## SECTION-I

## Number of questions $=\mathbf{3 0}$

DIRECTIONS for Questions 1 to 5: Answer the questions on the basis of the information given below.

Dream teams are formed by Television viewers by selecting five players from the sixteen players namely $\mathrm{P}_{1}, \mathrm{P}_{2}, \mathrm{P}_{3}, \mathrm{P}_{4}, \mathrm{P}_{5}, \mathrm{P}_{6}, \mathrm{P}_{7}, \mathrm{P}_{8}, \mathrm{P}_{9}, \mathrm{P}_{10}, \mathrm{P}_{11}, \mathrm{P}_{12}, \mathrm{P}_{13}, \mathrm{P}_{14}, \mathrm{P}_{15}$ and $\mathrm{P}_{16}$. The players belong to exactly one of the three teams namely Chicago Bulls, LA Lakers and Utah Jazz. Every dream team must have two players each from Chicago Bulls and LA Lakers and one player from Utah Jazz. $\mathrm{P}_{12}$ is not from Utah Jazz. $\mathrm{P}_{7}$ is from Chicago Bulls and, $\mathrm{P}_{2}$ and $\mathrm{P}_{9}$ are from LA Lakers.

The following table provides information about the players selected in 8 such dream teams formed.

| Dream Team | Player 1 | Player 2 | Player 3 | Player 4 | Player 5 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathbf{1}$ | $\mathrm{P}_{3}$ | $\mathrm{P}_{9}$ | $\mathrm{P}_{7}$ | $\mathrm{P}_{1}$ | $\mathrm{P}_{12}$ |
| $\mathbf{2}$ | $\mathrm{P}_{12}$ | $\mathrm{P}_{11}$ | $\mathrm{P}_{13}$ | $\mathrm{P}_{6}$ | $\mathrm{P}_{9}$ |
| $\mathbf{3}$ | $\mathrm{P}_{6}$ | $\mathrm{P}_{3}$ | $\mathrm{P}_{5}$ | $\mathrm{P}_{11}$ | $\mathrm{P}_{7}$ |
| $\mathbf{4}$ | $\mathrm{P}_{2}$ | $\mathrm{P}_{10}$ | $\mathrm{P}_{7}$ | $\mathrm{P}_{6}$ | $\mathrm{P}_{1}$ |
| $\mathbf{5}$ | $\mathrm{P}_{1}$ | $\mathrm{P}_{4}$ | $\mathrm{P}_{16}$ | $\mathrm{P}_{11}$ | $\mathrm{P}_{10}$ |
| $\mathbf{6}$ | $\mathrm{P}_{6}$ | $\mathrm{P}_{3}$ | $\mathrm{P}_{7}$ | $\mathrm{P}_{15}$ | $\mathrm{P}_{12}$ |
| $\mathbf{7}$ | $\mathrm{P}_{2}$ | $\mathrm{P}_{9}$ | $\mathrm{P}_{12}$ | $\mathrm{P}_{14}$ | $\mathrm{P}_{15}$ |
| $\mathbf{8}$ | $\mathrm{P}_{4}$ | $\mathrm{P}_{8}$ | $\mathrm{P}_{13}$ | $\mathrm{P}_{11}$ | $\mathrm{P}_{10}$ |

1. How many players belong to Utah Jazz from the given sixteen players ?
2. 3
3. 4
4. 5
5. 6
6. 7
7. How many players belong to LA Lakers from the given sixteen players ?
8. 7
9. 6
10. 5
11. 4
12. 3

Additional Information for questions 3 and 4: The 'match fee' of each player belonging to Chicago Bulls, LA Lakers and Utah Jazz is $\$ 800$, $\$ 775$ and $\$ 725$ per game played respectively.
3. Mr. XYZ formed a special team that had five players $P_{4}, P_{8}, P_{16}, P_{13}$ and $P_{15}$. What is the total match fee to be paid to this particular team for each game played by them?

1. $\$ 3725$
2. $\$ 3750$
3. $\$ 3775$
4. $\$ 3800$
5. $\$ 3850$
6. Which of the following teams earns the maximum aggregate match fee for each game played by them?
7. $\mathrm{P}_{1}, \mathrm{P}_{4}, \mathrm{P}_{10}, \mathrm{P}_{13}, \mathrm{P}_{15}$
8. $\mathrm{P}_{10}, \mathrm{P}_{13}, \mathrm{P}_{16}, \mathrm{P}_{4}, \mathrm{P}_{1}$
9. $\mathrm{P}_{4}, \mathrm{P}_{12}, \mathrm{P}_{11}, \mathrm{P}_{13}, \mathrm{P}_{5}$
10. $\mathrm{P}_{5}, \mathrm{P}_{10}, \mathrm{P}_{13}, \mathrm{P}_{1}, \mathrm{P}_{14}$
11. $\mathrm{P}_{13}, \mathrm{P}_{16}, \mathrm{P}_{14}, \mathrm{P}_{11}, \mathrm{P}_{4}$
12. Which of the following is not a team that had at least 2 players from Utah Jazz and at least one player each from Chicago Bulls and LA Lakers?
13. $\mathrm{P}_{4}, \mathrm{P}_{15}, \mathrm{P}_{13}, \mathrm{P}_{11}, \mathrm{P}_{10}$
14. $\mathrm{P}_{1}, \mathrm{P}_{5}, \mathrm{P}_{13}, \mathrm{P}_{4}, \mathrm{P}_{10}$
15. $\mathrm{P}_{6}, \mathrm{P}_{8}, \mathrm{P}_{13}, \mathrm{P}_{14}, \mathrm{P}_{15}$
16. $\mathrm{P}_{13}, \mathrm{P}_{4}, \mathrm{P}_{11}, \mathrm{P}_{14}, \mathrm{P}_{16}$
17. $\mathrm{P}_{1}, \mathrm{P}_{6}, \mathrm{P}_{5}, \mathrm{P}_{13}, \mathrm{P}_{11}$

DIRECTIONS for Questions 6 to 10: Answer the questions on the basis of the information given below.

