**T.I.M.E.**
Triumphant Institute of
Management Education Pvt. Ltd.

# Ref: AIMCAT1209

***INSTRUCTIONS***

1. Read the instructions given at the beginning/end of each section or at the beginning of a group of questions very carefully.
2. This test has two sections with 60 questions – 30 questions in each section. The TOTAL TIME available for the paper is **140 minutes**. The time available for each section is 70 minutes and you cannot return to the first section once you have started the second section.
3. You are expected to show your competence in both the sections.
4. All questions carry three marks each. Each wrong answer will attract a penalty of one mark.

## SECTION – I
## Number of Questions = 30

**DIRECTIONS** *for questions 1 and 2:* Answer the questions independently of each other.

**1.** The lengths of the sides of an acute angled triangle are 5, $x$, and 12, where $5 < x < 12$. How many integral values of $x$ are possible?
(1) 1 (2) 0 (3) 6 (4) 3

**2.** From the first $n$ natural numbers, three consecutive numbers are left out. The sum of the remaining numbers is 1348. What is the greatest of the three numbers that are left out?
(1) 11 (2) 10 (3) 16 (4) 15

**DIRECTIONS** *for question 3:* The question below is followed by two statements, I and II giving certain data. Answer the question using the following instructions:

Choose 1 : if the question can be answered by using statement I alone but not by using II alone.
Choose 2 : if the question can be answered by using statement II alone but not by using I alone.
Choose 3 : if the question can be answered by using either statement alone.
Choose 4 : if the question can be answered by using both the statements together but not by either statement alone.

**3.** Each of the students in a class contributed an equal amount and the total amount collected was Rs. 1500. How much did each student pay?
I. Had there been five fewer students each one would have paid an additional Rs. 10.
II. There were at least 30 students in the class and no student contributed more than Rs. 50.

**DIRECTIONS** *for question 4:* Select the correct alternative from the given choices.

**4.** Find the area of the region bounded by the graph $|x - 7| + |y - 9| = 12$.
(1) 200 sq.units (2) 100 sq.units
(3) 144 sq.units (4) 288 sq.units

**DIRECTIONS** *for questions 5 and 6:* Answer the questions on the basis of the information given below:

The seven basic symbols in a certain numeral system and their respective values are as follows.

I = 1, V = 5, X = 10, L = 50, C = 100, D = 500, M = 1000

In general, the symbols in the numeral system are written (and read) from left to right, starting with symbols representing larger values. The value of the numeral is the sum of the values of the symbols.
For example, XXXVIII = 10 + 10 + 10 + 5 + 1 + 1 + 1 = 38. An exception to the left to right reading occurs when a symbol is followed immediately by a symbol of greater value; then, the smaller value is subtracted from the larger.

For example XIX = 10 + (10 – 1) = 19

**5.** The value of the numeral, MMCMXCIX is
(1) 2899 (2) 3309
(3) 3321 (4) None of these

**6.** Which of the following can represent the numeral for 2095?
(a) MMLXLV (b) MMXCV
(c) MMVC (d) MMCCV
(1) Only (a)
(2) Only (b) and (c)
(3) Only (c) and (d)
(4) Only (a), (b) and (c)

**DIRECTIONS** *for questions 7 to 14:* Answer the questions independently of each other.

**7.** Consider the sequence of numbers $\mu_1, \mu_2, \mu_3 \ldots\ldots$ where $\mu_1 = -62.33$ and $\mu_2 = 27$. Find the sum of the first 9008 terms of this sequence, if
$\mu_k = \mu_{k-1} - \mu_{k-2}$ for every $k \geq 3$.
(1) 89·33 (2) – 35·33
(3) –81·33 (4) 70·66

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**8.** The following pair of equations have a unique solution for $x$, which is negative. For what value of p does this happen?

$(3p - x)^2 - 1 + y^2 = 0$

$9x^2 - y^2 = 0$

(1) 3 (2) 0

(3) $\sqrt{10}/9$ (4) $-\sqrt{10}/9$

**9.** Given $f(x) = a|x| - bx^2$, where $a$ and $b$ are constants. Then at $x = 0$, $f(x)$ is

(1) maximized whenever $a > 0$, $b > 0$
(2) minimized whenever $a > 0$, $b > 0$
(3) minimized whenever $a < 0$, $b > 0$
(4) maximized whenever $a < 0$, $b > 0$

**10.** If $k$ is a positive integer satisfying $a = k^2 - 3k$ and $b = a^2 + 2a$, then $b$ is always

(1) divisible by 24.
(2) one less than a perfect square.
(3) a difference of two perfect squares in at least two ways.
(4) more than one of the above

**11.** Raghu writes the number 458 on the blackboard. Each of his friends then walks up to the board and is allowed to perform exactly one operation. The operation can be either to double the number on the board (after the erasing the earlier number) or to erase the rightmost digit of the number on the board. If after sometime, the number 14 was on the board, then what is the minimum possible number of friends that Raghu has? (Assume that no friend walks up to the board twice)

(1) 4 (2) 6
(3) 8 (4) None of these

**12.** Mohan, a painter, took a square piece of canvas. He split it into 9 equal squares and painted the central square green. He then split each of the remaining eight squares into 9 equal squares and painted all the central squares green. He repeated this procedure till the unpainted area became less than half of the total area of the canvas. Find the number of times he had split up the squares.

(1) 4 (2) 5 (3) 6 (4) 7

**13.** If $x$ and $y$ are integers, then the equation, $5x + 6y = 138$ has:

(1) no solution for $x < 100$ and $y < 0$
(2) no solution for $x > 150$ and $y > -120$
(3) a solution for $-36 < x < -30$
(4) a solution for $43 < y < 70$

**14.** Every year, Kingdom Gloria goes to war with its neighbouring Kingdom Euphoria. In every war, Gloria loses half of its men in the army and to cope up with it, it inducts double the number of men lost in the war into its army in the same year after the war. The wars started in 1279 and took place again in 1280, 1281 and 1282. Then, the number of men the army lost in the war of 1282 is

(1) less than the number of men in the army before the war, in 1279.
(2) less than the sum of number of men in the army lost in 1279 and 1281.
(3) less than the sum of number of men in the army lost in 1280 and 1281.
(4) more than the sum of number of men in the army inducted into the army in 1279 and 1280.

**DIRECTIONS** *for questions 15 to 17:* Answer the questions on the basis of the information given below.

The following table gives the details of the ages and heights of the boys and girls attending a basketball camp. The height (in cm) of each boy/girl is an integer.

| Age Group (Age (A), in years) | Boys | Girls |
|---|---|---|
| $A \le 10$ | 8(120,130,150) | 10(110,130,140) |
| $11 \le A \le 13$ | 10(130,150,160) | 8(120,140,150) |
| $14 \le A \le 16$ | 6(150,160,180) | 6(140,150,170) |
| $A > 16$ | 5(170,180,200) | 8(150,160,180) |

In the above table, the number mentioned outside the brackets in each cell gives the number of boys (or girls) in that age group and the values mentioned inside the brackets give the minimum height, the average height and the maximum height of the persons in that group, in that order.

For example, of the eight boys who are of age not more than 10 years, the minimum height of any boy is 120 cm, the average height of all the boys is 130 cm and the maximum height of any boy is 150 cm.

**15.** A team is to be selected from the boys in the camp who were of age 13 years or below. If only boys who are 140 cm or more in height can be selected, the number of boys who can be selected is at most

(1) 9 (2) 10 (3) 11 (4) 12

**16.** If a team of girls of age 13 years or less is to be selected, with the condition that all the girls who are 130 cm or more in height must be selected, what is the minimum number of girls selected?

(1) 6 (2) 7
(3) 8 (4) None of these

**17.** For a national basketball tournament, two teams C and D of five girls each are to be selected from the camp. The average height of team C is at most

(1) 175 cm (2) 174 cm
(3) 173 cm (4) None of these

**DIRECTIONS** *for questions 18 and 19:* Answer the questions on the basis of the information given below.

$h_1(x) = 1 - x, 0 < x < 1$
$= 1, x \ge 1$
$= 0$, otherwise
$h_2(x) = -h_1(x)$ for all $x$
$h_3(x) = h_2(-x)$ for all $x$
$h_4(x) = -h_3(x)$ for all $x$

**18.** How many of the following products are necessarily zero for every $x$: $h_1(x)\,h_3(x)$, $h_3(x)\,h_2(x)$, $h_1(x)\,h_2(x)$?

