



(Test Ref.: AIMCAT1218)

INSTRUCTIONS

1. Read the instructions given at the beginning/end of a section or group of questions very carefully.
2. The total time for the test is **135 minutes**. You may apportion this time among various sections as you wish.
3. **Pattern of the test and marking scheme**

Section	Questions	Number of questions	Marks per question	Negative marks
Verbal Ability	1 – 20	20	3	1
Logic & Data Interpretation	21 – 40	20	3	1
Quantitative Ability	41 – 60	20	3	1
Total	–	60	–	–

4. You are expected to show your competence in all the three sections.
5. Each wrong answer will attract a penalty of one mark.
6. There are no negative marks for unattempted questions.
7. You can navigate to any question of your choice.
8. During the test, you can mark questions for review and return to them at a convenient time.
9. An answer once marked can be changed any number of times before submitting the test. However the last marked answer will be considered as the final answer.
10. Do not carry calculators, slide rules or any other calculating devices. Do not carry any other papers with you except your HALL TICKET. Rough papers for calculations will be provided.

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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 three sections with 60 questions – 20, 20, and 20 respectively in the first, second and third sections. The TOTAL TIME available for the paper is **135 minutes**. The student may apportion this time among various sections as he/she wishes. However, the student is expected to show his/her competence in all the three sections.
3. All questions carry three marks each. Each wrong answer will attract a penalty of one mark.

SECTION – I
Number of Questions = 20

DIRECTIONS for questions 1 to 3: 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.

1. The commonwealth conference will take place next year, not this year, as it is a **biennial** [a] / **biannual** [b] event.

There are innumerable characters in this novel, enough to **bemuse** [a] / **amuse** [b] the most clear-headed reader.

She **repelled** [a] / **repulsed** [b] his proposal by flinging the ring that he presented to her.

There was a great hue and cry for the **abnegation** [a] / **abrogation** [b] of the stringent emergency laws.

The barrister was **disbarred** [a] / **debarred** [b] from the law court on account of disproportionate assets.

- | | |
|-----------|-----------|
| (1) bbaab | (2) ababa |
| (3) aabba | (4) babab |

2. You must **adduce** [a] / **deduce** [b] evidence in order to make your argument acceptable.

DIRECTIONS for questions 4 to 6: Read the following passage and answer the questions that follow it.

What Stephen Batchelor says about what the Buddha actually taught — whether you end up embracing it or not — is undeniably startling, beautiful and visionary. Gotama, he tells us, spoke of the middle way as “an ancient path travelled upon by people in the past...On following it he came upon the ruins of a city with parks, ponds, graves, ramparts, a delightful place. He tells the king to renovate the city so it would become successful, prosperous and filled with people once again...Gotama did not say the path led to nirvana but to the restoration of a city — his teaching, the Dhamma — as a template for a civilization.”

He is now drawn to Buddhism “not because it has a more convincing explanation of the nature of reality than other religions, but that it offers a methodology which might actually work in addressing the question of suffering.” Buddha’s Four Noble Truths are “true not because they correspond to something real somewhere, but because, when put into practice, they can enhance the quality of your life.” Using the core teachings of Gotama, he engages with the world now “from the perspective of detachment, love and lucidity.” Batchelor began a fresh and close examination of the Pali canon, especially the ‘Kalamta Sutta’, for clues to what the Buddha had actually said.

Gotama seems to have only spoken of waking up to a contingent ground, not a withdrawal to “a timeless mystical now but an unflinching encounter with the contingent world as it unravels moment to moment.” Batchelor, attentive as ever, is sharply aware that his is a personal reading. “I have to be alert to the tendency to project onto Gotama my own preferences and values,” he notes. “Every Buddhist through history has constructed his or her own Gotama. I cannot

claim it is more truer or correct than yours. All I can say is that the material buried in the Pali Canon and elsewhere have not yet exhausted their capacity to generate more stories about Gotama and what he taught."

The insights that Batchelor offers us as he travels deeper into the Pali texts are brilliant, dazzling, and full of piercing clarity. I have always admired his prose ("Verses from The Centre"; "Living with the Devil"), and his new work abounds in rich insights and magnificent, clear writing. The metaphors Buddha used, says Batchelor, "seem to encourage a creation of a self than a renunciation of a self, rather than present the self as a fiction, Gotama presented it as a project to be realised – the functional, moral self that breathes and acts in the world...This is a useful way of looking at the self for a lay Buddhist person who works in the world than a renunciation model."