A machine recognises inputs only in the form of a string of bits to produce the products. It reads the string of bits from left to right. A bit could be only of two forms $\mathbf{0}$ or $\mathbf{1}$.
6. An input of $\mathbf{0}$ starts the machine if it is in the stop state and stops the machine if it is in the start state. Input of $\mathbf{1}$ is given to produce the product, only when the machine is in the start state. Otherwise, $\mathbf{1}$ is rejected by the machine. At the end of the day, machine should be stopped. If machine was in stop state initially, which of the following input strings is not valid for the day?

1. 011100100111111001110
2. 00110111100101010101010

## 5. 0101101110110111011011110

2. 00011110101111101010
3. $\mathbf{0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0}$
4. An input of $\mathbf{0}$ starts the machine if it is in the stop state and stops the machine if it is in the start state. Input of $\mathbf{1}$ is given to produce the product, only when the machine is in the start state, otherwise machine would not accept the input. If the machine was in stop state initially, which of the following inputs is not acceptable to the machine?
5. 011100110011100101110010
6. 01001001110010000001001

## 5. 011111001001111001111110

2. 01100111100100100111100
3. 00010010011001110010010
4. There was a demand of products of two different kinds - product A and product B. To achieve this objective, the machine was configured to read two bits at a time. An input of $\mathbf{0 0}$ starts the machine, input of $\mathbf{0 1}$ produces a unit of product $A$, input of $\mathbf{1 0}$ produces a unit of product $B$ and input of $\mathbf{1 1}$ stops the machine. The machine can produce the products only in its start state. Otherwise, it would just discard the input. It would also discard the input for stop or start if it is already in that state. Out of the following, the inputs that would produce more units of product $A$ than product $B$ are:
I. 00101010101010101010111101100110000101010101
II. 00110101001000010010010000011000001111101010
III. 00111000010101000101100100010010110011101100
5. I and III only
6. I and II only
7. II and III only
8. III only
9. I only
10. With increasing demand in variety, the management decides to produce 1800 different kinds of products with the same machine. A unique input should specify the production of each of the products, apart from two different unique inputs asking machine to start and stop respectively. The machine should be configured to read at least how many bits at a time to achieve this objective?
11. 10
12. 11
13. 901
14. 451
15. None of these
16. In the communication of input with the machine, it is possible that at most one bit-reversal happens due to errors in the communication channel. Bit-reversal refers to $\mathbf{1}$ changing into $\mathbf{0}$ or $\mathbf{0}$ changing into 1. To check at most one such bit-reversal, a parity bit is appended at the rightmost end of the input. Parity bit is not an instruction to the machine to do anything but just a check if the input has been read appropriately by the machine or not. The following algorithm should be followed for the check.
Step 1: Compute the parity bit for the input using a defined procedure.
Step 2: Append it at the end of the input and send it to the machine.
Step 3: Machine reads the input and computes parity bit using the same defined procedure.
Step 4: If parity bit supplied is equal to the parity bit computed, execute the input.
Step 5: If parity bit supplied is different from the parity bit computed, request a re-sending of the input.

Which of the following defined procedures of setting up the value of parity bit is in accordance with the machine's behaviour?

1. Set the parity bit to $\mathbf{0}$. Reverse the parity bit for each occurrence of bit $\mathbf{1}$ in the input.
2. Set the parity bit to $\mathbf{1}$. Reverse the parity bit for each occurrence of bit $\mathbf{1}$ in the input.
3. Set the parity bit to $\mathbf{1}$. Reverse the parity bit if the number of times bit $\mathbf{1}$ occurs in the input is even.
4. Set the parity bit to $\mathbf{0}$. Reverse the parity bit if the number of times bit $\mathbf{0}$ occurs in the input is even.
5. All of these

DIRECTIONS for Questions 11 to 15: Answer the questions on the basis of the information given below.

Seven friends, namely Piyashi, Qualin, Ravanya, Sanya, Tanya, Urvashi and Varsha passed their Xth board examination in 2007. The result was announced on a Sunday and from the next day, they started organising dinner parties on consecutive days. Each one of them organised exactly one party. On none of the days was more than one party organised. They decided that only four kinds of items viz. Dosa, Pizza, Berger and Idli would be ordered for the dinner parties. The costs per plate of Dosa, Pizza, Berger and Idli were Rs. 25, Rs. 45, Rs. 20 and Rs. 15 respectively. The following additional information was available:
I. In each of the dinner party, total number of plates ordered, taking all four items together was either 8 or 9 .
II. Each dinner party had different combination of number of plates of different items and each type of item was ordered for at least one plate but not more than three plates.
III. Qualin hosted the party immediately after Urvashi.
IV. Piyashi, Ravanya, Sanya and Varsha had ordered for more number of plates than the other three and hosted their parties immediately one after the other in that order only.
V. The total number of plates of Dosa, Pizza, Berger and Idli ordered were $14,16,18$ and 12 respectively including all dinner parties.
VI. In each dinner party, at least three items were ordered for 2 or more plates.
11. If Sanya paid Rs. 35 more than Ravanya, then what was the amount paid by Ravanya when she hosted the dinner party?

