Authors are required to explain all answer options i.e. why the selected answer is the correct one and why/how the student reached the wrong answer choice. The author needs to write the type of mistake against each answer choice.

Types of mistakes:

(1) Conceptual: The student may have some misconception about the actual concept.

(2) Calculation based: The student may have made mistakes in calculating or in applying formula.

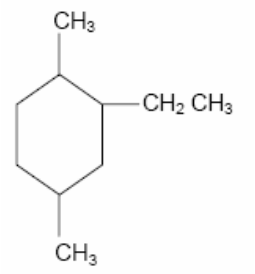
(3) Interpretation/ Understanding based: The student may have wrongly interpreted the information given in the question stem.

(4) Careless mistakes (over looking important info/direction):
The student may mix up the following terms:

(5) Correct/incorrect, can be/can never be, could be/must be

CHEMISTRY

1. What is IUPAC name of the compound having the following structure?

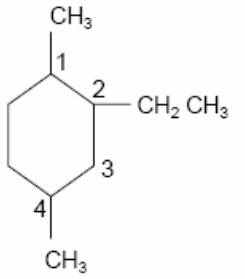


(1) 2 – Ethyl – 1, 4 – dimethylcyclohexane
(2) 1 – Ethyl – 2, 5 – dimethylcyclohexane
(3) 1, 4 – Dimethyl – 2 – ethylcyclohexane
(4) 2, 5 – Dimethyl – 1 – ethylcyclohexane

Explanation for answer choices:

Correct answer: (1) 2 – Ethyl – 1, 4 – dimethylcyclohexane

The name of the alicyclic compound is obtained by adding the prefix cyclo to the name of the corresponding straight chain hydrocarbon. While numbering the ring, when three or more substituents are present, we begin from the substituent that leads to the lowest set of locants. While naming, the substituent that comes first in the alphabetical order is named first. So the numbering of the given compound will be



and the name of the compound will be 2 – Ethyl – 1, 4 – dimethylcyclohexane

Incorrect answer: Option (2) The student misconception is that no matter how many substituents are present on the ring, the substituent that comes first in the alphabetical order is given the lowest number and its name is mentioned first.

Incorrect answer: Option (3) The student misconception is that the substituent with the least number of carbon atoms is given the lowest number and the ring is numbered in the direction that gives the next closer substituent the lower number possible.

Incorrect answer: Option (4) The student misconception is that no matter how many substituents are present on the ring, the substituent that comes first in the alphabetical order is given the lowest number. But while naming, substituents with least number of carbon atoms are named first.

2. A motor vehicle radiator was filled with 8L of water to which 2L of methyl alcohol (density 0.80 g/ml) was added. What is the lowest temperature at which the vehicle can be parked outdoors without the danger that water in the radiator will freeze? (Kf of water = 1.86 Km–1)

(1) – 290.625^{0}C (2) – 11.625^{0}C (3) – 3.360^{0}C (4) – 7.44^{0}C

Explanation for answer choices:

Correct answer: (2) – 11.6250C

Let us calculate the depression caused by the addition of methyl alcohol

$$\Delta T_f = \frac{K_f \times 1000 \times W_B}{W_A \times M_B}$$

W_A = 8000 × 1.0 = 8000 g (Density of water = 1g/ml)

W_B = 2000 × 0.8 = 1600 g

M_B = 32

$$\Delta T_f = \frac{1.86 \times 1000 \times 1600}{8000 \times 32}$$

= 11.625

Freezing point = 0 – 11.625

= – 11.625^{0}C

$\therefore$ The vehicle may be parked outdoors at temperature not below – 11.825^{0}C.

Incorrect answer: Option (1) The student by mistake used the wrong formula to calculate the depression caused by the addition of methyl alcohol as:

$$\Delta T_f = \frac{K_f \times 1000 \times W_A}{W_B \times H_B}$$

Where M_B = 32

W_A= 8000 g

W_B = 1600 g

Incorrect answer: Option (3) The student by mistake used the wrong formula to calculate the depression caused by the addition of methyl alcohol as

$$\Delta T_f = \frac{1000 \times W_B}{K_f \times W_A \times M_B}$$

Where W_A = 8000 g

W_B = 1600 g

M_B = 32

Incorrect answer: Option (4) The student by mistake used the wrong formula to calculate the depression caused by the addition of methyl alcohol as

$$\Delta T_f = \frac{K_f \times 1000 \times W_B}{W_A}$$

Where W_A = 8000 g, M_B = 32

MATH

1. A function f is defined for all positive integers and satisfies f(1) = 2005 and f (1) + f (2) + …….. f (n) = n^2f (n) for all n > 1. The value of f (2004) is

(1) $\frac{1}{2004}$ (2) $\frac{1}{1002}$ (3) 2 (4) 2004

Explanation for answer choices:

Correct answer: (2) $\frac{1}{1002}$

f (1) + f(2) + …… + f(n) = $(n)^2$ f(n)

Replace 'n' by (n – 1),

$\Rightarrow$ f (1) + f(2) + …… + f(n – 1) = $(n-1)^2$ f(n – 1).