Elsewhere, he writes that "Awakening is not primarily a cognitive act; it is an existential re-adjustment...a refined engagement with a shifting, complex world...it springs from a quiet, but curious intelligence. And it is empathetic, keenly sensitized to the peculiar texture of one's own and other's suffering." The Buddha suggested that "you turn your life to that which is very far from God: the pain and anguish of life on earth; to embrace the contingency of one's life is to embrace one's fate as an ephemeral but sentient being."

And this becomes the ground for unsentimental compassion and love. "As a way of life the middle path is an ongoing task of responsiveness and risk, grounded in a groundless ground. Its twists and turns are as turbulent and unpredictable as life itself."

4. We can infer from Batchelor's 'visionary' revelation that
 - (1) Buddha was more concerned with temporal matters than spiritual matters.
 - (2) he did not believe in nirvana.
 - (3) the middle path is one of abstinence.
 - (4) kings must engage themselves in renovation once in a while.

5. All of the following insights are found in the Pali texts EXCEPT
 - (1) Awakening is to be keenly aware of the world.
 - (2) Gotama was unaware of the transience of life.
 - (3) Awakening is to be sensitive to the suffering of self and others.
 - (4) The Buddha said that one should focus on the suffering on earth.

6. Batchelor's reading of the 'Kalama Sutta' in the Pali canon confirms his view that
 - (1) Buddhist values are in discord with modern priorities.
 - (2) Buddhism has a more convincing explanation of the nature of reality.
 - (3) Buddha's Four Noble Truths are mental concepts.
 - (4) Gotama engages himself with the concerns of the present world.

DIRECTIONS for questions 7 to 9: In each of the following questions, the word at the top is used in four different ways, numbered 1 to 4. Choose the option in which the usage of the word is INCORRECT or INAPPROPRIATE.

7. INTERIM
 - (1) The audience walked out of the hall during the interim, chatting loudly.
 - (2) We need to search out an interim solution to the Kashmir crisis.
 - (3) An interim government was set up before the country's first democratic elections.
 - (4) The interim report suggests that the accident was caused due to technical reasons.

8. SUGGESTS
 - (1) The evidence suggests that Mr.Peter is guilty of fraud.
 - (2) Does this note suggest anything to you?
 - (3) I suggest him to shut up.
 - (4) I suggest that we wait a little longer before reporting the matter.

9. SADDLE
 - (1) The traveller placed the saddle on the horse and mounted it.
 - (2) Do not saddle yourself of too many responsibilities.
 - (3) The saddle of lambs is a delicacy in many parts of the world.
 - (4) The saddle of the bicycle is frayed and torn.

DIRECTIONS for questions 10 to 12: Read the following passage and answer the questions that follow it.

Everyone agrees that there is a strong correlation among broken families, poverty, crime, distrust, social atomization, drug use, poor educational achievement, and low social capital. The arguments made by the Left and Right in what is a highly ideologized debate concern the direction of causality between economic and cultural factors. The Left argues that crime, family breakdown, and distrust are caused by lack of jobs, opportunity, education, and economic inequality more generally. Many observers would add racism and prejudice against minorities as factors. This causal link has led to calls for the United States to enact European-style welfare state protections to guarantee jobs or incomes to poor people, and to charges that growing problem of family breakdown is due to the failure of the American welfare state to "modernize" adequately.

The idea that such large changes in social norms could be brought on by economic deprivation in countries that were wealthier than any other in human history might give one pause. Poor people in the United States have higher absolute standards of living than Americans of past generations and more per capita wealth than many people in contemporary Third World countries with more intact family structures. The United States has not gotten poorer in the last third of the twentieth century; per capita income increased in constant dollars between 1965 and 1995 from \$14,792 to \$25,615

while personal consumption expenditures rose from \$9,257 to \$17,403. Poverty rates, after coming down dramatically through the 1960s and rebounding slightly thereafter, have not increased in a way that would explain a massive increase in social disorder.

Those favoring the economic hypothesis argue that absolute levels of poverty are not the source of the problem. Modern societies, despite being richer overall, have become more unequal, or else have experienced economic turbulence and job loss that have led to social dysfunction. In the case of family breakdown, a casual glance at the comparative data on divorce and illegitimacy rates shows that this cannot possibly be true. A look across the Organisation for Economic Co-operation and Development reveals no positive correlation between level of welfare benefits seeking to increase economic equality, and family stability. Indeed, there is a weak correlation between high levels of welfare benefits and illegitimacy, tending to support the argument advanced by American conservatives that the welfare state is the cause and not the cure for family breakdown. The highest rates of illegitimacy are found in egalitarian Scandinavian countries like Sweden and Denmark, which cycle upwards of 50 percent of their GDP through the state. This compares to the United States, which cycles less than 30 percent of GDP through the government and has higher levels of inequality yet lower rates of illegitimacy. Japan and Korea, which have minimal welfare state protections for poor people, also have what are among the lowest rates of divorce and illegitimacy in the OECD.

