Class 12

SAMPLE QUESTIONS MATHEMATICS

Q1. The integral $\int \dfrac{\sec^2 x}{(\sec x + \tan x)^{9/2}}\, dx$ equals (for some arbitrary constant K)

(A) $-\dfrac{1}{(\sec x + \tan x)^{11/2}}\left\{\dfrac{1}{11} - \dfrac{1}{7}(\sec x + \tan x)^2\right\} + K$

(B) $\dfrac{1}{(\sec x + \tan x)^{11/2}}\left\{\dfrac{1}{11} - \dfrac{1}{7}(\sec x + \tan x)^2\right\} + K$

(C) $-\dfrac{1}{(\sec x + \tan x)^{11/2}}\left\{\dfrac{1}{11} + \dfrac{1}{7}(\sec x + \tan x)^2\right\} + K$

(D) $\dfrac{1}{(\sec x + \tan x)^{11/2}}\left\{\dfrac{1}{11} + \dfrac{1}{7}(\sec x + \tan x)^2\right\} + K$

Q2. Let $f(x) = \begin{cases} x^2 \left|\cos\dfrac{\pi}{x}\right|, & x \neq 0 \\ 0, & x = 0 \end{cases}$, **for x is real?**

(A) X is differentiable at both x = 0 and x = 2
(B) X is differentiable at x = 0 and not at x = 2
(C) X is not differentiable at x = 0 and differentiable x = 2
(D) X is not differentiable at both x = 0 and x = 2

Q3. If y (x) satisfies the differential equation y' - y tan x = 2xsec x and y (0) = 0, then?

(A) $y\left(\dfrac{\pi}{4}\right) = \dfrac{\pi^2}{8\sqrt{2}}$

(B) $y'\left(\dfrac{\pi}{4}\right) = \dfrac{\pi^2}{18}$

(C) $y\left(\dfrac{\pi}{3}\right) = \dfrac{\pi^2}{9}$

(D) $y'\left(\dfrac{\pi}{3}\right) = \dfrac{4\pi}{3} + \dfrac{2\pi^2}{3\sqrt{3}}$

Q4. If $\vec{a}, \vec{b}, \vec{c}$ **are unit vectors satisfying**

$\left|\vec{a}-\vec{b}\right|^2 + \left|\vec{b}-\vec{c}\right|^2 + \left|\vec{c}-\vec{a}\right|^2 = 9$, **then** $\left|2\vec{a}+5\vec{b}+5\vec{c}\right|$ **is:**

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

Q5. The value of $6 + \log_{\frac{3}{2}}\left(\frac{1}{3\sqrt{2}}\sqrt{4-\frac{1}{3\sqrt{2}}\sqrt{4-\frac{1}{3\sqrt{2}}\sqrt{4-\frac{1}{3\sqrt{2}}\cdots}}}\right)$ is

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

SAMPLE QUESTIONS PHYSICS

Q1. A biconvex lens is formed with two thin plane convex lenses as shown in the figure given below. Refractive index n of the first lens is 1.5 and that of the second lens is 1.2. Both the curved surfaces are of the same radius of curvature R = 14 cm. For this bi convex lens, for and object distance of 40 cm, the image will be at a distance of:


$n = 1.5$ $n_2 = 1.2$
$R = 14$ cm
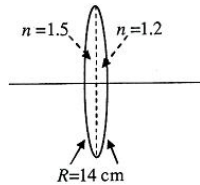
(A)   40 cm   (B)   35 cm
(C)   28 cm   (D)   44 cm

Q2. A cubical region of side a has its centre at the origin. It encloses three fixed point charges -q at (0, -a/4, 0), +3q at (0, 0, 0) and -q at (0, a/4, 0). Chose the correct option from the following:
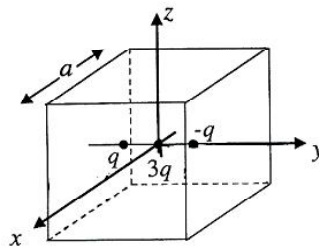
(A) The net electric flux crossing the plane $x = +\dfrac{a}{2}$ is equal to the net electric flux crossing the plane $x = -\dfrac{a}{2}$.