(1) 0 (2) 1 (3) 2 (4) 3

**19.** Which of the following is necessarily true?

(1) $h_4(x) = h_2(-x)$ for all $x$
(2) $h_3(x) = h_1(-x)$ for all $x$
(3) $h_4(x) + h_2(-x) = 0$ for all $x$
(4) $h_4(x) + h_1(-x) = 0$ for all $x$

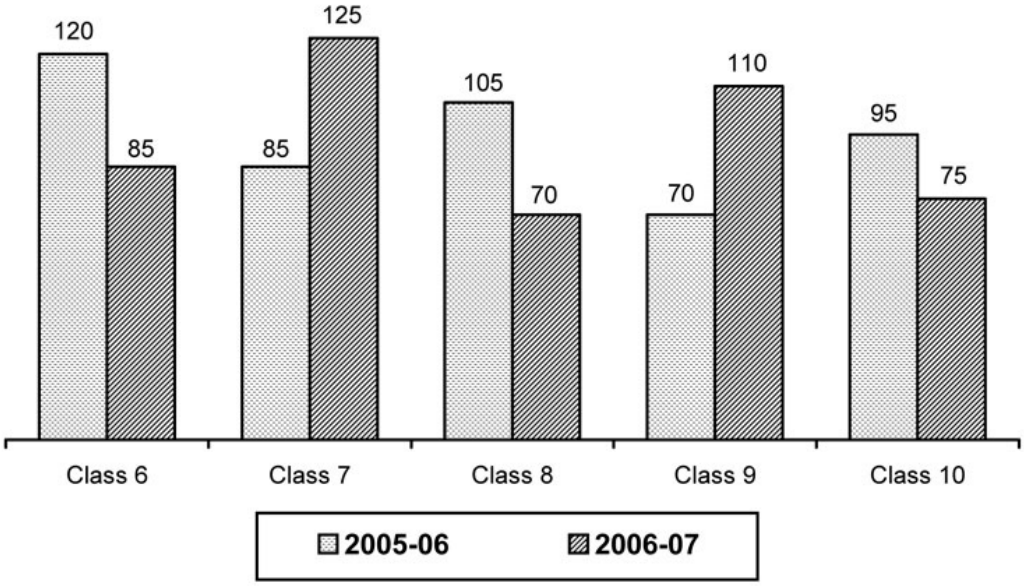
**DIRECTIONS** *for question 20:* Select the correct alternative from the given choices.

**20.** If both p and q belong to the set {1, 2, 3, 4, 5}, then the number of equations of the form $px^2 + qx + 1 = 0$ having real roots is

(1) 10 (2) 7 (3) 12 (4) 8

**DIRECTIONS** *for questions 21 to 23:* Answer the questions on the basis of the information given below.

In a model school, which has five classes – class 6 to class 10 – the new students join the school only in class 6 and no student leaves the school except after passing out from class 10. Every year, the students who fail in a class remain in the same class for the next academic year, while the students who pass are promoted to the next class. The following graph gives the number of children in each of the five classes of the school in the academic years 2005-06 and 2006-07. It is also known that 60 new students joined the school in the year 2006-07.




**21.** In the academic year 2005-2006, in which class did the maximum number of students fail?
(1) Class 6 (2) Class 7
(3) Class 8 (4) Class 9

**22.** Which class had the highest pass percentage in the academic year 2005-06?
(1) Class 6 (2) Class 7
(3) Class 8 (4) Class 9

**23.** In the academic year 2007-08, the number of students in class 6, class 7, class 8, class 9 and class 10 are 120, 90, 110, 90 and 95 respectively. Further, 60 students passed out of the school in the academic year 2006-07.
How many students joined the school in the academic year 2007-08?
(1) 80 (2) 85 (3) 90 (4) 100

**DIRECTIONS** *for questions 24 to 30:* Answer the questions independently of each other.

**24.** For all $x \in$ N, $3^{x-1} + 5^{x+1} + 6^{x+2}$ is divisible by
(1) 2 (2) 11 (3) 228 (4) 121

**25.** A drum contains 9 litres of water. Two buckets with respective capacities of 3 litres and 4 litres are provided. Neither the drum nor any of the two buckets is calibrated. Any of the following activities qualifies as an *operation.*
(i) Drawing water from the drum with a bucket.
(ii) Pouring water from either bucket into the drum
(iii) Pouring water out from one bucket into the other bucket.

If it is required to have exactly 3 litres in each bucket, the minimum number of *operations* to be performed is
(1) 3 (2) 4 (3) 5 (4) 6

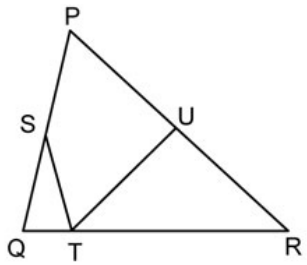
**26.** Find the number of Four-digit multiples of 3, which can be formed using the digits 1, 3, 5, 7, 9, and are less than or equal to 1200.
(1) 12 (2) 11 (3) 10 (4) 9

**27.** Every house in a colony has atmost 2 ACs and no house has fewer than 3 TVs. TVs were either B&W or colour. Considering all the houses together, there are more ACs than colour TVs, more colour TVs than B&W TVs and more B&W TVs than houses. The minimum possible number of houses in the colony is
(1) 4 (2) 5 (3) 2 (4) 3

**28.** Given $p$, $q$ and $r$ are real numbers, such that $p > q$ and $r \neq 0$, the inequality which is not always true is
(1) $p + 2r > q + 2r$ (2) $pr^3 > qr^3$
(3) $pr^2 > qr^2$ (4) $p - 3r > q - 3r$

**29.** Which of the following can never be a value of $\log_{2p}\frac{2p}{3q} + \log_{3q}\frac{3q}{2p}$ given that $2p \geq 3q$ and $q > (1/3)$?
(1) – 1.5 (2) 1 (3) –2 (4) –2.5

**30.**




In the figure above, ∠PQR = ∠PRQ + 30° and ∠QPR + ∠STU = 220°, SQ = ST and TU = UR. Find ∠PRQ.
(1) 10° (2) 15° (3) 30° (4) 20°

## SECTION – II
## Number of Questions = 30

**DIRECTIONS** *for questions 1 and 2:* Select the correct alternative from the given choices.

**1.** When critics accuse US companies of moving jobs to China to exploit cheap labour and sweatshop conditions, these businesses always argue that their presence has helped improve labour standards and even promote democracy. Now the same companies that pat themselves on the back are lobbying to weaken a draft Chinese labour law applicable to large businesses – and workers' rights activist are calling them hypocrites. Critics say efforts to water down the law show how US firms put profits ahead of principles in China.

Which of the following, if true, cast the most doubt on labour conditions improving despite the new law?

(1) The law could force firms that obey the proposed labour law to subcontract more work to those that are outside its purview.
(2) MNCs object that the bill would make it difficult to fire employees on probation, while giving too much power to the official union.
(3) Nike distanced itself from the draft law saying it has worked aggressively to make sure Chinese subcontractors comply with fair labor standards.
(4) Some say the law is too weak to protect since it relies on the party-run union, which generally favors managements.

**2.** Google is developing software for the first phone which is capable of translating foreign languages almost instantly – like the Babel fish in The Hitchhiker's Guide to the Galaxy.

Which of the following casts a doubt on the success of the software?

(1) Since mobile phones by nature are personal to the individual; it should get a feel of the person's voice from past voice search queries, for example.
(2) Like a professional human interpreter, the phone would analyze 'packages' of speech listening to the speaker until it understands the full meaning of words and phrases before attempting translation.
(3) Google has a voice recognition system that enables phone-users to conduct web searches by speaking commands into their phones.
(4) Although automatic text translators are now reasonably effective, voice-recognition has proved more challenging because of differences in voice, accent and pitch.

**DIRECTIONS** *for questions 3 to 5:* In each question, there are five sentences. Each sentence has pairs of words/phrases that are italicized and highlighted. From the italicized and highlighted words/phrases, select the **most appropriate** words/phrases to form correct sentences. Then, from the options given, choose the best one.

**3.** She is ***fortunate*** [a] / ***fortuitous*** [b] to have found such a nice house, so close to her office.
The Minister of Sports ***formally*** [a] / ***formerly*** [b] declared the Sports Meet open.
***Capitol*** [a] / ***Capital*** [b] punishment is banned in most countries.
He was ***indited*** [a] / ***indicted*** [b] on the charges of illegal drug-pedalling.
The Joneses frequently throw lavish parties to ***flaunt*** [a] / ***flout*** [b] their wealth.

(1) b a b a a (2) a a b b b
(3) a a b a a (4) a a b b a

**4.** The participants waited with ***baited*** [a] / ***bated*** [b] breath while the names of the winners were announced.
The initial ***diagnosis*** [a] / ***prognosis*** [b] made by the general physician was confirmed by a specialist.
Ten years of city life has transformed the uncouth country lad into an ***urbane*** [a] / ***urban*** [b] gentleman.
The ***balmy*** [a] / ***barmy*** [b] weather of the hill station helped her to recuperate fast.
I didn't have the courage to ***broach*** [a] / ***brooch*** [b] the delicate subject with him.

(1) a a b a a (2) b b b b a
(3) b b a a b (4) b a a a a

**5.** The mother-in-law never missed an opportunity to ***deprecate*** [a] / ***depreciate*** [b] her daughter-in-law's achievements.
All the students were asked to ***confirm*** [a] / ***conform*** [b] to the rules laid down by the school management.
Temperance and tolerance are some of the ***crucial*** [a] / ***cardinal*** [b] virtues advocated by all religions.
Students pursuing civil services exams should keep themselves abreast of ***currant*** [a] / ***current*** [b] events.
All nations of the world should make a ***conscience*** [a] / ***conscious*** [b] effort to cut-down the emissions of poisonous gases in order to save the planet

(1) a b b b b (2) b b b a b
(3) b a a a b (4) a b a b a

**DIRECTIONS** *for questions 6 to 8:* In each question, there are five sentences or parts of sentences that form a paragraph. Identify the sentence(s) or part(s) of sentence(s) that is/are correct in terms of grammar and usage. Then, choose the **most appropriate** option.

**6.** (a) Spring has sprang. The hills north of Beijing are alive
(b) with the sound of noisy restaurant attendants, some waiving red banners,
(c) standing at the side of the road shouting, "Stop here for a delicious meal!"
(d) at the mobs of city dwellers zooming by in their cars.
(e) Car ownership more than tripled in the last four years, making China the world's second largest market after the U.S.