10. In this passage, the author primarily

- (1) points to a correlation between crime and poverty.
- (2) suggests that America should adopt the European style of welfare state protection.
- (3) questions the correlation between poverty and social problems.
- (4) reveals statistics to show that poverty levels in the US have not risen.

11. The author uses the phrase 'might give one pause' to ask which of the following questions?

- (1) Is there a nexus between crime and poverty?
- (2) Can there be poverty in economically advanced countries?
- (3) Will the largesse provided by welfare states alleviate social problems?
- (4) Does economic deprivation in wealthy countries lead to social disruption?

12. Which of the following best describes the organization of the passage?

- (1) Making a generalization and following it with supporting details.
- (2) Denouncing the views of the Left by pitting those of the Right against them.
- (3) Negating popular perception with factual evidence.
- (4) Presenting arguments for and against a theory.

DIRECTIONS for questions 13 and 14: 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.

13. A. Such a person whom we call an 'enemy of the people' is unlikely to be cured of this affliction by imprisonment or for that matter by any other punishment.

- B. I believe that this deterrent effect exists despite the many protestations of sociologists and liberally-minded criminologists, but I also believe

that a very strong case can be made for trying to direct the energies of a potential criminal away from an easy life of theft and violent behaviour that threatens his fellow citizens.

C. In any large city there is likely to be a small minority of people, usually young males, who are aggressive by nature, participate in crime and appear to have no moral conscience that is in any way sympathetic to the general feelings of the community.

D. If, however he is seen to be able to get away with his crimes with relatively minor punishment this can become an important encouragement to others to follow a life of crime.

E. Most intelligent people who may have innate antisocial aspirations would nevertheless repress them and behave in a civilized manner if they felt it was likely that their crimes would be discovered and they would be severely punished.

- | | |
|-----------|-----------|
| (1) CADEB | (2) EADCB |
| (3) CEADB | (4) CABED |

14. A. Foremost among these are the requirement of minimizing collateral damage and casualties to innocent civilians in the theatre of conflict.

B. Modern weapon systems have highly accurate kill probability, are devastating and endow the armies of advanced countries with a grand advantage in neutralizing enemy from a distance while keeping their own casualties within acceptable limits.

C. However, there are constraints that apply to all parties involved and more so to developed nations.

D. In such an eventuality, the already battered non-combatant in the battle zone will pay the price, if no better alternative can be technologically found.

E. But, inspite of technological progress, equipment malfunction cannot be ruled out.

- | | |
|-----------|-----------|
| (1) BEADE | (2) CABED |
| (3) BCAED | (4) BAECD |

DIRECTIONS for questions 15 to 17: Read the following passage and answer the questions that follow it.

In the very early universe, soon after the first stars formed, black holes more massive than a billion Suns already speckled the sky. For years, these super-massive black holes were a cosmic anachronism. Although cosmologists put forth two theories for how they might have formed, neither offered a satisfying explanation for how these behemoths

came into existence less than a billion years after the Big Bang. Now, in a paper published in *Nature*, a team of researchers describe a third theory.

"Putting together a viable model for the origin of these super-massive black holes is a difficult theoretical task," said Stelios Kazantzidis, a former researcher at the SLAC/Stanford Kavli Institute for Particle Astrophysics and Cosmology who now works at The Ohio State University's Center for Cosmology and Astro-Particle Physics. "Yet we know from observations that super-massive black holes existed very early on in the history of the universe."

To explain these observations, astrophysicists had previously suggested that small "seed" black holes born in the collapse of the first stars could have quickly grown enormous by pulling in nearby gas or merging with other small black holes. Yet recent analysis suggests there just wasn't enough gas near these seeds for them to grow fast enough to explain observations. Alternatively, researchers have suggested that the gas in a forming galaxy—called a "protogalaxy"—could have spontaneously collapsed to form a large black hole. Yet this theory requires idealized conditions in which the gas is extraordinarily dense and metal-free.

Working with two researchers from the University of Zürich, Kazantzidis and then-KIPAC researcher Andres Escala sought to find a more reasonable explanation. The researchers posited that if two protogalaxies were to merge, together they might create a gas cloud massive and dense enough to collapse into a substantial black hole.