1. Rs. 220
2. Rs. 210
3. Rs. 260
4. Either (1) or (2)
5. Either (2) or (3)
6. If the maximum possible amount for a dinner party was paid on Monday, then who hosted that party?
7. Urvashi
8. Piyashi
9. Ravanya
10. Tanya
11. Varsha
12. If Qualin ordered for equal number of plates of each item, but paid Rs. 5 less than Tanya in the dinner party hosted by her, then what can be the maximum possible difference between the amount paid by Qualin and the minimum possible amount paid by any other friend?
13. Rs. 30
14. Rs. 20
15. Rs. 15
16. Rs. 10
17. Rs. 5
18. Which of the following could be the day on which maximum possible number of friends could have hosted the party?
19. Monday
20. Tuesday
21. Thursday
22. Friday
23. Saturday
24. Only Urvashi, Qualin and Piyashi ordered for 2 Bergers each in the parties they hosted. Also, only Qualin, Tanya, Piyashi, Ravanya and Varsha ordered for 2 Pizzas each in the parties they hosted and only Piyashi and Ravanya did not order for 2 plates of Dosa each in the parties they hosted. How many plates of Idli did Ravanya order in the party hosted by her?
25. 1
26. 2
27. 3
28. Either (1) or (3)
29. Either (1) or (2)

DIRECTIONS for Questions 16 to 20: Answer the questions on the basis of the information given below.

In the Presidential Election of the country called 'Incredible', only the members of the elected councils are eligible to vote. There are two types of elected councils in that country, the state-level elected council called the 'Assembly' and the central level elected council called the 'Parliament'. The members of assembly are abbreviated as MA and members of parliament are abbreviated as MP. There are only two political parties in that country namely party B and party C. All the MAs and MPs belong to one of these parties. There are only three states namely State 1, State 2 and State 3 in Incredible. There are three different assemblies, one each in these three mentioned states.

The following bar-graph compiles the size of the assemblies and the parliament in terms of number of members. The difference in the number of members between two parties in any council is not more than $10 \%$ of the total number of members of that council. In no elected council, two parties have equal number of members. If in an elected council, number of members of a particular party is more than the other party, then the party is said to enjoy 'majority' in that council.


Mr. Shake and Ms. Pratt are the only two candidates for the presidential election of Incredible. Every MA and MP can either vote for any one of the mentioned candidates or can abstain from voting. Weight of vote of each MA from state 1,2 and 3 are 3,2 and 1 respectively whereas the
weight of vote of each MP is 6 . Every council members can vote only once in the Presidential elections.

Mr. Shake is supported by Party B and Ms. Pratt is supported by Party C. The word supported indicates that no elected council member from that party will vote for any candidate other than the 'supported' candidate, unless mentioned otherwise.
16. If all the council members belonging to party $B$ vote for Mr. Shake, then which of the following can never be the total votes received by Ms. Pratt after due weight?

1. 2580
2. 2514
3. 2250
4. 2166
5. 2106
6. If party C enjoyed majority in all the elected councils, then what is the minimum possible number of council members who should definitely abstain from voting such that Mr. Shake still wins the election?
7. 270
8. 269
9. 268
10. 267
11. 266
12. Given that party B enjoys majority in all the state assemblies and Party C enjoys majority in the Parliament. Let ' X ' be the maximum possible absolute difference between the total number of elected council members of party $B$ and party $C$ and ' $Y$ ' be the minimum possible absolute difference between the total number of elected council members of party B and party $C$. Find the value of $(X-Y)$.
13. 66
14. 64
15. 56
16. 52
17. 60
18. Mr. Karl enters the fray as an Independent candidate and garners all the votes from elected council members from these three states. What is the maximum possible number of MPs, who vote for the candidates supported by their respective parties, such that Mr. Karl still manages to win the election?
19. 478
20. 269
21. 271
22. 538
23. 519
24. Given that one party enjoys majority in two state assemblies and the other party enjoys majority in the other remaining state and the Parliament. If all the elected members vote for the candidate supported by their respective parties, then what can be the maximum possible difference in votes (after due weight) received by Ms. Pratt and Mr. Shake?
25. 378
26. 388
27. 372
28. 392
29. 384

DIRECTIONS for Questions 21 to 25: Answer the questions on the basis of the information given below.
Upon noticing the sudden increase in absenteeism in an office, the concerned HR manager hired a consultant to analyse the employees' attendance data. The data was regarding four particular employees of the company and the number of days on which they were physically present in the company in a month consisting of 30 days. The HR manager did not provide the consultant with direct information on the number of days on which these four particular employees were present. Instead, he chose two of these four particular employees at a time, added the number of days on which they had been present and collated the six numbers so obtained in column-figures in descending order. Just before going through the data, the consultant spilled his coffee onto it because of which the column figures numbered 3,4 and 5 became illegible. The table, after the spilling of coffee, started appearing as shown below.