(B) The net electric flux crossing the plane $y = +\dfrac{a}{2}$ is more than the net electric flux crossing the plane $y = -\dfrac{a}{2}$.

(C) The net electric flux crossing the plane $x = +\dfrac{a}{2}$ is equal to the net electric flux crossing the plane `$y = -\dfrac{a}{2}$.

(D) The net electric flux crossing the plane $y = +\dfrac{a}{2}$ is equal to the net electric flux crossing the plane $x = -\dfrac{a}{2}$

Q3. For the resistance network shown in the figure, choose the correct option (s).
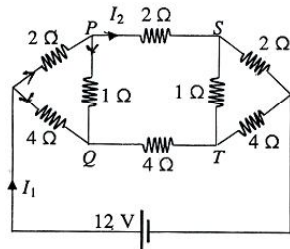
(A) The current through PQ is zero.　(B) $I_1 = 2A$

(C) The potential at S is more than at Q.

(D) $I_2 = 5A$

**Q4. A lamina is made by removing a small disc of diameter 2R from a bigger disc of uniform mass density and radius 2R as shown in the following figure. The moment of inertia of this lamina about axes passing through O and P is Io and Ip respectively. Both these axes are perpendicular to the plane of the lamina. The ratios $\dfrac{I_p}{I_o}$ to the nearest integer is:**
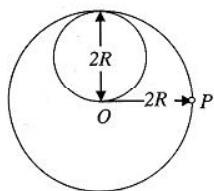
(A)   1   (B)   2
(C)   3   (D)   4

Q5. **An infinitely long solid cylinder of radius R has a uniform volume charge density ρ . It has a spherical cavity of radius $\frac{R}{2}$ with its centre on the axis of the cylinder, as shown in the figure. The magnitude of the electric field at the point P, which is at a distance 2R from the axis of the cylinder is given by the expression $\frac{23\rho R}{16k\varepsilon_0}$. Then the value of k is given by:**
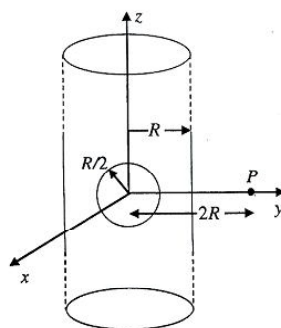
(A)   3   (B)   4
(C)   5   (D)   6

S A M P L E   Q U E S T I O N S   C H E M I S T R Y

Q1. **The number of optically active products obtained from the complete ozonolysis of the given compound is :**
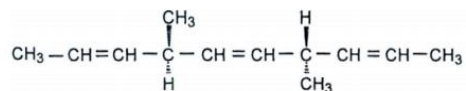
(A)　0　　　　　　　　　　　　　(B)　1
(C)　2　　　　　　　　　　　　　(D)　3

Q2. For an ideal gas, consider only P-V work in going from an initial state X to the final state Z. The final state Z can be reached by either of the two paths shown in the figure. Which of the following choice(s) is (are) correct? [take ΔS as change in entropy and W as work done]
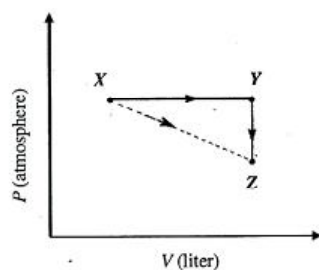
(A) $\Delta S_{x\to z} = \Delta S_{x\to y} + \Delta S_{y\to z}$
(B) $W_{x\to z} = W_{x\to y} + W_{y\to z}$
(C) $W_{x\to y\to z} = W_{x\to y}$
(D) $\Delta S_{x\to y\to z} = \Delta S_{x\to y}$

Q3. Which of the following molecules, in pure form, is (are) unstable at room temperature?
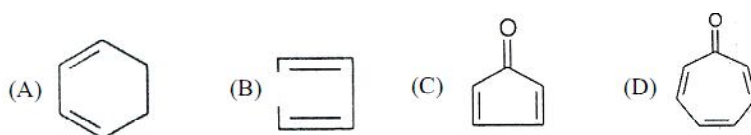
Q4. Identify the binary mixture(s) that can be separated into individual compounds, by differential extraction, as shown in the given scheme.
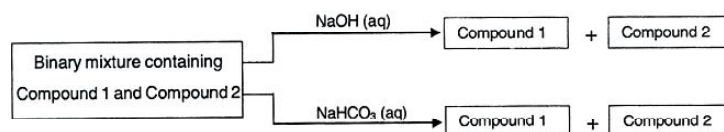
(A) C_6H_5OH and C_6H_5COOH (B) C_6H_5COOH and $C_6H_5CH_2OH$
(C) $C_6H_5CH_2OH$ and C_6H_5OH (D) $C_6H_5CH_2OH$ and $C_6H_5CH_2COOH$