To test this theory, the researchers created the most detailed simulations to date of two identical protogalaxies merging. Each galaxy consisted of a massive and extended dark matter halo surrounding a disk of stars and gas.

In the simulations, the merging protogalaxies orbit one another until gravity pulls them close enough to collide, producing a very dense but turbulent region. Like water down a drain, the gas in the nascent galaxies travels with great speed—several hundred kilometers per second—as it spirals toward the center. Yet unlike water in a drain, the matter has nowhere to go once it reaches the middle of the merged galaxies. As more and more gas squeezes into this small central region, an incredibly dense cloud forms. About 100,000 years after the two protogalaxies merge, the cloud becomes too massive to support its own weight and begins to collapse in on itself—creating just the right conditions for a super-massive black hole to form.

At this point in the simulation, just as all is about to be revealed, the scene goes fuzzy. Although the simulations offer higher resolution than any before—indeed, they took an impressive half a million CPU hours to run on supercomputers at the University of Zürich and the Ohio State Supercomputer Center—the resolution is not quite high enough to show the cloud's collapse, becoming too coarse at this point to be useful. Nonetheless, this work reveals for the first time that mergers between protogalaxies are likely to have led to the direct formation of super-massive black holes in the very early universe.

15. In the given passage, the main purpose of the researchers is to

 - identify the largest type of black hole in a galaxy.
 - compute the average density of a super massive black hole.
 - discuss the formation of a black hole.
 - trace the origin of super-massive black holes.

16. To test their 'theory', the researchers

 - created simulations of two identical protogalaxies merging.
 - showed the evolution of a gas disk created by the collision of two identical protogalaxies.
 - showed two identical protogalaxies orbiting one another.
 - showed that gases in nascent galaxies travel at great speed

17. Which of the following outcome CANNOT create the 'right' condition for a 'super-massive black hole to form'?

 - Gravity pulls the merging protogalaxies close enough to collide.
 - A high-density cloud forms as the gas in the protogalaxies travels towards the center.
 - The high-density cloud formed as a result of the merging of the protogalaxies collapses on itself.
 - A supermassive black hole has a magnitude in the order of billions of solar masses.

DIRECTIONS for questions 18 to 20: Each question consists of five sentences – A, B, C, D and E –on a topic. Some of the sentences are grammatically incorrect or inappropriate. Select as your answer the option that indicates the grammatically correct and appropriate sentence(s).

SECTION – II

DIRECTIONS for question 21: Select the correct alternative from the given choices.

21. Five friends Anu, Bhanu, Chitra, Damini and Elena played a game with initial amounts of Rs.24, Rs.26, Rs.30, Rs.32, and Rs.34 with them, not necessarily in the same order. It is known that everyone either lost or gained some amount but it was observed that the final amounts with each of them were from among the initial amounts with which they had started. Further, it was known that

 - Damini gained Rs.2 and Chitra lost Rs.4.
 - Bhanu lost the highest amount and Anu had Rs.32 at the end of the game.
 - It was observed that the number of friends who gained some amount was more than that of those who lost some amount.
 - The amount with none of them changed by more than Rs.8.
 - Elena neither started with the highest amount nor ended up with the highest amount.

Which of the following is true?

- (1) The increase in the amount with Elena was the highest.
(2) Chitra had Rs.30 at the start of the game.
(3) The amount with Anu increased by Rs.8.
(4) The amount with Bhanu decreased by Rs.6.

DIRECTIONS for questions 22 to 25: Answer the questions on the basis of the information given below.

The following table gives the details regarding the population and literacy rate in five districts – A, B, C, D and E. All questions pertain only to these five districts.

District	Population (in lakh)	Female population (in lakh)	Male literacy rate	Overall literacy rate
A	26.5	12.2	70%	55%
B	20.2	10.8	65%	52%
C	12.6	6.8	75%	62%
D	32.2	15.6	80%	67%
E	17.5	8.2	60%	44%

In each of the questions that follow, two statements A and B are given. Assess each statement and mark your answer choice as

- (1) if only statement A is true.
(2) if only statement B is true.
(3) if both statements A and B are true.
(4) if neither statement A nor statement B is true.

22. Statement A: In district B, the number of male literates is more than the number of female illiterates.
Statement B: The number of female literates in district A is 4.83 lakh.

23. Statement A: District E has the highest number of illiterate males.
Statement B: The number of illiterate males in district D is 3.32 lakh.