| Columns | $\mathbf{1}$ | $\mathbf{2}$ | $\mathbf{3}$ | $\mathbf{4}$ | $\mathbf{5}$ | $\mathbf{6}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Sum of number of days on which each employee <br> was present, taken two at a time | 51 | 49 |  |  |  | 40 |

Number of days on which the four particular employees were absent in that month are distinct integers. There is no such day in this particular month on which all the four particular employees were absent.
21. Column figure numbered 5 actually should read

1. 41
2. 42
3. 44
4. 45
5. 46
6. If one of the illegible column figures reads 45 , then which of the following is true?
7. One of the other illegible column figures reads 46 .
8. One employee was present on only 25 days of the month.
9. One employee was present on only 23 days of the month.
10. One employee was present on only 21 days of the month.
11. One employee was present on only 19 days of the month.
12. Eksa was the second employee, if the 4 employees are arranged in the ascending order of the days on which they were present in the month. What could have been the maximum possible number of days on which Eksa was present?
13. 25
14. 24
15. 23
16. 22
17. 21
18. When the consultant called up the HR manager and told his problem, all that the HR manager could remember was that the column figure numbered 3 is the addition of the number of days for the two employees who were present on the maximum and the minimum possible number of days. Which of the following is column figure numbered 3 ?
19. 43
20. 44
21. 45
22. 46
23. 47
24. Which of the following can never be the number of days on which exactly three of the four particular employees were present in that month?
25. 2
26. 4
27. 5
28. 11
29. 20

DIRECTIONS for Questions 26 to 30: Answer the questions on the basis of the information given below.
In Tekishi's Castle, five events viz. Bridge the Gap, Dragon Lake, Fortress, Giant Maze and Muddy Waters (in that order only) are organised one after the other from Monday to Friday. On each day all the mentioned events take place. However, on a particular day a participant starts from Bridge the Gap and moves to the next event only when he/she successfully completes the previous event. On each day participants keep moving to the next event till they reach Muddy waters or they are engaged in those events till they are not able to successfully complete any one of the events. All the participants reaching the event 'Muddy Waters' successfully complete it. Those participants, who are unable to successfully complete an event in a particular day, are termed as 'rollover participants' for that day. Rollover participants for a particular day, return the next day to participate in the same event which they were not able to successfully complete the previous day. New participants coming each day are termed as 'fresh participants'. The following table gives the data about the number of participants in various events from Monday to Friday in a particular week. There were no rollover paricipants from the preceeding week.

|  | Bridge the <br> Gap | Dragon <br> Lake | Fortress | Giant <br> Maze | Muddy <br> Waters |
| :--- | :---: | :---: | :---: | :---: | :---: |
| Monday | 25 | 23 | 20 | 14 | 11 |
| Tuesday | 28 | 22 | 24 | 26 | 20 |
| Wednesday | 20 | 18 | 13 | 13 | 13 |
| Thursday | 25 | 27 | 20 | 16 | 12 |
| Friday | 22 | 18 | 22 | 24 | 22 |

26. Which of the following accommodated the maximum possible number of rollover participants?
27. Dragon Lake on Thursday
28. Bridge the Gap on Tuesday
29. Bridge the Gap on Friday
30. Bridge the Gap on Wednesday
31. Dragon Lake on Wednesday
32. What can be the maximum possible ratio of number of fresh participants reaching 'Muddy Waters' on Tuesday to the number of fresh participants in 'Bridge the Gap' on Tuesday?
33. $7: 9$
34. $9: 14$
35. $5: 7$
36. $10: 13$
37. $9: 13$
38. Rollover participants on Tuesday only are allowed to participate again only a day after the immediately following day and all the other conditions remain the same. Find the sum of number of rollover participants in all the events on Thursday.
39. 29
40. 30
41. 22
42. 25
43. 28
44. What is the maximum possible number of total rollover participants on any day?
45. 21
46. 19
47. 25
48. 23
49. 22
50. Which event showed the maximum possible 'Variation' (Maximum number of rollover participants among the given five days - Minimum number of rollover participants among the given five days) during the given week?
51. Giant Maze
52. Bridge the Gap
53. Fortress
54. Dragon Lake
55. Cannot be Determined

## SECTION - II

## Number of questions $=\mathbf{3 0}$

DIRECTIONS for Questions 31 to 35: The sentences given in each question, when properly sequenced, form a coherent paragraph. Each sentence is labelled with a letter. Choose the most logical order of sentences from among the given choices to construct a coherent paragraph.
31. A. This is a fault.
B. The highest as the lowest form of criticism is a mode of autobiography.
C. The critic is he who can translate into another manner or a new material his impression of beautiful things.
D. The artist is the creator of beautiful things; to reveal art and conceal the artist is art's aim.
E. Those who find ugly meanings in beautiful things are corrupt without being charming.