Subtracting this from the given equation gives f(n) = n^2 f(n) – $(n-1)^2$ f(n – 1), so f(n) =

$\frac{(n-1)^2}{n^2-1}$ f(n – 1) = $\frac{n-1}{m+1}$ f(n – 1)

Now apply this result repeatedly for n = 2004

f(2) = 2005 × (1/3)

f(3) = 2005 × (1/6) = 2005 × (1/(3 + 3))

f(4) = 2005 × (1/10) = 2005 × (1/(3 + 3 + 4))

f(5) = 2005 × (1/15) = 2005 × (1/(3 + 3 + 4 + 5))

f(2004) = 2005 × (1/(3 + 3 + 4 + 5 +.....+ 2004)) = 2005 × (1/(3 + (3 + 4 + 5 +.....+ 2004)))

= 2005 × (1/3 + (1001(3 + 2004))) = 2005 × (1/(3 + 2009007))

= 2005 × (1/2009010) = 1/1002

Incorrect answer: Option (1) The student may have wrongly calculated the 2004^{th} term as 2005 × 1/(2(3 + 3 + 4 + 5 + ...+ 2004))

Incorrect answer: Option (3) The student may have taken f(n) = n – 1. Hence f(1) = 2005, f(2) = 2004 …. f(2004) = 2

Incorrect answer: Option (4) The student may have taken f(n) = n. Hence f(2004) = 2004

2. N is a 4-digit number. If we reverse the last 3 digits of N, the new number is 3 × 11 × 12 more than the original number. How many such 4-digit numbers exist?

(1) 540 (2) 3240 (3) 450 (4) 600

Explanation for answer choices:

Correct answer: (1) 540

Let the 4-digit no. be 1000 a + 100 b + 10 c + d and new no. is 1000 a + 100 d + 10 c + b

$\Rightarrow$ New no. – Original no. = 3 × 11 × 12

$\Rightarrow$ 99 d – 99 b = 33 × 12

$\Rightarrow$ d – b = 4

The combinations of b and d are (0, 4), (1, 5), (2, 6), (3, 7), (4, 8), (5, 9)

So, there are 9 choices for the first place, 6 for the second place, 10 choices for the third place and only 1 choice for the last place (according to the second place). Hence, total number of solutions is 9 × 6 × 10 × 1 = 540

Incorrect answer: Option (2); The student may take 6 choices for last place as well (4, 5, 6, 7, 8, 9) i.e. 9 × 6 × 10 × 6 = 3240

Incorrect answer: Option (3) The student may forget to take the combination (0, 4) for d and b i.e. 9 × 5 × 10 × 1 = 450

Incorrect answer: Option (4) The student may take 10 choices for first place, including zero i.e. 10 × 6 × 10 × 1 = 600

ENGLISH

(A) READING COMPREHENSION

Directions for questions 1 – 4: The passage given below is followed by a set of four questions Choose the best answer to each question.

While complex in the extreme, Derrida's work has proven to be a particularly influential approach to the analysis of the ways in which language structures our understandings of ourselves and the world we inhabit, an approach he termed deconstruction. In its simplest formulation, deconstruction can be taken to refer to a methodological strategy which seeks to uncover layers of hidden meaning in a text that have been denied or suppressed. The term 'text', in this respect, does not refer simply to a written form of communication, however. Rather, texts are something we all produce and reproduce constantly in our everyday social relations, be they spoken, written or embedded in the construction of material artifacts. At the heart of Derrida's deconstructive approach is his critique of what he perceives to be the totalitarian impulse of the Enlightenment pursuit to bring all that exists in the world under the domain of a representative language a pursuit he refers to as logocentrism. Logocentrism is the search for a rational language that is able to know and represent the world and all its aspects perfectly and accurately. Its totalitarian dimension, for Derrida at least, lies primarily in its tendency to marginalize or dismiss all that does not neatly comply with its particular linguistic representations, a tendency that, throughout history, has all too frequently been manifested in the form of authoritarian institutions. Thus logocentrism has, in its search for the truth of absolute representation, subsumed difference and oppressed that which it designates as its alien 'other'. For Derrida, western civilization has been built upon such a systematic assault on alien cultures and ways of life, typically in the name of reason and progress.