(1) a, b and d (2) c and e
(3) a and e (4) b, c and e

7. (a) One of the driest springs ever recorded in northern Europe could lead to power blackouts this summer,
(b) with nuclear reactors going of line because of low river levels.
(c) The exceptionally dry weather will also rise food prices and has already forced water restrictions
(d) among millions of people, say, governments, farm groups and meteorological organizations across the continent.
(e) Large parts of northern and eastern European countries have had their driest three month spells in more than 50 years.
(1) Only a (2) b, c and d
(3) b and e (4) a and e

8. (a) When a person steps on a moving walkway,
(b) they slow their foot speed to
(c) half the earlier speed.
(d) This might help save energy, but even under ideal conditions
(e) only a walkway makes a small difference in travel time.
(1) b, c and e (2) Only b
(3) b and d (4) a, c and d

**DIRECTIONS** *for questions 9 and 10:* In each of the following questions, the word in capitals is used in four different ways, numbered 1 to 4. Choose the option in which the usage of the word is INCORRECT or INAPPROPRIATE.

9. **BREAK**
(1) After three hours of work, I am longing for a break.
(2) My garment business has reached break-even.
(3) She is still in a state of shock after the break-in.
(4) Unable to face the pressure, Sarah had a break up.

10. **BLOW**
(1) The hijackers threatened to blow up the plane if the government failed to concede to their demands.
(2) Losing both her parents in quick succession was an insufferable blow to her.
(3) The storm seems to be quite fierce, but I'm sure it will blow off by tomorrow.
(4) It is immodest to blow your own trumpet.

**DIRECTIONS** *for questions 11 to 14:* Answer the questions on the basis of the following information.

Four families decided to attend the marriage ceremony of one of their friends. One of the families had no kids but the other families had at least one kid each, and at least one kid attended the marriage from each of the families. Further Shilpa does not have any kids and she reached just before Malini's family.

Aman and his wife reached last with their only kid. Gowri reached before Shilpa but after Divya. Malini's and Divya's daughters go to the same school. The family with no kids came just after the family with 2 kids.

Neither Suman nor Naveen is the husband of Gowri. Pradeep and Suman have at least one kid each. Pradeep said his son could not come because of his exams.

11. Which of the following is a correct pair of husband and wife?
(1) Pradeep and Malini (2) Suman and Shilpa
(3) Naveen and Gowri (4) Suman and Divya

12. Of the following pairs of persons, whose daughters go to the same school?
(1) Pradeep and Naveen
(2) Aman and Suman
(3) Suman and Naveen
(4) Aman and Pradeep

13. Which woman arrived third?
(1) Shilpa (2) Gowri
(3) Malini (4) Divya

14. Which family is known to have more than one kid for certain?
(1) Aman's (2) Pradeep's
(3) Suman's (4) Naveen's

**DIRECTIONS** *for questions 15 and 16:* The sentences given in each of the following questions, when properly sequenced, form a coherent paragraph. Each sentence is labelled with a letter. From among the four choices given below each question, choose the most logical order of sentences that constructs a coherent paragraph.

15. (a) Maintaining and monitoring financial stability has always been a key objective of monetary policy.
(b) Accordingly, the RBI set up a Financial Stability Unit in August-2009 and started presenting periodical reports since March 2010.
(c) The first report found the banking system to be broadly healthy and well-capitalized, but noted that global economic shocks, inflation, the slow pace of fiscal consolidation and the unsettlingly large capital inflows posed significant risks to financial mobility.
(d) However, it was only from the middle of 2009 that the government and the RBI sought to institutionalize the process making financial stability "an integral driver of the policy frame work".
(e) The Reserve Bank of India's second financial stability report is generally positive.
(1) a b c d e (2) e a d b c
(3) a b c e d (4) e c a d b

16. (a) The basic dilemma of the nuclear age has been with us since Hiroshima; how to bring the destructiveness of modern weapons into some moral or political relationship with the objectives that are pursued.
(b) More than 200 years ago, the philosopher Immanuel Kant defined the ultimate choice before mankind; if world history was to culminate in universal peace, would it be through moral insight or through catastrophe of a magnitude that allowed no outcome?
(c) We are approaching a point where that choice may be imposed on us.
(d) Efforts to develop a more nuanced application have never succeeded, from the doctrine of a geographically limited nuclear war in the 1950 and 1960s to the "mutual assured destruction" theory of general nuclear war in the 1970s.
(e) Any use of nuclear weapons is certain to involve a level of casualities and devastation out of proportion to foreseeable foreign-policy objections.
(1) a b e d c (2) a c b e d
(3) a e d b c (4) b c a e d

**DIRECTIONS** *for questions 17 to 20:* Read the following passage and answer the questions that follow it.

In human imagination, the sun once circled a planet housing man's soul, locus of a comsic tug-of-war between good and evil. Over time, man was disabused. The Copernican revolution dethroned earth as the centre of the universe. The Darwinian revolution toppled humans as God's elect. Truth turned out to be relative. Reality's fundamental units, subatomic particles, acted playful, shifty, ungraspable. Insight into the earth's fine ecological balance wrecked the notion of nature as a backdrop, and of history as a man-centric Grand Narrative. Now genes research is unveiling needling likenesses between man and worm. Yet humans navel-gaze. They refuse to accept that they could be a transitional species like any other, that their existence is a contingent fact, not a cosmic necessity.

Blessed with formidable intelligence, man dreams of brain-powered survival: technological advance, space colonisation, even a radical alteration of his own nature as future man-machine. Sadly, from this heroic optimism, it's but a short step to narcissistic pessimism. Haunted by life's intrinsic fragility, humans obsess about calamities. Yet even when panicking about Hiroshima repeats or global warming, man exults in his own mastery: destroyed or self-destructing, he thinks he'll take the world down with him.

The ecosystem similarly, is viewed only in terms of its capacity to sustain human life. Natural disasters are seen in terms of human casualties and damage to property. It's as if human life and all that's living on a planet cradling millions of species were one and the same. The conflation is in keeping with an anthropocentric concept of divinity: God is made in man's image, His grace denied other life forms. Man doesn't bother with a scientifically valid question a poet once asked: if fish dreamed of heaven, wouldn't their god resemble a fish?

Shedding political correctness, some scientists wonder aloud if puzzlingly destructive humans aren't an evolutionary aberration on a planet that's billions of years old. More, if their ceasing to be might not be a blessing for biodiversity. Arguing from the other end, paleontologist Stephen Jay Gould said the earth – survivor of ice ages, meteorite hits and mass extinctions – had enormous capacity to withstand man's assaults. When disaster strikes, humans could be discarded by a planetary shrug.

For most people though, it's unthinkable that humanity's extinction can be a cosmic non-event. How can earth survive the moral calamity of man's absence? The illusion has long intellectual lineage. Philosophers have said the world is Will and Idea, both human monopolies. They've claimed reality consists of phenomena as perceived by consciousness. The world, called into being by the mind, cannot exist independently of it. Only, taken to its logical end, that's to argue that the fact the earth predates human life is itself an embedded mental construct!

As humanity builds knowledge, philosophy, religion and science seem to converge at one point: reality as 'thing-in-itself' is elusive. So far, quantum physics, probing the quirky subatomic world, endorses that. Macro-reality has reference points but it's a question of scale. As Pascal wrote, the vast and the infinitesimal both escape the intellect, which is capable of grasping the 'part', not the 'totality' which can only be apprehended spiritually.

Can the natural order, then, be tamed by meanings imposed by men? The nature of its sovereignty, its resistance to forced penetration, is radical. Just as the nature of human freedom, in the existential sense, is radical. The one reinforces the other. Accepting the universe's indifference to human concerns requires intellectual courage. And apprehending its cosmic force demands a liberating intuition that helps overcome the limits of human understanding. Both efforts are necessary if man is to spare the earth thoughtless depredations.

If man thinks he alone is the measure of all things, he can know neither reality's true measure – nor his own possibilities of transcendence. When such a man ceases to be, no wiser dead than living, the sun will go on shining. Distant stars will still be born and decay. Nearer home, creatures big and small will regain a terrestrial heaven from which they had been banished. And the earth may even be better off for it.

**17.** The words 'if fish dreamed of heaven, wouldn't their god resemble a fish?' are used by the author to suggest that
(1) it is natural for man to believe that he is the pinnacle of creation.
(2) the anthropocentric vision of the world is the only true one.
(3) the world belongs as much to a fish as to a man.
(4) man is no more important than other life forms.

**18.** A 'planetary shrug'
(1) is evidence that man need not bother about the abuses heaped on the planet.
(2) is proof that man's presence is a deviation not the raison de tre of planet earth.
(3) is the process by which the earth outlives major threats.
(4) is demonstration that man's absence will be a blessing to the planet.

**19.** The passage suggests that
(1) the universe is not so much hostile as indifferent to man's plight.
(2) man should go beyond a self-centred approach to comprehend the world.
(3) in the absence of man all other creatures would find the earth a heaven.
(4) the universe is indifferent to man's happiness or unhappiness.

**20.** The 'illusion' the passage refers to is
(1) the belief that reality is merely what is perceived by the sense.
(2) the belief that the earth predates man and will survive him.
(3) the belief that man is all important in the scheme of the world.
(4) the belief that man determines the fate of the planet.