1. ABCDE
2. DCBEA
3. BAEDC
4. EBCDA
5. DEABC
6. A. To paraphrase Nietzsche, the existentialists had killed God.
B. One is thus left wondering what to make of The Fall, steeped as it is in Christian imagery and thought.
C. Camus throughout his life was very much a secular philosopher.
D. Perhaps as he reached middle age Camus was questioning the relentlessly amoral, selfcentered worldview of the existentialists.
E. Lack of hostility toward Christianity does not of course imply acceptance.
7. ECBDA
8. CBDEA
9. BECDA
10. CDBEA
11. BCEDA
12. A. In effect, labour becomes warm hot bodies applying muscle not brains.
B. Education and training adds to the stock of 'human capital'.
C. In conventional terms, labour refers to the physical and mental effort of a human being applied to the production of goods and services.
D. Labour, unlike capital, has been subject to definitional reduction through time rather than expansion.
E. Similarly, entrepreneurship and management have become detached from labour.
13. BEDCA
14. CDBEA
15. DCEAB
16. ACBED
17. ECDAB
18. A. Ignorance is the opposite of knowledge, i.e., want of knowledge.
B. To deal with uncertainty and ignorance economists have recognized the entrepreneur as possessing this non-rational form of knowledge.
C. Like some ancient priest-king, the entrepreneur 'knows' the future and leads his people.
D. Entrepreneurial knowledge is essentially intuitive.
E. It involves seeing and realizing a vision of future markets, products and/or other opportunities.
19. CBADE
20. DCABE
21. ABDEC
22. DEABC
23. BCEDA
24. A. Wonder is marvellous, but it is also cruel, cruel, cruel.
B. We have paid a terrible price for our education, such as it is.
C. Of course, wonder is costly because it is the antithesis of the anxiously worshipped security.
D. The Magian World View, in so far as it exists, has taken flight into science.
E. We have educated ourselves into a world from which wonder has been banished.
25. BDECA 2. EDACB 3. ACBDE 4. DCBAE 5. CABED

DIRECTIONS for Questions 36 to 40: The passage given below is followed by a set of five questions. Choose the most appropriate answer to each question.

Voltaire, like many others before and after him, was awed by the order and the beauty of the universe, which he thought pointed to a supreme designer, just as a watch points to a watchmaker. In 1779 , a year after Voltaire died, that idea was attacked by David Hume, a cheerful Scottish historian and philosopher, whose way of undermining religion was as arresting for its strategy as it was for its detail. Hume couldn't have been more different from today's militant atheists.

In his "Dialogues Concerning Natural Religion," which was published posthumously, and reports imaginary discussions among three men, Hume prized apart the supposed analogy between the natural world and a designed artifact. Even if the analogy were apt, he pointed out, the most one could infer from it would be a superior craftsman, not an omnipotent and perfect deity. And, he argued, if it is necessary to ask who made the world it must also be necessary to ask who, or what, made that maker. In other words, God is merely the answer that you get if you do not ask enough questions. From the accounts of his friends, his letters, and some posthumous essays, it is clear that Hume had no trace of religion, did not believe in an afterlife, and was particularly disdainful of Christianity. He had a horror of zealotry. Yet his many writings on religion have a genial and even superficially pious tone. He wanted to convince his religious readers, and recognized that only gentle and reassuring persuasion would work. In a telling passage in the "Dialogues," Hume has one of his characters remark that a person who openly proclaimed atheism, being guilty of "indiscretion and imprudence," would not be very formidable.

Hume sprinkled his gunpowder through the pages of the "Dialogues" and left the book primed so that its arguments would, with luck, ignite in his readers' own minds. And he always offered a way out. In "The Natural History of Religion," he undermined the idea that there are moral reasons to be religious, but made it sound as if it were still all right to believe in proofs of God's existence. In
an essay about miracles, he undermined the idea that it is ever rational to accept an apparent revelation from God, but made it sound as if it were still all right to have faith. And in the "Dialogues" he undermined proofs of God's existence, but made it sound as if it were all right to believe on the basis of revelation. As the Cambridge philosopher Edward Craig has put it, Hume never tried to topple all the supporting pillars of religion at once.

In Paris, meanwhile, a number of thinkers began to profess atheism openly. They were the first influential group to do so, and included Denis Diderot, the co-editor of the Enlightenment's great Encyclopédie, and Baron D'Holbach, who hosted a salon of freethinkers. Hume visited them, and made several friends there; they presented him with a large gold medal. But the philosophers were too dogmatic for Hume's taste. To Hume's like-minded friend the historian Edward Gibbon, they suffered from "intolerant zeal." Still, they represented a historical vanguard: explicit attacks on religion as a whole poured forth within the next hundred years.

Since all the arguments against belief have been widely publicized for a long time, today's militant atheists must sometimes wonder why religion persists. Hitchens says that it is born of fear and probably ineradicable. Harris holds that there are genuine spiritual experiences; having kicked sand in the faces of Judaism, Christianity, and Islam, he dives headlong into the surf of Eastern spirituality, encouraging readers to try Buddhist techniques of meditation instead of dangerous creeds. Dawkins devotes a chapter, and Dennett most of his book, to evolutionary accounts of how religion may have arisen and how its ideas spread. It's thin stuff, and Dennett stresses that these are early days for a biological account of religion. It may, however, be too late for one. If a propensity toward religious belief is "hard-wired" in the brain, as it is sometimes said to be, the wiring has evidently become frayed. This is especially true in rich countries, nearly all of which-Ireland and America are exceptions-have relatively high rates of unbelief.

After making allowances for countries that have, or recently have had, an officially imposed atheist ideology, in which there might be some social pressure to deny belief in God, one can venture conservative estimates of the number of unbelievers in the world today. Reviewing a large number of studies among some fifty countries, Phil Zuckerman, a sociologist at Pitzer College, in Claremont, California, puts the figure at between five hundred million and seven hundred and fifty million. This excludes such highly populated places as Brazil, Iran, Indonesia, and Nigeria, for which information is lacking or patchy. Even the low estimate of five hundred million would make unbelief the fourth-largest persuasion in the world, after Christianity, Islam, and Hinduism. It is also by far the youngest, with no significant presence in the West before the eighteenth century. Who can say what the landscape will look like once unbelief has enjoyed a past as long as Islam's-let alone as long as Christianity's? God is assuredly not on the side of the unbelievers, but history may yet be.
36. According to the passage, which of the following statements best describes the difference between Voltaire and Hume?