Q5. The substituents R1 and R2 for nine peptides are listed in the following table. How many of these peptides are positively charged at pH = 7.0?

$$H_3 \overset{\oplus}{N} - CH - CO - NH - CH - CO - NH - CH - CO - NH - CH - CO \overset{\ominus}{O}$$

with substituents: H, R_1, R_2, H
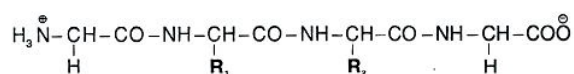
Peptide	R_1	R_2
I	H	H
II	H	CH_3
III	CH_2COOH	H
IV	CH_2CONH_2	$(CH_2)_4NH_2$
V	CH_2CONH_2	CH_2CONH_2
VI	$(CH_2)_4NH_2$	$(CH_2)_4NH_2$
VII	CH_2COOH	CH_2CONH_2
VIII	CH_2OH	$(CH_2)_4NH_2$
IX	$(CH_2)_4NH_2$	CH_3

(A)   2   (B)   3
(C)   4   (D)   5

SAMPLE QUESTIONS BIOLOGY

Q1. The most accepted theory of locomotion of amoeba is:

(A)   Rolling movement theory   (B)   Surface tension theory
(C)   Contraction hydraulic theory
(D)   Mast sol gel theory

Q2. 'Fungi can be distinguished from algae as shown in the figure in the fact that:
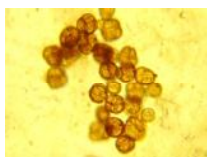
(A) Cell wall is cellulosic cell wall and chlorophyll is absent
(B) Nucleus is present
(C) Mitochondria is absent
(D) Cell wall is chitinous and chlorophyll is absent

Q3. The figure shown below is a heteroecious fungus. Identify the name of the fungus.

(A) Albugo (B) Phytophora
(C) Puccinia (D) Ustaligo

Q4. The figure shown below is a fruiting body of aspergillus is called:

(A) Apothecium (B) Perithecium
(C) Cleistothecium (D) Hypanthodium

Q5. The sedimentation constant of ribosomes is generally 70S. It breaks up into two subunits whose sedimentation constant are :

(A) 50 S and 30 S (B) 60 S and 30 S
(C) 50 S and 20 S (D) 40 S and 20 S

SAMPLE QUESTIONS MENTAL ABILITY

Q1. Nine numbers are written in ascending order. The middle number is also the average of the nine numbers. The average of the five largest numbers is 68 and average of the five smallest numbers is 44. What is the sum of all the numbers?

(A) 504   (B) 307

(C) 565   (D) None of the above

Q2. Find the number of triangles in the following figure:

(A) 15   (B) 16

(C) 17   (D) 18

Q3. Some boys are standing in a queue. If the 10th boy from behind is 5 behind the 12th boy from the front. How many boys are there in the queue?

(A) 22   (B) 24

(C) 26   (D) 28

Q4. An insect moves north, east, south and west and then repeats these moves indefinitely, as shown in the figure where x axis points east and y axis points north. The first leg of journey is 80 units and each leg is half as long as the preceding one. If the starting point is (0;0) then what is the ultimate destination point?

(A) (32;64) (B) (30;62)
(C) (28;54) (D) None of the above

Q5. Nine points lie in a plane as shown below. The number of triangles that can be drawn, having three of these points as vertices, is?