24. Statement A: The overall literacy rate of the five districts together is more than the overall literacy rate of district A.
Statement B: The female literacy rate is the highest in district D.

25. Statement A: The difference between the male and the female literacy rates is the highest in district D.
Statement B: More than 50% of the population of the five districts put together are males.

DIRECTIONS for question 26: The question below is followed by two statements, A and B. Answer the question using the following instructions:

- Mark (1)** if the question can be answered by using one of the statements alone but cannot be answered by using the other statement alone.

Mark (2) if the question can be answered by using either of the statements alone.

Mark (3) if the question can be answered by using both the statements together but not by either of the statements alone.

Mark (4) if the question cannot be answered even by using both the statements together.

26. Which team won the hockey match between India and Pakistan?

 - A. India was trailing by two goals with only five minutes left for the match to end.
 - B. India scored three goals in the last five minutes of the match.

DIRECTIONS for questions 27 to 29: Answer the questions on the basis of the information given below.

Each of the five boys – Karan, Prakash, Ravanth, David and Ranjan – has a different number of characteristics among blue eyes, black hair, white complexion, broad forehead and long hair. It is also known that,

- (i) Ranjan does not have as many characteristics as Prakash but has a white complexion.

(ii) Prakash does not have as many characteristics as Ravanth, who does not have blue eyes.

(iii) David does not have as many characteristics as Karan and Karan does not possess the maximum number of characteristics in the group.

(iv) the number of characteristics that Ranjan possesses is exactly two more than that possessed by the boy having the least number of characteristics.

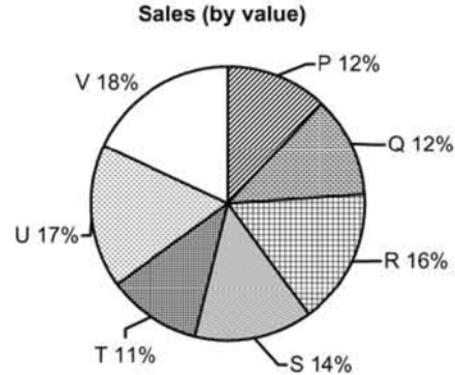
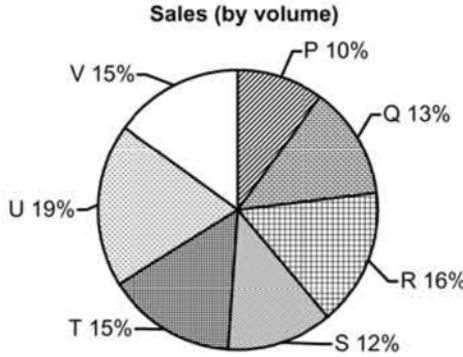
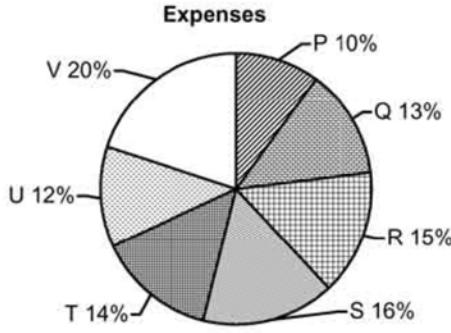
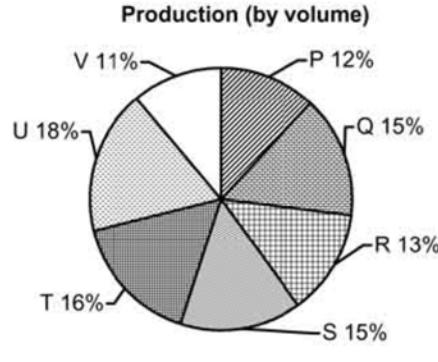
(v) Prakash has long hair and one of the characteristics of Ranjan is a broad forehead.

(vi) every characteristic is possessed by a different number of boys and it is possible that there is a boy who does not possess any of the given characteristics and that there is a characteristic not possessed by any of the boys.

27. Which of the following additional statements is/are necessary to know about the characteristics possessed by each of boys?

DIRECTIONS for questions 31 to 35: Answer the questions on the basis of the information given below.

Company XYZ manufactures seven different products – P, Q, R, S, T, U and V. The following pie-charts give the productwise split-up of the total production, total expenses and total sales of the company in a year.



For any product,
 $\text{Profit} = \text{Sales (by value)} - \text{Expenses}$
 $\text{Profitability (\%)} = \frac{\text{Profit}}{\text{Sales (by value)}} \times 100$

DIRECTIONS for question 30: Select the correct alternative from the given choices.