1. Voltaire was in awe of the cosmos whereas Hume was unmoved.
2. Voltaire was daunted by nature while Hume was the mundane historian.
3. Voltaire was a deist and Hume a zealot.
4. Hume disputed Voltaire's notion of the transcendental originator.
5. Hume affirmed religious theories in a veiled manner unlike Voltaire.
6. Why, according to the passage, does Hume adopt a veneer of complaisance in his writings?
7. Because Hume prized apart the analogy of the supreme craftsman.
8. Because Hume questioned the existence of the perfect deity.
9. Because he was facile in his dissuasion.
10. Because he was disdainful of Christianity.
11. Because he did not believe in an afterlife.
12. According to the third paragraph, Hume's recurring strategy pointed to his main objective, which was to:
13. Sprinkle enough anti Christ ammunition in the public.
14. Instigate readers to rebel against their faith.
15. Kindle the minds of the readers against miracles.
16. Implant moral reasons to believe in God.
17. Innervate and invoke mistrust towards one's faith.
18. What, according to the author, could be the reason for Hume's rejection of the intellectuals?
19. That they professed atheism under the garb of knowledge.
20. That they were fearful of intolerance.
21. That they represented a radical religious sect.
22. That the authoritarian liberals were fractious.
23. That they were inciting freethinking.
24. What, according to the passage, is not a reason for the spread of unbelief?
25. The 'wiring' has since become frayed.
26. There is an officially imposed ideology.
27. The rich countries are turning atheist.
28. There are genuine spiritual experiences.
29. People are possibly getting biologically turned off.

DIRECTIONS for Questions 41 to 45: Each of the following questions has a paragraph from which the last sentence has been deleted. From the given options, choose the one that completes the paragraph in the most appropriate way.
41. Beneath the surface of conscious and volitional knowledge, however, lies the twin domains of the personal and 'collective unconscious' or "a structural layer of the human psyche containing inherited elements, distinct from the personal unconscious". Socrates is famous for, among other things, recognizing that one knows but knows not that one knows. Such knowledge forms part of the personal unconsciousness and the Socratic method is a traditional way of raising such knowledge to consciousness.

1. Another is the 'talk therapy' of analytic and Freudian psychology.
2. As to the collective unconscious, it "contains the whole spiritual heritage of mankind's evolution, born anew in the brain structure of every individual".
3. Analytically, access to such collectively unconscious knowledge is through active imagination.
4. Ambiguity plagues analysis of knowledge due to its biological roots.
5. Therefore, ultimately, all knowledge is personal \& tacit.
6. Critics often argue that the ability to effect structural change is limited in ethical consumerism. They cite the preponderance of niche markets as the actual effects of ethical consumerism. Critics also argue that ethical consumerism is fundamentally anti-democratic. In their view, the act of buying is considered as a vote, and the number of votes does not equal one per individual. Instead the more money an individual (corporation, government, university etc.) has the more votes they have in the market place.
7. Critics also argue that the continued reliance on inherently anti-democratic methods leads to societies that no longer understand or desire engaged citizenry.
8. This viewpoint suggests, though, that for a democratic system to be fair, vote distribution must be equal for all viewpoints.
9. The distribution of wealth therefore leads to an unfair distribution of votes.
10. A small group having few votes is irrelevant, means nothing and/or can have no influence.
11. Some argue that "Shopping is more important than voting".
12. The belief in temporary incarnation or inspiration is worldwide. Certain persons are supposed to be possessed from time to time by a spirit or deity; while the possession lasts, their own personality lies in abeyance, the presence of the spirit is revealed by convulsive shiverings and shakings of the man's whole body, by wild gestures and excited looks, all of which are referred, not to the man himself, but to the spirit which has entered into him; and in this abnormal state all his utterances are accepted as the voice of the god or spirit dwelling in him and speaking through him.
13. But in the southern islands of the Pacific the god frequently entered the priest, who moved and spoke as if entirely under supernatural influence.
14. In this respect there was a striking resemblance between the rude oracles of the Polynesians, and those of the celebrated nations of ancient Greece.
15. Thus, for example, in the Sandwich Islands, the king, personating the god, uttered the responses of the oracle from his concealment in a frame of wickerwork.
16. As soon as the god was supposed to have entered the priest, the latter became violently agitated, and worked himself up to the highest pitch of apparent frenzy.
17. In this state he often rolled on the earth, foaming at the mouth, and revealed the will of the god.
18. Rare is the artist who can suffuse his work with so much ambiguity and still intrigue. The known career of Stanley Kubrick encompasses an acknowledged 13 movie features, one withdrawn movie feature, several short documentaries, and a myriad number of photo spreads. Controversy surrounded many of these projects. On a surface level, Kubrick seemed willing to alienate the audience for his desired effects. Yet the constant control and manipulation of all things surrounding his work also freed it up to interpretation. One knows, for the most part, that one is watching a Kubrick movie - its authorship is clear.
19. Our speculation is further encouraged by Kubrick's secrecy surrounding both his life and his film projects - a state of control that remains fairly unparalleled among most popular artists.
20. Easy speculation follows the interpretation, but it is more of a challenge to dig beneath the popular veneer and debate the actual man and his deeper meanings.
21. His is a career shrouded in myth and frustrating mystery.
22. Yet we must persevere and try to understand what little we can of this particular artist's story, even though it may demand a precision and incisiveness that no single writing can attain.
23. It may not be entirely correct to call Kubrick a child prodigy.
24. How does the media of today working with the most sophisticated electronic equipment compare with the past? How can they be worse when events today are portrayed in "real time?" Both the press and televised news have been guilty of many sins. In spite of all the great advances in the technology of communications, what unites them over more than a hundred years has been the "rush to judgment" in order to out-scoop rivals. Newspaper journalists could always excuse the need to meet deadlines with the explanation that it was not possible to wait and find confirmation in the field because they lacked the technical "eyes and ears" of information gathering that would allow them to check the validity of their sources.
25. An examination of several historical examples will clarify the difference.
26. The reporter's of today's televised news are of a different order.
27. They have been raised on appreciating visual images as "reality" with the fill-in provided by a reporter.
28. Unlike the previous generations of newspaper readers, they do not dispose of the same leisure time to wade carefully through follow-up reporting.
29. They knew however that the readers would expect follow-up reporting to verify and interpret events with careful research and analysis.