In response to logocentrism, deconstruction posits the idea that the mechanism by which this process of marginalization and the ordering of truth occurs is through establishing systems of binary opposition. Oppositional linguistic dualisms, such as rational/irrational, culture/nature and good/bad are not, however, constructed as equal partners as they are in, say, the semiological structuralism of Saussure. Rather, they exist, for Derrida, in series of hierarchical relationships with the first term normally occupying a superior position. Derrida defines the relationship between such oppositional terms using the neologism difference. This refers to the realization that in any statement, oppositional terms differ from each other (for instance, the difference between rationally and irrationality is constructed through oppositional usage), and at the same time, hierarchical relationship is maintained by the deference of one term to the other (in the positing of rationality over irrationality, for instance). It is this latter point which is perhaps the key to understanding Derrida's approach to deconstruction.

For the fact that at any given time one term must defer to its oppositional 'other', means that the two terms are constantly in a state of interdependence. The presence of one is dependent upon the absence or 'absent-presence' of the 'other', such as in the case of good and evil, whereby to understand the nature of one, we must constantly relate it to the absent term in order to grasp its meaning. That is, to do good, we must understand that our act is not evil for without that comparison the term becomes meaningless. Put simply, deconstruction represents an attempt to demonstrate the absent – presence of this oppositional 'other', to show that what we say or write is in itself not expressive simply of what is present, but also of what is absent. Thus, deconstruction seeks to reveal the interdependence of apparently dichotomous terms and their meanings relative to their textual context; that is, within the linguistic power relations which structure dichotomous terms hierarchically. In Derrida's own words, a deconstructive reading "must always aim at a certain relationship, unperceived by the writer, between what he commands and what he does not command of the patterns of a language that he uses …[It] attempts to make the not – seen accessible to sight".

Meaning, then, is never fixed or stable, whatever the intention of the author of a text. For Derrida, language is a system of relations that are dynamic, in that all meanings we ascribe to the world are dependent not only on what we believe to be present but also on what is absent. Thus, any act of interpretation must refer not only to what the author of a text intends, but also to what is absent from his or her intention. This insight leads, once again, to Derrida's further rejection of the idea of the definitive authority of the intentional agent or subject. The subject is decentred; it is conceived as the outcome of relations of difference. As author of its own biography, the subject thus becomes the ideological fiction of modernity and its logocentric philosophy, one that depends upon the formation of hierarchical dualisms, which repress and deny the presence of the absent 'other'. No meaning can, therefore, ever be definitive, but is merely an outcome of a particular interpretation.

1. According to the passage, Derrida believes that the system of binary opposition

(1) represents a prioritization or hierarchy
(2) reconciles contradictions and dualities.
(3) weakens the process of marginalization and ordering of truth.
(4) deconstructs reality
(5) is essential to the deeper understanding of a logical stand.

Explanation for answer choices:

Correct answer: (1) represents a prioritization or hierarchy

We have to bear in mind that we are to look not for the right answers, but for the best among the available answers, and that best answers to most of the questions revolve around the same central idea, and thereby they concatenate.

As per Derrida, "**the ordering of truth** occurs … through establishing systems of binary opposition" in a "series of **hierarchical relationships** with the first term normally occupying a superior position."

Incorrect answer: Option (2): Binary opposition does not 'reconcile'; it makes the unseen visible.

Incorrect answer: Option (3) Binary opposition is the "absent-presence of the other". It does not weaken the ordering of truth.

Incorrect answer: Option (4): Deconstruction is only to make the unseen visible. Binary opposition is the "absent-presence of the other". We obtain binary opposition through deconstruction. The former does not result in the latter.

Incorrect answer: Option (5) may be right, but does not connect with the main thrust of the argument.

2. Derrida rejects the idea of 'definitive authority of the subject' because

(1) interpretation of the text may not make the unseen visible.

(2) the meaning of the text is based on binary opposites.

(3) the implicit power relationship is often ignored.

(4) any act of interpretation must refer to what the author intends.

(5) the definitiveness may evanesce, if not rooted in scientific logic of the time.

Explanation for answer choices:

Correct answer: (1) interpretation of the text may not make the unseen visible.

Option (1) is validated by the lines "certain relationship, unperceived by the writer", and "what we say or write is in itself not expressive simply of what is present, but also of what is absent".