30. Eight friends P, Q, R, S, T, U, V and W sit around a circular table. P and S always sit next to each other while R and T never sit together. In how many ways can these eight friends sit around a circular table?
 (1) 1920 (2) 960 (3) 480 (4) 240

It is known that the company made a profit on each of its products and the units of any product sold in a year are only those that are manufactured in the same year.

31. For which product is the expenditure per unit produced the highest?
(1) R (2) S (3) T (4) V
32. If the overall profitability of the company was definitely more than $x\%$, then the maximum possible value of x is
(1) $29\frac{3}{11}$ (2) $27\frac{3}{11}$ (3) $21\frac{3}{7}$ (4) $24\frac{7}{20}$
33. At most what percentage of the total production was sold?
(1) 60% (2) $66\frac{2}{3}\%$ (3) $68\frac{1}{2}\%$ (4) $73\frac{1}{3}\%$
34. If the total sales were 1.5 times the total expenses, then for how many products was the profitability more than 25%?
(1) 2 (2) 4 (3) 5 (4) 3
35. It is known that, the total profit from sales of product U was the highest among all the products, and the total expenses of the company were Rs.50 crore. If the total sales (by value) of the company were definitely less than z , then what is the maximum possible value of z ?
(1) Rs.250 crore (2) Rs.400 crore
(3) Rs.450 crore (4) Rs.600 crore

DIRECTIONS for question 36: The question below is followed by two statements, A and B. Answer the question using the following instructions.

- Mark (1) if the question can be answered by using one of the statements alone but cannot be answered by using the other statement alone.
Mark (2) if the question can be answered by using either statement alone.
Mark (3) if the question can be answered by using both the statements together but cannot be answered by using either statement alone.
Mark (4) if the question cannot be answered even by using both the statements together.

36. A cube is painted using the six colours – red, blue, green, yellow, violet and orange, in such a way that each face is painted in a single colour and each colour is painted on only one face. Is the face coloured blue opposite to the face coloured yellow?
A. The face coloured red is adjacent to that coloured blue, and the face coloured yellow is adjacent to the face coloured red.
B. The face coloured green is adjacent to the face coloured violet as well as the face coloured orange, while the face coloured violet is not adjacent to the face coloured orange.

DIRECTIONS for questions 37 to 40: Answer the questions on the basis of the information given below.

As part of organizing a state level cricket tournament on the lines of the hugely successful IPL, a popular cricketing club, The Santos Cricket Club, decided to form three committees for the smooth conduct of the tournament. The committees formed were the administration committee, the finance committee and the

marketing committee. Each of the 42 members in the general council of the Santos Cricket Club was part of at least one of the three committees. The following additional information is also known about the committees formed:

- A maximum number of council members were part of the finance committee.
 - The administration committee had a total of 21 members in it.
 - The number of members who were part of only the administration committee was two less than the number of members who were part of only the marketing committee.
 - Fifteen members who were part of the administration committee were also part of at least one of the other two committees.
 - The number of members who were part of only the marketing committee was double the number of members who were part of all the three committees.
 - Among the members of the finance committee, the number of members who were also part of the marketing committee was one less than the number of members who were part of only the finance committee.
 - 37. The minimum number of members who were part of both the administration and the finance committees, but not the marketing committee, is
(1) 4 (2) 5 (3) 6 (4) 7
 - 38. Additional information from which of the following statements will be sufficient to find the exact number of members in each committee?
(1) Four members were part of all the three committees.
(2) Six members were part of only the administration committee.
(3) Twenty members were part of the marketing committee.
(4) Nine members were part of only the finance committee.
 - 39. The number of members in any of the three committees is not less than
(1) 19 (2) 18 (3) 16 (4) 15
 - 40. After some time it was decided that no member can be part of all the three committees, and hence members who were part of all the three committees had to withdraw from one committee. As a result, one member opted out of the marketing committee, one member opted out of the administration committee, while the remaining members who were part of all the three committees opted out of the finance committee.
- Which of the following statements is now true?
- (1) The maximum number of members are in the finance committee.
 - (2) The maximum number of members are in the administration committee.
 - (3) The maximum number of members are in the marketing committee.
 - (4) Either (1) or (3)

SECTION – III
Number of Questions = 20

DIRECTIONS for questions 41 to 60: Answer the questions independently of each other.