DIRECTIONS for Questions 46 to 50: The passage given below is followed by a set of five questions. Choose the most appropriate answer to each question.

Historically in American fiction, tackling work has fallen overwhelmingly to the realist novelist. Fancy and imaginative play don't enter business, the earnest writer concludes. Why, then, should they inform a literature about business? In the 19th century, William Dean Howells, a contemporary of Henry James and Mark Twain, delivered the best example of this earnestness in The Rise of Silas Lapham. Howells split the difference between the worldly James and the folksy Twain and arrived at Lapham, a roughneck from Vermont who makes a fortune in the paint business, but fails miserably at negotiating the rarefied climes of Boston society.
The gentle comedy of manners that follows is the calm before the storm: Lapham makes a series of foolish but principled business decisions that sends him to the brink of bankruptcy, and he's forced to beat a retreat back to his Vermont sanctuary with a mere fraction of his wealth. He can rest soundly, however, in the knowledge that he is buttressed by a loving family and that he has conducted his business honourably - facts no doubt reassuring to Howells's Gilded Age audience. The rise of Silas Lapham is not a financial one but a moral one, and less a rise than a reaffirmation.

All that comfort ends in the new century with The Financier, Theodore Dreiser's first instalment of his Cowperwood trilogy. Dreiser modelled Frank Cowperwood on the traction magnate Charles Tyson Yerkes, who owned half of Chicago's public transport until he was jailed for embezzlement in the 1870s. Cowperwood's life follows Yerkes's like a remora upon a shark. When confronted with ruin, Cowperwood conspires to save himself, which sets off a domino effect in which all the other characters do the same - and to hell with everyone else. Again, realism carries the day, as The Financier updates Silas Lapham's rise-and-fall paradigm with Dreiser's depiction of the moral relativity of commercial life and the supremacy of the individual's self-interest. The world presented was the real one, and Dreiser's message, in stark journalistic prose, was its need for reform. With time to reflect upon Gilded Age excess, literature demanded someone with an advocating heart, savouring in exposé and social awareness.

The rise-and-fall paradigm, which has modern-day iterations in Tom Wolfe's satiric The Bonfire of the Vanities and Philip Roth's bleak, beautiful American Pastoral, made the work novel feasible by turning it, first, into a comedy of manners, and then into a morality tale. It enters its next phase as a broad social indictment with Sinclair Lewis's Babbitt. Whereas Silas Lapham and Frank Cowperwood were avatars of wealth, respect and power, Babbitt is a middling, middle-aged, middle

American, "nimble in the calling of selling houses for more than people could afford to pay". By turning his attention away from the elite towards the everyman, Lewis unveils the stultifying conformity of mowed lawns and motorcars and conservative political views that, to his dismay, had gripped middle America between the world wars. Despite Babbitt's attempts to break free from that conformity, his nerve fails. He has no will to buck the trends of main street and no conviction if conviction comes at the expense of business. His fall is really just a sinking back into the social expectations established by his associates. What remains for him, if not the succour of Silas Lapham's unified family - Babbitt, like Cowperwood, is an unfaithful husband - is the hope that his son will have the courage for independence he lacked.

After Babbitt, war and economic depression take literary precedent as subjects over the pitfalls of business, and we get Hemingway and Steinbeck and Let Us Now Praise Famous Men. But when the second world war ends, Babbitt's literary descendents are born: Tom Rath in Sloan Wilson's The Man in the Gray Flannel Suit, and the more vicious Frank Wheeler in Richard Yates's Revolutionary Road. These two novels - the first ending with an affirmation of 1950s family values, the second ushering in the bleak divisions of the 1960s - depict with relentless fidelity the charade of business life in relation to the more gruesome work of the killing done in war, as well as the pettiness and oppression of social striving, financial concerns and attendant family strife.