**DIRECTIONS** *for question 21:* The question below is followed by two statements, I and II giving certain data. Answer the question using the following instructions:

Choose 1 : if the question can be answered by using statement I alone but not by using II alone.
Choose 2 : if the question can be answered by using statement II alone but not by using I alone.
Choose 3 : if the question can be answered by using either statement alone.
Choose 4 : if the question can be answered by using both the statements together but not by either statement alone.

**21.** Four friends – P, Q, R and S – participated in a race and each of them finished in one of the top four positions. Further, P did not finish 1st, Q did not finish 2nd, R did not finish 3rd and S did not finish fourth. Who finished in which position?

I. Neither R nor S finished first or second.
II. Neither P nor Q finished third or fourth.

**DIRECTIONS** *for questions 22 to 24:* Read the following passage and answer the questions that follow it.

Volatile markets are a away of life for the Indian investor. Often that can deter mutual fund (MF) investors seeking growth. But that need not be so, if you have the right approach. Take the case of Chanchal Das, a 45-year-old HR consultant form Delhi. Eight months ago, when he decided to invest Rs.1 lakh, he made sure that market volatility doesn't significantly impede the growth of his investment. He took recourse to a lesser-known, but highly effective approach of a systematic transfer plan. (STP).

Through an STP, the investor can transfer parts of a lump sum from one MF scheme to another, within the same fund house, at regular intervals. Such a transfer averages the cost of purchase and thus mitigates market-related risks. The investor can first park his funds in a liquid or floating rate debt fund, and then get it transferred to the scheme (usually equity or balanced) of his choice at regular intervals.

STP works well for investors who have a large sum of money to invest in equity markets, but do not have the skill or information to judge market movements and time their entry into the market. "STP allows averaging of the cost even as your money earns more returns while in the waiting mode," says financial planner Gaurav Mashruwala.

Periodic transfer of money to an equity fund would mean that the investor gets more units when the markets are down and the net asset value (NAV) is low and fewer units when markets are high. Therefore, the STP route will help the investor average the cost of acquisition of units. Thus, in effect, an STP follows the same approach as a systematic investment plan (SIP), which many of us are more familiar with, giving the benefit of cost averaging. The major difference between the two being that STP works better for lump sum investments. Of course, STP hands you another advantage. The money parked in liquid or floating rate funds earn a higher return, currently as much as 6-7 percent per annum. This is much higher than the 3.5 percent per annum that you would get from a savings account if you were to wait for the market to clam down. Last, but not the least STPs provide the flexibility of reviewing the amount to be transferred and the intervals at which the transfer takes place.

STP's utility comes to the fore especially in volatile market conditions such as those today. They would have worked well in the past too but unfortunately, they didn't exist then. If we assume that a person invested Rs.1 lakh per month in index funds from January to December 1993, a period when markets were volatile, he would have seen a growth of 39.70 per cent in his investments. The Sensex, on the other hand, gained only about 36 per cent in that period. But, the STP does not work as well in a market steadily going up. The return on STPs (index funds) was 24 per cent between January and December 2006 (when the markets went up steadily except for a couple of months in between) as against the Sensex growth of 48 per cent. The periodicity of the transfer is an important determinant too. A monthly transfer imparts greater cost averaging benefits compared to a quarterly transfer…since it captures greater market movements. As of now, not many people take the STP route. Rajiv Kumar, head, regional distribution (Delhi ad Rajasthan), Karvy Stock Broking, says: 'At present only 3-5 percent of investors opt for STP. It will take time for people to understand the product. The numbers …increase gradually"

However, STP is not a magic mantra for generating returns. It is just a way for disciplined investing over the long term.

**22.** Which of the following is true about STP?
(1) STP allows for lump sum investment and lump sum transfer from one MF scheme to another.
(2) Frequent transfer of funds is advisable to avoid wild market swings.
(3) Investor gets more units when the markets are high and the NAV is low, and vice versa.
(4) STP is ideal for both long term and short term investors.

**23.** SIP and STP differ in all of the following EXCEPT:
(1) Kind of investment including the ease and interval with which funds are transferred.
(2) Return on investments.
(3) Size of the amount invested.
(4) Mode of operating the account for transfer of funds.

**24.** It can be inferred from the passage that
(1) Sensex gained marginally less than STP in the calendar year 1993.
(2) STP is likely to draw more investors over a period of time.
(3) The volatility of the market has had its deep impact on STP as well.
(4) STPs are gaining better growth today than they did at the end of twentieth century.

**DIRECTIONS** *for questions 25 to 27:* Answer the questions on the basis of the information given below.

All the students in a class of 100 attended a summer camp, organised by SAI and WHO together. At the camp, each of these students had the option of enrolling for coaching in at most three sports, namely Football, Cricket and Hockey.

In an attempt to find out the relative popularity of the three sports, SAI collected the number of students enrolled for each of these three sports and found that, *a* students had enrolled for Hockey, *b* for Football and *c* for Cricket.

WHO, on its part, collected the data regarding the number of sports enrolled for by each of the 100 students and found that, *d* students had enrolled for exactly one sport, *e* for exactly two sports, *f* for exactly three sports and *g* students had not enrolled for any of the three sports.

**25.** If $d > e > f$ and $c$ is less than $a$ as well as $b$, what is the maximum possible value of $c$?
(1) 63 (2) 64
(3) 65 (4) None of these

**26.** If $a$ is less than $b$ as well as $c$, the number of students who enrolled only for hockey is at most
(1) 32 (2) 48
(3) 49 (4) None of these

**27.** If $a + b + c = 100$, the number of students who enrolled for none of the three sports is at most
(1) 30 (2) 66 (3) 68 (4) 52

**DIRECTIONS** *for questions 28 to 30:* Read the following passage and answer the questions that follow it.

The virtues of realism have always been underplayed by most in the economics profession. This is a greater issue of concern than it would be for most professions simply because economists – often the most unrealistic of them – tend to exercise a disproportionate influence on policies that affect the lives of many millions of people.

This is only one of the reasons why Reinert's new book (How Rich Countries Got Rich... and Why Poor Countries Stay Poor) is so important. As evident from his title, Reinert asks the most fundamental questions about economic development, and proceeds to answer them with clear logic, a sweeping grasp of history and an immensely readable style. In the process, he comprehensively shatters a number of prevailing myths within the profession of mainstream economics about the process of economic development and what societies must do to achieve that elusive goal of "developed country" status.

Reinert begins with an acute assessment of what is wrong, methodologically and axiomatically, with the long stream of economic thinking that traces its origins to David Ricardo's work. He argues that Ricardo's theory of comparative advantage, which is the lynchpin of much economic thinking, was deeply unreal in its assumptions. It even provided a foundation for colonialism by making it morally defensible to keep some countries as producers of raw materials only.

The large number of simplifying assumptions that make standard theories less relevant to the actual world are probably well known. But Reinert hones in on some of the most crucial, such as "the equality assumption", which effectively assumes away all differences between human beings, between economic activities and between nations. One classic example is the concept of the "representative firm", which equates the giant firm Microsoft with a 12-year-old self-employed shoeshine boy in a Lima slum.

Other assumptions, such as that of "perfect information" are equally suspect, while the totality of assumptions leads to the theoretical loss of both time (history) and space (geography). This in turn means that, despite some recent attempts to partially incorporate these elements, there is a tendency to downplay the importance of increasing returns, technological change and synergies.

In consequence, four important economic concepts that are key to understanding the process of economic development were lost to economics, despite the fact that early thinkers emphasised all of these. The first is the concept of innovation (the key focus of policymakers in China today). The second is the insight that economic development results from synergistic effects, and that people sharing a job market with innovative industries will have higher wages than others. The third is that different economic activities can be qualitatively different carriers of economic development, so that it matters which specialisation is chosen. Reinert's final concern is that the labour theory of value posits a system of exchange whereby labour hours are void of any other qualities which, according to him, disregards the important connections between mode of production, technology and institutions that underlie the labour embodied in commodities.

The main problem is that the ahistorical theorising generated by all this has replaced a far richer tradition of social and economic thought, which Reinert characterises as "The Other Canon". As he puts it, "Before Adam Smith it was often understood that economic development was based on collective rent-seeking, originating in synergies of increasing returns, innovations and division of labour that were found clustered only in the cities". Thus, the origins of the concept of increasing returns are not to be found in Adam Smith's all-too-famous example of the division of labour in a pin factory, but in the writings of Xenophon, whose book Oeconomicus in the 4th century BC in Greece gave economics its name. In 1613 the Italian Antonio Serra described the positive effects of increasing returns with greater clarity than Smith, while the 18th century German economist Ernst Ludwig Carl used the same pin factory example first. In the same vein, Reinert shows that many of the so-called novelties of modern economic modelling are more than the partial resurrection of earlier insights of The Other Canon, dusted off to be displayed in spangling new colours to a profession that has lost its own history.

Indeed, according to Reinert, history's first deliberate large-scale industrial policy – the promotion of wool production in 15th century England – was based on an observation of what made the richer areas of Europe rich: that technological development in one field in one geographic area could extend wealth to an entire nation. Subsequently, there have been systematic attempts to suppress this basic insight: "Wealthy nations keep poor countries poor based on theories postulating the non-existence of the very factors that created their own wealth".