Incorrect answer: Option (2) does not even seek to answer the question.

Incorrect answer: Option (3) There is no "power relationship".

Incorrect answer: Option (4) is negated by the line "certain relationship, unperceived by the writer".

Incorrect answer: Option (5). There is no transience or scientific knowledge involved.

3. According to the passage, Derrida believes that:

(1) Reality can be constructed only through the use of rational analysis.

(2) Language limits our construction of reality.

(3) A universal language will facilitate a common understanding of reality.

(4) We need to uncover the hidden meaning in a system of relations expressed by language.

(5) Deconstruction is a pre-requisite to construction.

Explanation for answer choices:

Correct answer: (4) We need to uncover the hidden meaning in a system of relations expressed by language.

Option (4) is validated by the lines "what we say or write is in itself not expressive simply of what is present, but also of what is absent".

Incorrect answer: Option (1) Deconstruction is not about "rational analysis". Making the unseen visible is the aim of deconstruction.

Incorrect answer: Option (2) Making the unseen visible will also involve language.

Incorrect answer: Option (3) Universal language will rather be "a systematic assault on alien cultures and ways of life" that Derrida condemns.

Incorrect answer: Option (5) The option misleads the reader by using opposing terms.

4. To Derrida, 'logocentrism' **does not** imply:

(1) A totalitarian impulse.

(2) A domain of representative language.

(3) Interdependence of the meaning of dichotomous term.

(4) A strategy that seeks to suppress hidden meanings in a text.

(5) Certainty of relationships.

Explanation for answer choices:

Correct answer: (3) Interdependence of the meaning of dichotomous term.

Option (3) Mark the emphasis on 'does not'. Interdependence of dichotomous terms is the opposite of logocentrism that Derrida debunks.

We have to find the most wrong answer.

Incorrect answer: Option (1): "Logocentrism " is totalitarian, which "logocentrism has, in its search for the truth of absolute representation, subsumed difference and oppressed that which it designates as its alien 'other'.

Incorrect answer: Option (2) can be inferred from the lines "Logocentrism is the search for a rational language that is able to know and represent the world and all its aspects perfectly and accurately."

Incorrect answer: Option (4) is what 'logocentrism ' does.

Incorrect answer: Option (5) is how it does.

(B) SENTENCE CORRECTION

Directions: The following question consists of a sentence or part thereof that may have an error of standard English usage. Identify the error and select the option that corrects the error. If there is no error, mark (1).

The manufacture of automobile was extremely expensive until assembly-line techniques made them cheaper to produce.

(1) The manufacture of automobile was extremely expensive until
(2) The manufacture of automobiles was extremely expensive till
(3) Manufacture of the automobile was extremely expensive until
(4) The manufacture of automobiles was extremely expensive until
(5) Manufacture of the automobiles was extremely expensive till

Explanation for answer choices:

Correct answer: (4) The manufacture of automobiles was extremely expensive until

Option (4) rectifies the error of pronoun agreement, by adding 's' to 'automobile'.

Incorrect answer: Option (1) Here is a simple error of noun-pronoun agreement. The plural 'them' in the portion not underlined refers to 'automobile' (singular). We can't change the portion not underlined, so we have to change the noun.

Incorrect answer: Option (2) rectifies the error, but introduces another error 'till' in place of until.

Incorrect answer: Option (3) simply changes the positioning of article 'the'.

Incorrect answer: Option (5) rectifies the error, but introduces error of 'till' and changes place of article. 'Till' is a condition of time. 'Assembly-line technique' is not a condition of time.

BIOLOGY

1. Which of these viruses is used as a 'Biological Control Agent' to destroy insect plant pests and arthropod plant pests?

(1) Variola Virus (2) Rubeolla virus (3) Myxoviruus (4) Baculovirus

Explanation for answer choices:

Correct answer: (4) Baculovirus

It is parasitic on in some insect pests & soil borne arthropods

Incorrect answer: (1) It is parasitic on human beings & causes small pox

Incorrect answer: (2) It is parasitic on human beings & causes measles

Incorrect answer: (3) It is parasitic on human beings & causes Influenza

2. Many pathogens attack the root system of most of the crops. Which of these fungi is used as biological control agent for these root pathogens?