41. How many non-negative roots does the equation $3^y - (2y + 1) = 0$ have?
 (1) 0 (2) 1 (3) 2 (4) 3
42. If a, b, c and d are positive real numbers, where $a = 2b$ and $3c = 4d$, then find the ratio of $(abc^2 + 2b^2d^2)$ and $(a^2cd + 2bc^2d)$.
 (1) 41 : 96
 (2) 41 : 48
 (3) 25 : 144
 (4) Cannot be determined
43. If $N = 2222^{3333} + 5555^{6666}$, then which of the following statements is true?
 (1) N is divisible by 3, 7 and 11 but not 9.
 (2) N is divisible by 7, 9 and 11.
 (3) N is divisible by 9 and 11 but not 7.
 (4) N is divisible by 7 and 11 but not 3.
44. In a group of 115 people, 60, 50 and 40 people like three different games A, B and C respectively. The number of people who like all the three games is two-third the number of people who like exactly two of the three games. The number of people who like only A and B is the same as that of those who like only B and C, which, in turn, is the same as that of those who like only C and A. If every person likes at least one of the three games, what is the number of people who like all the three games?
 (1) 25
 (2) 35
 (3) 10
 (4) Cannot be determined
45. A coin is biased such that heads occurs four times as frequently as tails. Another coin is biased such that heads occurs 65% of the times. When the two coins are tossed simultaneously, what is the probability of at least one tail turning up?
 (1) 35% (2) 87% (3) 48% (4) 73%
46. Praful went to the market and bought apples, bananas and oranges. He purchased at least 25 fruits of each variety and calculated that if the cost of each orange was Rs.1 more and the cost of each banana was Rs.4 more, then his total expenditure on the fruits would have gone up by Rs.136. If he bought a total of 80 fruits, find the number of bananas he purchased.
 (1) 26 (2) 27 (3) 28 (4) 29
47. Exactly 3000 students wrote a multiple choice test comprising exactly 5 questions, each question, in turn, having exactly five answer choices, exactly one of which is correct. Every question correctly answered fetches 4 marks and every question incorrectly answered fetches -1 mark. If each student attempted all the questions and the answer choices marked by no two students are the same for all the five questions, then the number of students with a net positive score in the test is at least
 (1) 696 (2) 1720 (3) 1024 (4) 1976
48. The sum of the lengths of all the 12 edges of a cuboidal block of wood is 72 m. What is the maximum possible total surface area (in sq.m.) of the block?
 (1) 96 (2) 216 (3) 162 (4) 108
49. There are ten cities – L, M, N, O, P, Q, R, S, T and X – some of which are connected to some of the other cities by one-way routes. The following network shows the routes by which one can travel between the cities. The direction of each arrow indicates the possible direction of travel by that route.
-
- ```

graph LR
 L --> P
 P --> T
 X --> M
 M --> Q
 Q --> T
 X --> N
 N --> Q
 N --> O
 R --> S
 S --> T

```
- In how many ways can one travel from city X to city T, without covering any city more than once?  
 (1) 7      (2) 8      (3) 10      (4) 11
50. Two sisters, Preethi and Savitha have a habit of reading one book each, immediately before going to bed every night. Last night, Preethi took three hours to read a book of 150 pages, in which the lines were spaced 3 per inch and the left and the right margins together comprised 20% of the page width, while Savitha took five hours to read a book of 250 pages, in which the lines were spaced 4 per inch and the left and the right margins together comprised 25% of the page width. If today the sisters exchange the books and start reading at 8:00 pm, then find the earliest time by which both sisters would have finished reading their respective books. Assume that the other aspects, like page size, top and bottom margins, of both the books are identical.  
 (1) 10:24 p.m. the same day  
 (2) 11:36 p.m. the same day  
 (3) 12:48 a.m. the next day  
 (4) 2:15 a.m. the next day
51. If  $a$  is a real number,  $a^-$  is defined as the greatest integer less than or equal to  $a$  and  $a^+$  is defined as the least integer greater than or equal to  $a$ . The four values P, Q, R and S are defined for two real numbers  $m$  and  $n$  in the following manner.  
 $P = m^- + n^- + (m + n)^-$   
 $Q = (2m)^- + (2n)^-$   
 $R = m^+ + n^+ + (m + n)^+$   
 $S = (2m)^+ + (2n)^+$

Which of the following cannot be true?

- |             |             |
|-------------|-------------|
| (1) $R > S$ | (2) $R = S$ |
| (3) $P = Q$ | (4) $P > Q$ |

52. P, Q and R are three sets defined as below:

$$\begin{aligned}P &= \{2, 6, 10, 14, \dots, 1498\} \\Q &= \{2, 5, 8, 11, \dots, 1499\} \\R &= \{2, 7, 12, 17, \dots, 1497\}\end{aligned}$$

Find  $n(P \cup Q \cup R)$ .

