4) Streptokinase

22. Among the following which one is an induced ovulator?
   (1) Rabbit
   (2) Deer
   (3) Dog
   (4) Cow

23. The step at which first meiotic division takes place during spermatogenesis is
   (1) Spermatogonia $\rightarrow$ Primary spermatocytes
   (2) Primary spermatocytes $\rightarrow$ Secondary spermatocytes
   (3) Secondary spermatocytes $\rightarrow$ Spermatozids
   (4) Spermatozids $\rightarrow$ Spermatogonia
24. Match the following:

<table>
<thead>
<tr>
<th>Column I</th>
<th>Column II</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Saheli</td>
<td>(i) Suppress sperm motility and fertilising capacity of sperms</td>
</tr>
<tr>
<td>b. Condoms</td>
<td>(ii) Device containing progestogens applied under the skin</td>
</tr>
<tr>
<td>c. Multiload 375</td>
<td>(iii) Prevent the entry of semen into female reproductive tract</td>
</tr>
<tr>
<td>d. Implant</td>
<td>(iv) Non-steroidal preparation</td>
</tr>
</tbody>
</table>

(1) a(iii), b(iv), c(i), d(ii)  (2) a(iv), b(iii), c(ii), d(i)  (3) a(iv), b(iii), c(i), d(ii)  (4) a(iii), b(i), c(ii), d(iv)

25. Match the following:

<table>
<thead>
<tr>
<th>Column I</th>
<th>Column II</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Neanderthal man</td>
<td>(i) Common ancestor of apes and humans</td>
</tr>
<tr>
<td>b. Dryopithecus</td>
<td>(ii) Tuang baby</td>
</tr>
<tr>
<td>c. Homo erectus</td>
<td>(iii) Used hides to protect their bodies and buried their dead</td>
</tr>
<tr>
<td>d. Australopithecus</td>
<td>(iv) First man to use fire</td>
</tr>
</tbody>
</table>

(1) a(iii), b(i), c(iv), d(ii)  (2) a(iii), b(iv), c(i), d(ii)  (3) a(i), b(ii), c(iii), d(iv)  (4) a(ii), b(iii), c(i), d(iv)

26. Some marsupials of Australia resemble placental mammals as they faced similar environmental pressure. Which of the following combination does not show phenotype convergence?

<table>
<thead>
<tr>
<th>Placental mammal</th>
<th>Australian marsupial</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Anteater</td>
<td>Numbat</td>
</tr>
<tr>
<td>(2) Lemur</td>
<td>Spotted cuscus</td>
</tr>
<tr>
<td>(3) Bobcat</td>
<td>Tasmanian wolf</td>
</tr>
<tr>
<td>(4) Flying squirrel</td>
<td>Flying phalanger</td>
</tr>
</tbody>
</table>

27. Match the columns and choose the correct option

<table>
<thead>
<tr>
<th>Column I</th>
<th>Column II</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Influenza</td>
<td>(i) Paramyxo virus</td>
</tr>
<tr>
<td>b. Mumps</td>
<td>(ii) Orthomyxo virus</td>
</tr>
<tr>
<td>c. Small pox</td>
<td>(iii) Varicella virus</td>
</tr>
<tr>
<td>d. Chicken pox</td>
<td>(iv) Variola virus</td>
</tr>
</tbody>
</table>

(1) a(i), b(ii), c(iii), d(iv)  (2) a(ii), b(i), c(iv), d(iii)  (3) a(ii), b(i), c(iii), d(iv)  (4) a(i), b(ii), c(iv), d(iii)

28. The breeding method which is preferably used in cattle to remove inbreeding depression without causing a large scale change in the superior characteristics of the breed is

(1) Inbreeding  (2) Outcrossing  (3) Crossbreeding  (4) Interspecific hybridization

Note: Answer key of Sample Paper is available at www.aakash.ac.in & www.anthe.in
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790 Classroom + 10 Distance 89 Classroom + 1 Distance 715 Classroom + 36 Distance 157 Classroom + 31 Distance

576 in NSEs 2018 481 in IMO Level-I 2018-19 791 in NSO Level-I 2018-19 585 in KVPY Aptitude Test 2018
548 Classroom + 28 Distance 466 Classroom + 15 Distance 776 Classroom + 15 Distance 457 Classroom + 128 Distance

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### ANSWERS

**Class XII Studying - Medical**

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