(1) Trichoderma (2) Aspergillus (3) Streptomyces (4) Psaliota

Explanation for answer choices:

Correct answer: (1) Trichoderma

It is type of soil borne fungus & lives as a lethal parasite on the Nematodes

Incorrect answer: (2) It causes a disease called Aspergillosis in human beings

Incorrect answer: (3) It produces many antibiotics such as Streptomycin, Tetracycline, and Erythromycin etc

Incorrect answer: (4) Psaliota campestris is the other name of Agaricus campestris & it is the edible mushroom

CIVIL SERVICES EXAMINATION

1. Where will be the next summit of Non- Aligned Movement held in 2012?

(1) Kuala Lumpur (2) Havana (3) Tehran (4) Sharm El Sheikh

Explanation for answer choices:

Correct answer: (3) Tehran

Incorrect answer: (1) Kuala Lumpur - Held the NAM summit in 2003.

Incorrect answer: (2) Havana - Held the NAM summit in 2006.

Incorrect answer: (4)Sharm Le Sheikh - Held the NAM summit in 2009.

2. The birthplace of Buddha is Lumbini. Where is it located?

(1) Bhutan (2) Sikkim (3) Nepal (4) Assam

Explanation for answer choices:

Correct answer: (3) Nepal

Incorrect answer: (1) Bhutan a country located in the eastern Himalayan range.

Incorrect answer: (2) Sikkim an Indian State is located in the eastern part of the Indian subcontinent.

Incorrect answer: (4) Assam is an eastern state of India. This is where Gautam Buddha breathed his last.

3. In ancient history, who held the second Buddhist Council and where?

(1) King Ajatasatru in Rajagaha (now Rajgir) (2) Monk Yasa in Vesāli

(3) King Ashoka at Pātaliputra (4) Theravada monks in Mandalay Burma

Explanation for answer choices:

Correct answer: (2) Monk Yasa in Vesāli

Incorrect answer: (1) This was the first Buddhist Council.

Incorrect answer: (3) The third council was conducted under King Ashoka.

Incorrect answer: (4) This was the fifth Buddhist council.

4. Aligarh Muslim University was founded by Sir Syed Ahmed Khan. AMU was initially called named

(1) Muhammedan Anglo –Oriental College

(2) Jamia Millia Islamia

(3) Markazuddrasatal Islami Jamiatur Raza

(4) Al Jamea Tus Saifiyah

Explanation for answer choices:

Correct answer: (1) Muhammedan Anglo –Oriental College

Incorrect answer: (2) Jamia Millia University New Delhi, a central University, was established in 1988 by an Act of Parliament

Incorrect answer: (3) Markazuddrasatal Islami Jamiatur Raza, an Islamic University located in Bareilly India, was established in 2000 by Aktar Raza.

Incorrect answer: (4) 43rd Dai Syedna Abdeali Saifuddin Saheb founded Al Jamea Tus Saifiyah in Surat.

PHYSICS

1. In a simple cubic cell, each corner atom is shared by

(1) two neighbouring unit cells

(2) three neighbouring unit cells

(3) four neighbouring unit cells

(4) eight neighbouring unit cells

Explanation for answer choices:

Correct answer: (4) eight neighbouring unit cells

Eight neighbouring unit cells share each corner atom in a simple cubic cell - four are situated in the same layer as the corner atom and the other four are situated below/above the corner atom.

Incorrect answer: (1): Two neighbouring unit cells.

There are more than two adjacent unit cells sharing the corner atom.

Incorrect answer: (2): Three neighbouring unit cells.

Each corner atom in a simple cubic cell is shared by three adjacent cells excluding itself but the cells in the layer above/below these also share the corner atom.

Incorrect answer: (3): Four neighbouring unit cells.

Each corner atom is shared by four adjacent atoms but the cells in the layer above/below these also share the corner atom.

2. The number of atoms per unit cell in a body-centred cubic crystal system is

(1) 1 (2) 2 (3) 3 (4) 4

Explanation for answer choices:

Correct answer: (2) 2

In addition to the atoms at the eight corners, there is also an atom at the body centre in a body-centred cubic structure. Since a corner atom is shared among eight cells which touch there and the body centred atom belongs exclusively to the cell under consideration, there are 8 (1/8) +1 = 2 atoms associated with the cell.

Incorrect answer: (1): In a body-centred cubic system, there is an atom at the body centre which belongs exclusively to the cell under consideration. Hence, the number of atoms per unit cell is one more than that in a simple cubic structure.

Incorrect answer: (3): The number of atoms per unit cell in a body-centred cubic crystal would be three only if there are two atoms in the body centred cube in addition to the ones at the corners. But there is only one atom at the centre in addition to the ones at the corners.

Incorrect answer: (4): The number of atoms per unit cell in a body-centred cubic crystal would be four only if each face had one atom in addition to the ones at the corners. But there is only one atom at the centre in addition to the ones at the corners.