(A) 74 (B) 75
(C) 76 (D) None of the above

S A M P L E Q U E S T I O N S E N G L I S H

Q1. Find the one word for many words:

1. **To write under a different name.**
2. **A handwriting that cannot be read.**
3. **A person's peculiar habit.**
4. **Violating the sanctity of a church.**
(A) 1- Pseudonym 2- Illegible, 3- Idiosyncrasy, 4-Sacrilege
(B) 1- Anonymous 2- Illegible, 3- Idiosyncrasy, 4-Sacrilege
(C) 1- Pseudonym 2- Illegible, 3- Idiosyncrasy, 4-Epicure
(D) 1- Pseudonym 2- Legible, 3- Idiosyncrasy, 4-Sacrilege

Q2. Write the synonyms of the word written in capital letters.

1. **LETHARGIC** 2. **ALACRITY**
3. **BRUSQUE** 4. **CIRCUMSPECT**
(A) 1- energetic, 2- eagerness, 3- rude, 4- cautious
(B) 1- unenergetic, 2- eagerness, 3- rude, 4- cautious
(C) 1- unenergetic, 2- secret, 3- rude, 4- cautious
(D) 1- unenergetic, 2- eagerness, 3- humble, 4- cautious

Q3. Find the antonyms of the words written in capital letters.

1. **ALOOF** 2. **BLAND**
3. **COGNIZANT** 4. **EQUIVOCAL**
(A) 1-gregarious 2-mix, 3-ignorant, 4- clear
(B) 1-gregarious, 2-spicy, 3-ignorant, 4- unclear
(C) 1-gregarious, 2-spicy, 3-ignorant, 4- clear
(D) 1-far, 2-spicy, 3-ignorant, 4- clear

Q4. Fill in the blanks with suitable preposition.

If you want to go _____1_____ bus, you have to go to the bus stop. You look at the time table. Then you wait _____2_____ your bus. When the bus arrives, you get _____3_____ the bus. You buy a ticket _____4_____ the driver or show your ticket to the driver. When you arrive at your destination, you get _____5_____the bus. Sometimes you even have to change buses at another bus stop.

(A)   1-by, 2-for, 3-on, 4- with, 5-off
(B)   1-from, 2-for, 3-on, 4- from, 5-off
(C)   1-by, 2-for, 3-on, 4- from, 5-off
(D)   1-by, 2-to, 3-on, 4- from, 5-off

Q5. In the following question four parts of a sentence are given in option. One part has a mistake. Identify that part.

(A)   The students   **(B)   have discovered that**
(C)   they can address issues more effectively
(D)   Through letter-writing campaigns and not through public demonstrations.

(A)   A   (B)   B
(C)   C   (D)   D

SAMPLE QUESTIONS GENERAL KNOWLEDGE

Q1. Who introduced the concept of Five Years Plan in India?

(A)   Motilal Nehru   (B)   Mahatma Gandhi
(C)   Jawaharlal Nehru   (D)   None of the above

Q2. In which one of the following cities did union Telecommunications Minister Kapil Sibal Launch the country's first 4G services on April 10, 2012?

(A)   Delhi   (B)   Pune
(C)   New Delhi   (D)   Kolkata

Q3. Which one of the following actresses won the best Supporting Actress in 60th National Film Award in the year 2013?

(A) Dolly Ahluwalia   (B) Dolly Bindra
(C) Vidya Balan   (D) None of the above

Q4. From which one of the following parties does Barrack Obama belong to?

(A) Democratic Party   (B) Conservative Party
(C) Labour Party   (D) None of the above

Q5. Which one of the following commando forces killed the world's most notorious terrorists Osama Bin Laden?

(A) Desert Storm
(B) NSG
(C) SEAL
(D) None of the above

Class 12 Math Answers

1. Ans C   2. Ans B   3. Ans A   4. Ans C   5. Ans D

Class 12 Physics Answers

1. Ans A   2. Ans A   3. Ans A   4. Ans C   5. Ans D

Class 12 Chemistry Answers

1. Ans A   2. Ans A   3. Ans B   4. Ans A   5. Ans B

Class 12 Bilogy Answers

1. Ans D   2. Ans D   3. Ans C   4. Ans C   5. Ans A

SaClass 12 Mental Ability Answers

1. Ans A   2. Ans C   3 Ans C   4. Ans A   5. Ans C

Class 12 English Answer

1. Ans A   2. Ans B   3. Ans C   4. Ans C   5. Ans D

Class 12 General Knowledge Answer

1. Ans C   2. Ans C   3. Ans A   4. Ans B   5. Ans C