**28.** Which of the following concepts does not come under the critical scan of Reinert?
(1) Perfect information
(2) Comparative advantage
(3) Equality assumption
(4) Division of labour

**29.** Which of the following statements is true about 'The Other Canon'?
(1) It established the origins of the concept of increasing returns.
(2) Adam Smith put forward the theory that economic development was based on collective rent-seeking.
(3) The pin factory example was an enlightening discovery of Xenophon.
(4) Antonio Serra laid the foundation of the theory of increasing returns.

**30.** Reinert's case of wool production in 15$^{th}$ century England supports the argument that
(1) selling raw materials is more lucrative than selling finished products.
(2) payment for manufacturing exceeds the payment for raw material.
(3) developing countries should not focus on manufacturing industry.
(4) England dominated the European market for textile.

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# (Key and Solutions for AIMCAT1209)

## Key

### SECTION – I

| | | | | | |
|---|---|---|---|---|---|
| 1. 1 | 6. 4 | 11. 3 | 16. 3 | 21. 2 | 26. 4 |
| 2. 1 | 7. 2 | 12. 3 | 17. 2 | 22. 3 | 27. 4 |
| 3. 1 | 8. 4 | 13. 4 | 18. 3 | 23. 4 | 28. 2 |
| 4. 4 | 9. 4 | 14. 3 | 19. 3 | 24. 1 | 29. 2 |
| 5. 4 | 10. 4 | 15. 4 | 20. 3 | 25. 1 | 30. 4 |

### SECTION – II

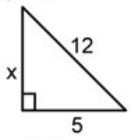
| | | | | | |
|---|---|---|---|---|---|
| 1. 1 | 6. 2 | 11. 4 | 16. 4 | 21. 3 | 26. 3 |
| 2. 4 | 7. 1 | 12. 2 | 17. 4 | 22. 2 | 27. 2 |
| 3. 4 | 8. 4 | 13. 1 | 18. 3 | 23. 4 | 28. 4 |
| 4. 4 | 9. 4 | 14. 2 | 19. 2 | 24. 2 | 29. 1 |
| 5. 1 | 10. 3 | 15. 2 | 20. 4 | 25. 3 | 30. 2 |

## Solutions

### SECTION – I

**Solutions for questions 1 and 2:**

**1.** In any triangle, sum of two sides must be greater than the third side.
$\therefore x + 5 > 12 \Rightarrow x > 7$
Given that the triangle is acute.
Consider $x$, for which the triangle is right angled.
$x^2 + 5^2 = 12^2$
$\Rightarrow x = \sqrt{119}$




For the triangle to be acute, $x > \sqrt{119}$
$\Rightarrow x \geq 11$.
Since $x$ is also less than 12, only one value exists.
Choice (1)

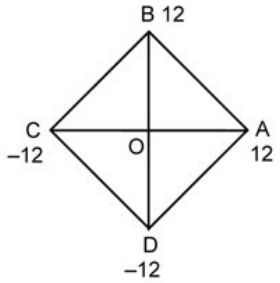
**2.** $\frac{n(n+1)}{2} > 1348$ but close to it. By trial, $\frac{52(53)}{2} = 1378$
So 30 is the difference i.e., 9 + 10 + 11
The greatest of the numbers is 11. Choice (1)

**Solution for question 3:**

**3.** Let, $x$ be the number of students and $y$ be the amount contributed by each student.
Given,
$xy = 1500$ ……. (i)
From statement (I) alone:
$(x - 5)(y + 10) = 1500$ ……..(iii)
From (i) and (ii), the only possible value of $x$ (as $x$ is an integer) is 30.
From statement (II) alone:
$x \times y = 1500$
$30 \times 50 = 1500$
$50 \times 30 = 1500$
The number of students can be 30 or 50.
$\therefore$ Statement II alone is insufficient. Choice (1)

**Solution for question 4:**

**4.** Given $| x - 7 | + | y - 9 | = 12$
The graph of the equation $| x | + | y | = 12$ is as follows




The area of the $\Delta OAB = \frac{1}{2}$ (OA) (OB) $= \frac{1}{2}$ (12) (12) = 72
$\therefore$ The area of the ABCD = $4 \times \Delta OAB = 4 \times 72 = 288$
The graph of $| x - 7 | + | y - 9 | = 12$ graph is the same, except that the centre of the square is (7, 9) instead of (0, 0).
$\therefore$ The area enclosed by the graph of $| x - 7 | + | y - 9 | = 12$ is the same as that by $|x| + |y| = 12$.
$\therefore$Hence the area is 288 sq.units. Choice (4)

**Solutions for questions 5 and 6:**

**5.** MMCMXCIX
= 1000 + 1000 + (1000 – 100) + (100 – 10) + (10 – 1)
= 2999 Choice (4)

**6.** MMLXLV = 1000 + 1000 + 50 + (50 – 10) + 5 = 2095
MMXCV = 1000 + 1000 + (100 – 10) + 5 = 2095
MMVC = 1000 + 1000 + (100 – 5) = 2095
MMCCV = 1000 + 1000 + 100 + 100 + 5 = 2205
Hence, (a), (b) and (c) are equal to 2095
Choice (4)

**Solutions for questions 7 to 14:**

**7.** It is given that $\mu_k = \mu_{k-1} - \mu_{k-2}$ for $k \geq 3$.
$\therefore \mu_3 = \mu_2 - \mu_1 \Rightarrow \mu_2 = \mu_1 + \mu_3$
i.e., In the sequence every number is the sum of its successor and its predecessor in the series
Let $\mu_1 = a$, $\mu_2 = b$
$\mu_3 = \mu_2 - \mu_1 = b - a$
$\mu_4 = \mu_3 - \mu_2 = b - a - b = -a$
$\mu_5 = \mu_4 - \mu_3 = -a - b + a = -b$

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$\mu_6 = \mu_5 - 5_4 = -b + a$
$\mu_7 = \mu_6 - \mu_5 = -b + a + b = a$
$\mu_8 = \mu_7 - \mu_6 = a + b - a = b$
$\therefore \mu_7 = \mu_1$ and $\mu_8 = \mu_2$
and this cycle repeats for every 6 terms
i.e., $\mu_k + \mu_{k+1} + \mu_{k+2} + \mu_{k+3} = \mu_{k+4} + \mu_{k+5} = 0$
i.e., Sum of any 6 consecutive terms in this series = 0
$\therefore$sum of 9006 terms in the series (9006 is divisible by 5) is 0.
$\therefore$sum of 9007 + 9008 terms = sum of 1st and 2nd terms
= –62·33 + 27 = –35·33. Choice (2)

**8.** The given equations are quadratic in $x$ and $y$ and $x$ has a unique value, which is negative.
If $y^2$ is eliminated from the given two equations, the result is
$(3p - x)^2 - 1 + 9x^2 = 0$
$9p^2 + x^2 - 6px - 1 + 9x^2 = 0$
$\Rightarrow 10x^2 - 6px + (9p^2 - 1) = 0$ ------- (1)
$x$ can have a UNIQUE solution,
only when the discriminant of (1) is equal to zero.
Hence $(-6p)^2 - 4\,(10)\,(9p^2 - 1) = 0$
$\Rightarrow 36p^2 - 40\,(9p^2 - 1) = 0$
$\Rightarrow 9p^2 - 90p^2 + 10 = 0$
$\Rightarrow p^2 = 10/81;\ p = (\pm\sqrt{10}\ /9)$ ---- (2)
From (1) $x < 0$, for $\frac{6p}{10} < 0 \Rightarrow p < 0$
$\therefore p = -\sqrt{10}/9$

**Alternative Solution:**
Once the quadratic equation is obtained as $10x^2 - 6px + 9p^2 - 1 = 0$, for a unique solution to exist, discriminant is zero.
$\Rightarrow x = \frac{6p}{10}$. Since $x$ is negative, $p < a$
Only choice (4) satisfies. Choice (4)

**9.** Given, $f(x) = a\,|x| - bx^2$.
when $a < 0$ and $b > 0$,
$f(x) = a|x| - bx^2 \le 0$ for all real values of $x$.
Also, $f(0) = 0$.
Hence, $f(x)$ is maximum at $x = 0$ whenever $a < 0$ and $b > 0$. Choice (4)

**10.** $b = (k^2 - 3k)^2 + 2(k^2 - 3k)$
$= (k^2 - 3k)\,(k^2 - 3k + 2)$
$= k(k - 3)\,(k - 2)\,(k - 1)$
This is a product of 4 consecutive integers.
The product of $n$ consecutive integers is always divisible by $n$!
As $n = 4$ in this case, $b$ is always divisible by 4! i.e., 24
Hence choice (1) is true.
$b = a^2 + 2a$
$b + 1 = a^2 + 2a + 1 = (a + 1)^2$
Hence $b + 1$ is always a perfect square i.e., $b$ is one less than a perfect square.
Hence choice (2) is true.
$a^2 + 2a = (a + 1)^2 - 1^2$
Also, $k - 3k$ is always even.
$\therefore \frac{a(a+2)}{2}$ is even, $a^2 + 2a = \frac{a(a+2)}{2} \times 2$
$\therefore$ We can write
$\therefore \frac{a(a+2)}{2} = x + y$ and $2 = x - y$
where $x$ and $y$ are natural numbers.
$\therefore$ $b$ can be expressed as difference of two perfect squares in at least two ways.
Hence choice (3) is true.
As all the choices are true, choice (4) follows.
Choice (4)