- (1) 875    (2) 896    (3) 898    (4) 900

53. A student of Statistics calculated the average height of all the students of his class as A. He also calculated the average of the average heights of all the possible pairs of students (two students taken at a time) as B. Further, he calculated the average of the average heights of all the possible triplets of students (three students taken at a time) as C. Which of the following is always true of the relationship among A, B and C?

- |                   |                   |
|-------------------|-------------------|
| (1) $A + 2B = 3C$ | (2) $A + B = C$   |
| (3) $A = 2B = 3C$ | (4) $3A = 2B = C$ |

54. Find the reflection of the point (7, 11) in the x-y plane about the line  $x + y = 0$ .

- |               |                   |
|---------------|-------------------|
| (1) (-11, -7) | (2) (11, -7)      |
| (3) (-7, -11) | (4) None of these |

55. Which of the following cannot be the sum of the squares of 12 consecutive odd natural numbers?

- (1) 2300    (2) 2924    (3) 3644    (4) 4356

56. M and N are two stations on a railway line. A single rail track is present between these stations. X, Y and Z are three trains that run between M and N. X runs half as fast as Y, which, in turn, runs at a speed  $33\frac{1}{3}\%$  less than that of Z. Each day, X leaves M at 7:00 a.m., for N, and as soon as it reaches N, Z starts from N and reaches M at 9:00 a.m. One day, X started 24 minutes behind schedule but increased its speed by  $11\frac{1}{9}\%$  to try to catch up on the schedule. If Z also increased its speed and reached M at the usual time, find the ratio of the speeds of Z and X, on that day.

- (1) 23 : 5    (2) 31 : 5    (3) 27 : 5    (4) 29 : 5

57. Three mathematical operators  $@$ ,  $\#$  and  $*$ , are defined for real numbers as below:

$$\begin{aligned}@(a, b, c) &= a(b + c) \\ \#(a, b, c) &= ab + bc + ca \\ *(a, b) &= ab\end{aligned}$$

Other arithmetic operators like  $+$ ,  $-$ , etc. have their usual meaning.

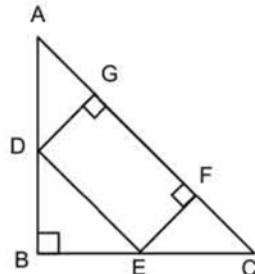
The value of which of the following expressions is equal to  $@(a, b, c) + @ (b, c, a) + @ (c, a, b)$ ?

- |                                       |                                    |
|---------------------------------------|------------------------------------|
| I. $2\#(a, b, c)$                     | II. $2*(a, b) + *(b, c) + *(c, a)$ |
| III. $*(a, 2b) + *(2b, c) + *(c, 2a)$ |                                    |
| (1) Only I and II                     | (2) Only I                         |
| (3) Only I and III                    | (4) All three statements           |

58. If  $x, y$  and  $z$  are positive real numbers, for what ratio of the values of  $y$  and  $z$  is the value of  $\left(\frac{x}{y} + \frac{z}{12x} + \frac{4y}{x} + \frac{x}{3z}\right)$  the minimum?

- (1) 1 : 4    (2) 1 : 2    (3) 3 : 4    (4) 4 : 1

59.



In the above figure (not drawn to scale), the length of the hypotenuse, AC, of the right-angled triangle ABC is 12 cm. DEFG is a rectangle, with  $DE = 4$  cm. If the area of triangle ABC is not less than that of any right-angled triangle whose hypotenuse is 12 cm, find the area of DEFG.

- |               |               |
|---------------|---------------|
| (1) 12 sq.cm. | (2) 16 sq.cm. |
| (3) 6 sq.cm.  | (4) 9 sq.cm.  |

60. Malini and Shalini play a game in which they first write down the first  $n$  natural numbers and then take turns in inserting plus or minus signs between the numbers. When all such signs have been placed, the resulting expression is evaluated (i.e., the additions and subtractions are performed). Malini wins if the absolute value of the result is even and Shalini wins if the absolute value of the result is odd. Which of the following statements is true?

- |                                            |  |
|--------------------------------------------|--|
| (1) Malini wins if $n$ is a multiple of 4  |  |
| (2) Shalini wins if $n$ is even            |  |
| (3) Shalini wins if $n$ is odd             |  |
| (4) Malini loses if $n$ is a multiple of 4 |  |