**11.** The required result '14' can be achieved in a minimum of 8 steps as shown below

① ② ③ ④ ⑤ ⑥ ⑦ ⑧
$458 \to 45 \to 90 \to 180 \to 360 \to 720 \to 72 \to 7 \to 14$
Choice (3)

**12.** After the first split, the area remaining unpainted = $\frac{8}{9}$ of total area. After the second split, the area remaining unpainted become $\frac{8}{9}$ of the area remaining unpainted after the first split. Hence, after $n$ splits, the area remaining unpainted will be $\left(\frac{8}{9}\right)^n$ times the total area of the canvas.
If unpainted area is less than 50% of total area, $\left(\frac{8}{9}\right)^n < 0.5$
By trial and error $\left(\frac{8}{9}\right)^5 > 0.5$ and $\left(\frac{8}{9}\right)^6 < 0.5$.
Hence, at least 6 splits are required. Choice (3)

**13.** Given equation is,
$5x + 6y = 138$
$\Rightarrow y = 5k + 3$, where k is an integer
and $x = 24 - 6k,\ k \in$ z
The problem can be solved by elimination of choices method.
**Choice (1) :**
$x = 30$ and $y = -2$ is a solution of the equation $5x + 6y = 138$.
So choice (1) is false.
**Choice (2) :**
$x > 150 \Rightarrow 24 - 6k > 150$
$\Rightarrow 6k < -126$
$\Rightarrow k < -21$ - - (1)
Now, $y > -120$
$\Rightarrow 5k + 3 > -120 \Rightarrow 5k > -123$
$\Rightarrow k > \frac{-123}{5}$ - - (2)
$\therefore$ from (1) and (2),
$k = -24, -23, -22$
When $k = -24$, $x = 168$ and $y = -117$
Also, $x = 168$ and $y = -117$ is a solution of the equation $5x + 6y = 138$.
$\therefore$ choice (2) is false.
**Choice (3) :**
$-x = -36$ and $y = 53$ is a solution of the equation $5x + 6y = 138$
Since $x = 24 - 6k$, there cannot be a solution for
$-36 < x < -30$
$\therefore$ Choice (3) is false
**Choice (4) :**
Since $y = 5k + 3$ there exists solution for $43 < y < 70$
For example,
$y = 48$ and $x = -30$ is a solution of the equation $5x + 6y = 138$
$\therefore$ choice (4) is true. Choice (4)

**14.** Let the total number of army men at the beginning of 1279 be 8 (we choose a convenient power of 2)
Then the following table depicts the strength of army of Gloria.

| | 1279 | 1280 | 1281 | 1282 |
|---|---|---|---|---|
| Strength of army at start of the year | 8 | 12 | 18 | 27 |
| Number of men lost | 4 | 6 | 9 | 13.5 |
| New induction after the war | 8 | 12 | 18 | 27 |
| Strength at end of the year | 12 | 18 | 27 | 40.5 |

Number of losses in 1282 = 13.5
**Choice (1):**
Strength of army before war = 8
$13.5 \not< 8$
Choice (1) is false
**Choice (2):**
Number of men lost in 1279 = 4
Number of men lost in 1281 = 9
Total number of men lost in 1279 and 1281
= 4 + 9 = 13
$13.5 \not< 13$
Choice (2) is false

**Choice (3):**
Total number of men lost in 1280 = 6
Total number of men lost in 1281 = 9
$\therefore$ total no of men lost in 1280 and 1281 = 6 + 9 = 15
13.5 < 15
$\therefore$ Choice (3) is true

**Choice (4):**
Total number of men inducted in 1279 and 1280
= 8 + 12 = 20
$13.5 \ngtr 20$
Choice (4) false Choice (3)

**Solutions for questions 15 to 17:**

**15.** We have to find the maximum number of boys who were 13 years or below and had a height of 140 cm or above. For boys in the $A \le 10$ age group, the total height is $130 \times 8$ = 1040 cm.
There is one boy with height 120 cm and another one with a height of 150 cm.
$\therefore$ The total height of the remaining six students
= 1040 – (150 + 120) = 770 cm.
Of these six students, the maximum number of students with height 140 cm or more is two (as minimum height is 120 cm)
Similarly, for the boys in the age group 11 to 13 years, the maximum number of boys with height 140 cm or more is 9 (when there is one boy with a height 130 cm)
$\therefore$ Total number of boys = 3 + 9 = 12 boys. Choice (4)

**16.** We have to find the minimum number of girls of age 13 years or below who are of height 130 cm or above. For the girls in the $A \le 10$ age group, the total height is $10 \times 130$ = 1300 cm. For a minimum number of girls above the height of 130 cm, we have to assume that all of them above the height of 130 cm have the maximum height, i.e., 140 cm.
$\therefore$ Height of the remaining eight girls other than the tallest and the shortest = 1300 – (140 + 110) = 1050 cm. If two more girls are assumed to be of height 140 cm, all the rest would be of height less than130 cm.
$\therefore$Minimum number of girls in the $A \le 10$ age group of height 130 cm or more is 3.
Similarly the minimum number of girls in the age group of $11 \le A \le 13$ would be 5 (as one girl has a height of 120 cm).
$\therefore$ Total = 3 + 5 = 8. Choice (3)

**17.** We have to select five of the tallest girls in the camp. There can be at most two girls of height 170 cm in the age group 14 to 16 years and if we assume five of the girls in the age group above 16 were of height 150 cm, we can have one girl of height 180 cm and two girls of heights 175 cm each.

$$\therefore \text{Average height} = \frac{180+175+175+170+170}{5} = 174 \text{ cm.}$$

Choice (2)

**Solutions for questions 18 and 19:**

**18.** Given,
$h_1(x) = 1 - x,\ 0 < x < 1 = 1,\ x \ge 1 = 0$, otherwise
$h_2(x) = -h_1(x)$ for all $x$
$h_3(x) = h_2(-x)$ for all $x$
$h_4(x) = -h_3(x)$ for all $x$.
So,
(i) for $x > 0$, $h_3(x) = 0$ and for $x \le 0$, $h_1(x) = 0$
$\therefore h_1(x)\, h_3(x) = 0$ for all $x$.
(ii) $h_2(x) = 0$ for $x \le 0$ and $h_3(x) = 0$ for $x > 0$.
$\therefore h_2(x)\, h_3(x) = 0$ for all $x$.
(iii) $h_1(x) = 0$ for $x \le 0$ and $h_2(x) = 0$ for $x \le 0$.
Hence, $h_1(x)\, h_2(x) = 0$ for $x \le 0$ only
Hence, the products $h_1(x) \cdot h_3(x)$ and $h_3(x) \cdot h_2(x)$ only are necessarily zero for every $x$. Choice (3)

**19.** We have,
$h_4(x) = -h_3(x) = -h_2(-x)$
i.e., $h_4(x) + h_2(-x) = 0$. Choice (3)

**Solution for question 20:**

**20.** The given equation is $px^2 + qx + 1 = 0$
In order to have real roots,
$q^2 - 4p \ge 0 \Rightarrow q^2 \ge 4p$
when $p = 1$, $q$ can take values of 2, 3, 4, 5
when $p = 2$, $q$ can take values of 3, 4, 5
when $p = 3$, $q$ can take values of 4, 5
when $p = 4$, $q$ can take value of 4, 5
when $p = 5$, $q$ can take the value of 5
thus we can have 12 equations satisfying the given condition. Choice (3)

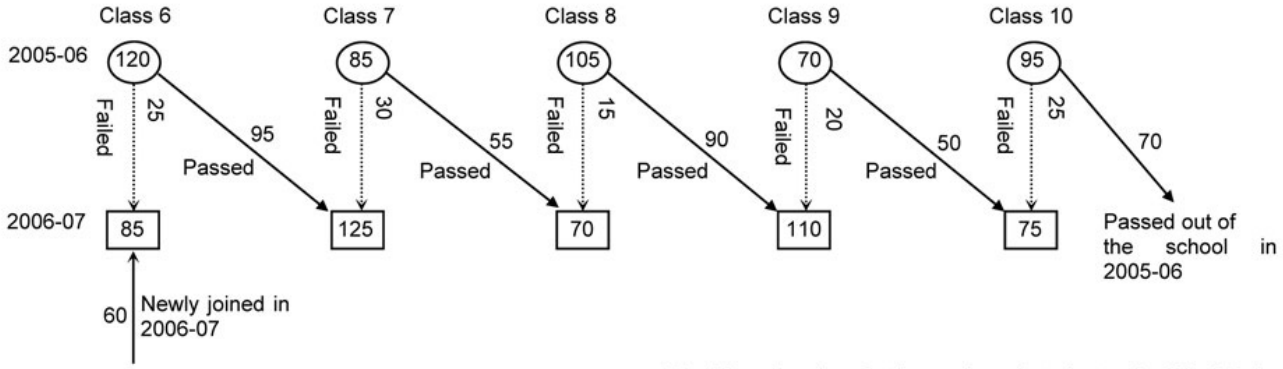
**Solutions for questions 21 to 23:**

The number of students in the different classes in the years 2005-06 and 2006-07 are

| Year | Class 6 | Class 7 | Class 8 | Class 9 | Class 10 |
|---|---|---|---|---|---|
| 2005-06 | 120 | 85 | 105 | 70 | 95 |
| 2006-07 | 85 | 125 | 70 | 110 | 75 |

It is known that 60 students joined the school in 2006-07.
As we know that students can join only in class 6, these 60 students should have joined in class 6. Of the total class of 85 students of class 6 in 2006-07, if 60 are newly joined students, the remaining 25 students must be those who failed in class 6 in 2005-06. Now, of the total class of 120 students, if 25 have failed, the remaining 95 students must have passed and hence should have advanced to class 7 of 2006-07.

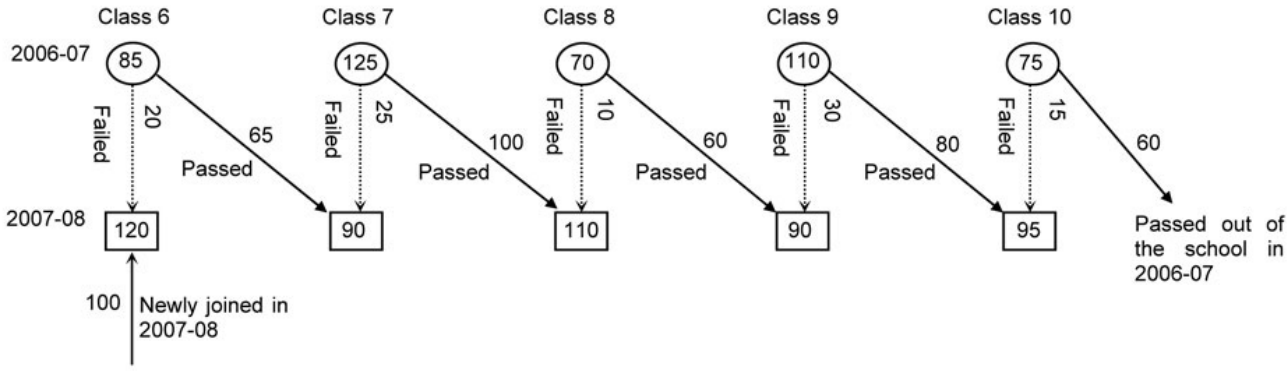
Similarly, in the class of 125 students of class 7 of 2006-07, if only 95 students are from class 6 of previous year, the remaining 30 must be from class 7 of previous year, i.e., who failed in class 7 of previous year. Similarly, we can calculate the values for the remaining classes also and all this can be represented as follows.




**21.** The maximum number of students failed in class 7.
Choice (2)

**22.** Since for class 8, the number of students who failed is the minimum and the total number of students is the highest, clearly class 8 would have had the highest pass percentage. Choice (3)

**23.** It is given that 60 students passed out of the school in 2006-07, which implies that of the total batch of 75 students of class 10 in 2006-07, 60 passed but the remaining 15 failed. Now, of the total class of 95 students of class 10 of 2007-08, 15 are from class 10 of the previous year. Therefore the remaining 80 students must be from class 9 of the previous year. Again this can be represented as follows.




100 students joined the school in 2007-08. Choice (4)

**Solutions for questions 24 to 30:**

**24.** Given expression is $3^{x-1} + 5^{x+1} + 6^{x+2}$ (say E).
Now, it is obvious that E is always even. Hence, any number that always divides E must be 2 or a multiple of 2.
Put $x = 1$
E = 1 + 25 + 216 = 242
Put $x = 2$
E = 3 + 125 + 1296 = 1424
HCF of 242 and 1424 is 2
∴ Choice (1) follows. Choice (1)

**25.**

| Operation | 3-l bucket | 4-l bucket | Drum |
|---|---|---|---|
| Initially | 0 | 0 | 9 |
| 1 | 3 | 0 | 6 |
| 2 | 0 | 3 | 6 |
| 3 | 3 | 3 | 3 |

∴Three operations are needed. Choice (1)

**26.** To get a four-digit number less than or equal to 1200, the first two digits must be taken as 1 and 1.
We know that, a number is divisible by 3 only if the sum of its digits is divisible by 3.
So, the possibilities for the last two digits are:
{1, 3} {1, 9} {7, 3} {7, 9} or (5, 5}.
If we consider the order there is a total of 9 possibilities.
Choice (4)

**27.** Let the number of houses be H,
Total number of ACs be A
Total number of B and W TVs be B
Total number of colour TVs be C
Given that A > C > B > H --- (1)
Also A ≤ 2H (Every hour had at most = 2ACs) --- (2)
(B + C) ≥ 3H
(The total number, of TVs ie every house is not less than 3)
We need to know the minimum value of H.
If H = 1, then A ≤ 2
Which doesn't satisfy (1)
If H = 2, A ≤ 4
Where we do not get suitable values of B and C satisfying (1)
When H = 3, A ≤ 6
When A = 6, B = 4, C = 5
All the conditions are satisfied
∴ Minimum possible value of H = 3. Choice (4)

**28.** When $r$ is negative, the inequality $pr^3 > qr^3$ does not hold good. Choice (2)

**29.** The given expression is

$$\log_{2p}\left(\frac{2p}{3p}\right) + \log_{3q}\left(\frac{3q}{2p}\right)$$

$$\log_{2p}(2p) - \log_{2p}(3q) + \log_{3q}(3p) - \log_{3q}(2p)$$

$$= 1 + 1 - \left[\log_{2p}(3q) + \log_{3q}(2p)\right] --- (1)$$

$$Let \log_{3q}(2p) = k$$

It is given $q > \frac{1}{3}$

⇒ The base $3q > 1$
It is given $2p \geq 3q$, hence $2p > 1$
As $2p \geq 3q$ $\log_{3q}(2p) \geq 1$,

⇒ $k \geq 1$ --- (2)

If $\log_{3q}(2p) = k, then \log_{2p}(3q) = \frac{1}{k}$ -- (3)

Using (2) and (3)
(1) can be rewritten as

$$2 - \left[\frac{1}{k} + k\right] = 2 - \left(k + \frac{1}{k}\right) --- (4)$$

If $k \geq 1$, $k + \frac{1}{k} \geq 2$

Hence $0 \geq 2 - \left(k + \frac{1}{k}\right)$ or $2 - (k + \frac{1}{k}) \leq 0$.

So, the given expression can have a maximum value of zero. All other values are negative. Hence, the given expression cannot have a positive value. Choice (2)

**30.** Let ∠PRQ = $x°$
∠PQR = $x + 30°$
∠QPR + ∠STU = 220°
In ΔPQR,
∠PQR + ∠QPR + ∠PRQ = 180°
∠QPR = 180 – ($x°$ + $x°$ + 30°) = 150° – $2x$
∠STQ + ∠STU + ∠UTR = 180° ------ (1)
(∵ QTR is a straight line)
SQ = ST ⇒ ∠STQ = ∠SQT = $x°$ + 30°
TU = UR ⇒ ∠UTR = ∠URT = $x°$
(1) ⇒ ∠STU = 180° – ($x°$ + 30° + $x°$)
= 150° – $2x°$
∠QPR + ∠STU = 220°
2 (150° – $2x°$) = 220°
$x°$ = 20° Choice (4)

| *Difficulty level wise summary - Section I* | |
|---|---|
| Level of Difficulty | Questions |
| *Very Easy* | – |
| *Easy* | 25, 28 |
| *Medium* | 1, 2, 3, 4, 5, 6, 7, 8, 10, 12, 13, 14, 15, 16, 18, 19, 20, 21, 22, 23, 24, 26, 29, 30 |
| *Difficult* | 9, 11, 27 |
| *Very Difficult* | 17 |

## SECTION – II

**Solutions for questions 1 and 2:**

1. The given para discusses a draft labor law in China intended to protect workers and criticizes US firms that do not support the law.
What casts the greatest doubt of the ability of the draft law to protect workers is choice (1). If the law comes through, firms that obey the law would subcontract works to those that evade law. While choice (4) also points to the law remaining ineffective, choice (1) is stronger since the union, through party run, might still protect workers.
Choice (1)

2. The given para talks of Google developing a software for a phone that can translates almost instantly. We have to find an option that casts doubt on the success of the software. Choice 1, 2 and 3 are positive and hopeful. Only 4 talks of a challenges difficult to overcome. Choice (4)

**Solutions for questions 3 to 5:**

3. Fortuitous means happening by chance, fortunate meaning lucky is more apt here. Hence a.
Formally meaning officially makes sense here, formerly which means in the past is inapt in the context. Hence a.
Capital punishment means punishment by death. Capitol refers to the building in which the U.S. Congress meets. Only the former makes sense in this context. Hence b.
The word indict which means to accuse someone of a crime is apt in the given context The word indite, means put a speech etc. into words, does not make sense here. Hence b.
To flout is to violate. Flaunt means to display, only the latter makes sense here. Hence a. Therefore aabba.
Choice (4)

4. To wait with bated breath is to wait in an anxious or excited way. To bait is to use a small amount of food on a hook or a special device to attract and catch a fish or an animal. Only the former makes sense here. Hence b.
Diagnosis is an identification of or an opinion about a problem or disease while a prognosis is a prediction about the outcome. Only a suits the context.
The word urbane means suave and sophisticated while urban means of or related to the city. The word urbane is apt as it contrasts with 'uncouth country lad'. Hence a.
The word balmy which means soothing and comforting is apt in the context. Barmy meaning mad does not make sense here. Therefore a.
Broach is to open up (a conversation etc.). A brooch is a piece of jewellery. Only a makes sense here. Hence the sequence is baaaa. Choice (4)

5. Deprecate is to disapprove or to belittle. Depreciate means to reduce or lessen. Only the former makes sense here. Hence a.
Conform is to comply with rules or standards. Confirm is to establish the truth or correctness of. Only the former makes sense in the given context. Hence b.
Crucial meaning decisive does not make sense in the context. Only the word cardinal collocates with virtues. Cardinal virtues refer to qualities like justice, prudence, fortitude. etc. Hence b.
Currant meaning a small black dried grape does not make sense in the context. Current meaning present day is more apt in the context. Hence b.
Conscience refers to a person's sense of what is right and wrong, conscious implies self-awareness. Only b suits the context. The sequence is abbbb. Choice (1)

**Solutions for questions 6 to 8:**

6. (a) is erroneous because the past tense of the word 'spring' (to appear) is sprung, so the correction is 'spring has sprung'. (b) is incorrect because the word 'waiving' is incorrect here. The word 'waive' which means to restrain from insisting on or applying (a right or claim) does not make sense here. The word 'wave' (move one's hand to and fro in greeting ) is apt. In d the usage of the word mobs is erroneous The word mobs which means groups of angry people is a misfit because the context does not imply that the people are angry or unruly. The correct word which should be used here is 'throngs'. Only c and e are correct in terms of grammar and usage. Choice (2)

7. (b) is erroneous because the expression 'of line' is incorrect. The correction is 'with nuclear reactors going off line.....' (c) is incorrect because the word 'rise' is incorrect here. The correct word to be used here is 'raise' meaning increase. (d) is incorrect because the preposition 'among' is incorrect in this context. The correct preposition to be used here is 'on' because restrictions are imposed on people. (e) is incorrect because 'three-month' should be hyphenated since it refers to a period and qualifies 'spells'. Only a is free of errors. Choice (1)

8. (a) has no error. (b) is erroneous. part (a) has the subject of the sentence which is a 'person'. The corresponding pronoun must be he or she. Hence the use of 'they' and 'their' in (b) is incorrect. (c) and (d) do not have any error. The position of 'only' is incorrect in (e), ..... 'a walkway makes only a small difference.....' Choice (4)

**Solutions for questions 9 and 10:**

9. Option 1 uses the word 'break' correctly in the sense of a 'rest' between work.
Option 2 uses 'break even' correctly to indicate the stage where the expenses and income are evenly poised.
Option 3 uses 'break-in' in the sense of a forced entry into a private home/bank etc.
Option 4 does not use 'break' correctly – under pressure Sarah will 'break down'. A 'breakup' is the failure of a relationship / partnership. Choice (4)

10. The word 'blow' is used inappropriately in choice (3). Here, blow should be followed by over. To 'blow over' means to go away without having a serious effect. Choice (3)

**Solutions for questions 11 to 14:**

Given,

Shilpa does not have any kids
∴ she is not the wife of Aman, Pradeep or Suman.

So, Shilpa is the wife of Naveen.

| | | | | |
|---|---|---|---|---|
| Naveen | – | Shilpa | – | No Kids |
| Aman | – | – | – | One Kid |
| Suman | – | – | – | |
| Pradeep | | | | |

⇒ Malini belongs to the family which reached last i.e. Aman's. (as Gouri reached before shilpa but after Divya and Shilpa came just before malini).

As Suman was not the husband of Gowri, he was the husband of Divya and Pradeep was the husband of Gowri.

| | | | | |
|---|---|---|---|---|
| Naveen | – | Shilpa | – | No Kids |
| Aman | – | Malini | – | One Kid |
| Suman | – | Divya | – | |
| Pradeep | – | Gowri | | |

As, Divya reached the party before Gowri and Shilpa, she is the first person to reach the party. Gowri is the second person, Shilpa is the third and Malini is the fourth.

11. Suman and Divya form a married couple. Choice (4)

**12.** Malini's and Divya's daughter i.e. Aman's and Suman's daughter go to the same school. Choice (2)

**13.** Shilpa arrived third. Choice (1)

**14.** Pradeep's family definitely has more than one kid. Choice (2)

**Solutions for questions 15 and 16:**

**15.** While (a) and (e) both appear to be possible opening sentence, it is clear that db go together – 'accordingly' in (b) follows 'sought to institutionalize the process' in (d). Hence we narrow down to choices (2) and (4). (e) is the first sentence in both introducing RBI's second 'financial stability report'. (c) follows (b) since 'the first report' in it refers to the first of the report being presented 'since March 2010'. Hence e a d b c. Choice (2)

**16.** b is the opening sentence as it states the main idea on which the paragraph is based. c follows b. 'that choice' in c refers to the choice mentioned in b. a follows showing how and why that choice is 'being imposed on us'. e follows elaborating on nuclear weapons. (d) concludes drawing evidence from history on what the future may hold. Hence b c a e d is the correct sequence. Choice (4)

**Solutions for questions 17 to 20:**

**Number of words and Explanatory notes for RC:**

Number of words : 684

**17.** The words in quote occur at the end of para 3, wherein the author points to man's anthropocentric (interpreting or regarding the world in terms of human values and experiences) approach. The author calls this a scientifically valid question. Hence, he is suggesting that all life forms may be equally important in the overall scheme of the world. Para 1 points to how the belief that the earth is the centre of the universe was dislodged. He also points to the earth predating man and possibly outlasting him. In this context, 4 is the only possible answer. Choice (4)

**18.** The word occurs at the end of para 4 and refers to how the earth survives disasters like meteor hits and mass extinction. Choice (3)

**19.** Refer to the penultimate para which suggests that man must have the courage to accept cosmic 'indifference to human concerns' and this would help 'overcome the limits of human understanding.' Choice (3) is stated. Choice (2)

**20.** The word 'illusion' occurs in para 5 and it follows the 'unthinkable' that human extinction may be a non-event as far as the earth is concerned. Hence the illusion is belief that man is all important. Choice (4)

**Solution for question 21:**

**21.** Given.,
$P \times 1$
$Q \times 2$
$R \times 3$
$S \times 4$
From statement (I) alone:
$R/S \times 1$ or 2
$\Rightarrow R/S = 3$ or 4
As $R \times 3$, R = 4 and S = 3
Now as $P \times 1$, P = 2 and Q = 1
From statement (II) alone:
$P/Q \times 3/4$
$\Rightarrow P/Q = 1/2$
As $P \times 1$, P = 2 and Q = 1
Now as $R \times 3$, R = 4 and S = 3
$\therefore$ We can find the individual ranks by using either statement alone. Choice (3)

**Solutions for questions 22 to 24:**

**Number of words and Explanatory notes for RC:**

Number of words : 624

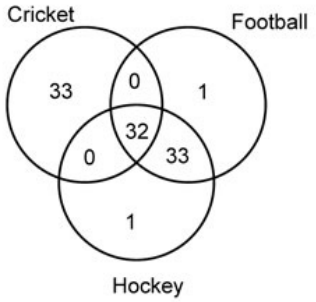
**22.** First part of option 1 is correct but the 2nd part should be '…. parts of lump sum….' (2nd para). Option 3 is incorrect as the investor gets more units when the markets are 'low' (para5) and so is option 4 (last sentence of the passage.) Only option 2 is the correct choice (last 3 sentences of the penultimate para). Choice (2)

**23.** The differences between SIP and STP are listed in second half of para 4. (4) is the odd man out, as it is not a mentioned in the passage. Choice (4)

**24.** Refer to the penultimate para. Option (1) is incorrect as STP was marginally higher over Sensex in 1993. Options (3) and (4) are no inferences, as they are the information/ data given. Option (2) is a correct inference (last sentence of penultimate para – 'The numbers …….. increase gradually'). Choice (2)

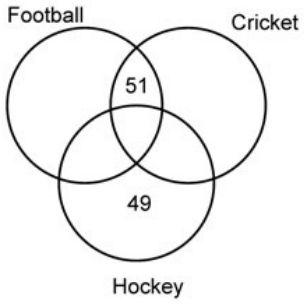
**Solutions for questions 25 to 27:**

**25.** Given, d > e > f.
As c must be maximum, d = 35, e = 33, f = 32.
c is at most 65 as in the following case.



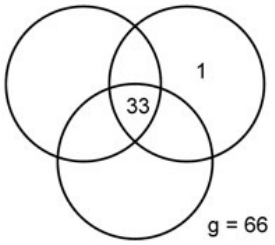

Choice (3)

**26.** The maximum number of students who can enrol for only hockey is 49 as follows.




Choice (3)

**27.** In this case, maximum possible value of g is 66 as shown below.




Choice (2)

**Solutions for questions 28 to 30:**

**Number of words and Explanatory notes for RC:**

Number of words : 774

**28.** Choice (4) is a criterion for '…economic development …based on collective rent-seeking, originating in synergies of increasing returns, innovations and division of labour…' (para 7). The others have been criticized in para 3, 4 and 5. Choice (4)

**29.** Choice (1) is supported by '…the origins of the concept of increasing returns are … found in…insights of The Other Canon, dusted off to be displayed in spangling new colors to a profession that has lost its own history.' (penultimate para last sentence). Choice (1)

**30.** Choice (2) is supported by the logic that '…technological development in (wool production) could (make) an entire nation (wealthy). (para 8) Choice (2)

| ***Difficulty level wise summary - Section II*** | |
|---|---|
| Level of Difficulty | Questions |
| *Very Easy* | – |
| *Easy* | 2 |
| *Medium* | 1, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 18, 19, 21, 22, 23, 24, 28, 29, 30 |
| *Difficult* | 7, 15, 16, 17, 20, 25, 26, 27 |
| *Very Difficult* | – |