Rath and Wheeler both bemoan their deadening jobs ("the dullest job you can possibly imagine," says Wheeler) and cast sceptical eyes on the earnest endeavours of those who find satisfaction in their work. If Babbitt could turn glum, the characters in The Man in the Gray Flannel Suit and Revolutionary Road are woefully disaffected - especially Wheeler, whose theatricality is on a par with Hamlet's and who can barely contain several fancies of violent rage. Conformity bears down on both men worse than it did on Babbitt, but without Babbitt's hope for the next generation. By Frank Wheeler's time, children are nothing but an excuse, like the Veritype and the Dictaphone, for another drink. Rath and Wheeler are paradigms of characters who work merely as a means to an ever more hazy end, and they're not happy about it. They romanticise the war ("It's a little like the way I felt going up to the line the first time, in the war," says Wheeler, "... this terrific sense of life. I felt full of blood"), in essence longing for the thrill and fulfilment of way-of-life work.
46. In the context of American fiction, according to the passage, business can be best delivered by:

1. The Imaginative
2. The Earnest
3. The Folksy
4. The Pragmatist
5. According to the passage, The Rise of Silas Lapham, can be termed a success because:
6. It is a comedy of manners.
7. It marks a righteous moment.
8. Lapham is an invaluable roughneck.
9. Silas is a failure at negotiating society.
10. It is not just a financial success.
11. According to the passage, the domino effect in the Cowperwood story entrenches which of the following theories:
12. The rise-and-fall paradigm.
13. The moral excesses of commercial life.
14. Pre-eminence of self-possession.
15. The need for reform.
16. The battle between the self and the society.
17. Why, according to the passage, does Lewis turn his attention away from the elite towards the Everyman?
18. Lewis wanted to usher in social reform.
19. Lewis wanted to make Everyman the center of social attention.
20. Babbit was established as the archetypal Everyman
21. Lewis wanted to depict the chasm in the society
22. Lewis wanted to bare the languish possessing the society.
23. The statement "the dullest job you can possibly imagine," best delineates which one of the following?
24. The depiction of hard-core business.
25. The pettiness and oppression of striving.
26. The lamentably antagonistic frame of mind.
27. The persistence of the bleak divisions of the ' 60 s .
28. The hankering for thrill and fulfillment.

DIRECTIONS for Questions 51 and 52: The following questions consist of two words each that have a certain relationship with each other followed by alternatives. Select the alternative that has the same relationship as depicted in the original pair of words.
51. Credulous : Believe

1. Peevish : Irritate
2. Avaricious : Lust
3. Lecherous : Greed
4. Soporific: Walk
5. Malevolent : Death
6. Minatory : Irreprehensible
7. Nugatory : Jejune
8. Callous : Torpid
9. Stentorian : Consonant
10. Stridulous : Craggy
11. Prelection : Harken

DIRECTIONS for Questions 53 to 55: The following statements may have some grammatical errors in them. Mark (1) if there is one error, mark (2) if there are two errors, Mark (3) if there are three errors, mark (4) if there are more than three errors, mark (5) if there is no error.
53. The cabinet minister said that in his opinion he thought that the draft should be returned back to the selection committee.
54. Anyone wishing to enroll in the exercise and fitness program due to start next month should send in their application before the end of next week.
55. Many linguists are not aware that each one out of ten English speaking adults in the city lack critical communication skills.

DIRECTIONS for Questions 56 to 60: The passage given below is followed by a set of five questions. Choose the most appropriate answer to each question.

Entering the teaching profession is most challenging in the early moments when one is unacquainted with what lies ahead. To have mastered the role of student in a school does not lead naturally to an easy execution of the role of teacher. Indeed, new teachers often experience their students as unpredictable; many wonder if they will ever be able to gain a feeling of control over "the classroom". Soon, however, after a few years of stumbling they gain a mastery of the textbooks and their associated pedagogical devices. They begin to see a repetitive pattern in the way that students tend
to respond to the certain problems and issues and, most importantly, they begin to remember which of their responses were effective in which contexts. The key to their success is confinement. They must learn within the already determined environment of the textbook to focus student attention on the key issues, which in linked sequence provide the essence of a stage of the mastery of a discipline. This isolation and clear pedagogical linking of the important stuff also provides the instructor with a defensible matrix of expectations against which fair evaluation can take place. Essential to the teacher, and somewhat available in the intellectual structure of the textbook, is a refined developmental sense of what is appropriate at which age level. Given the body of material a teacher must cover, time demands that repetition be eliminated and that only those things, which are age appropriate, no more and no less, be the stuff of each year's work. The teacher's willingness to commit himself to being part of a team by working within the specific segment of the curricular pie for which he is responsible is a significant sign of professional maturity. To know the sequences of instruction and to know his place in them increases the degree of predictability of each day and hence adds significantly to the ease and comfort of professional life.

Virgil's greatness as a guide and teacher for Dante rested in his understanding that his student must experience, either directly or vicariously, all the possibilities of the human soul before discussion would be of value. Accordingly, Virgil seldom offered tuition but most often responded to questions, which emerged from the intense experiences of traveling the underworld. The postmodern school with its emphasis on student inquiry will introduce the element of unpredictability into daily discourse and disturb any possibility of the routinization of the educational discourse. Responding constantly to questions emerging from students' experience, teachers will re- assume the Socratic mantle and reverse the progressive de-skilling the profession has undergone since the Industrial Revolution.

Ethical "conversation" in schools focuses often on socializing the young to behaviors adults have deemed needed for a successfully functioning society. If one adds to this the additional voices which urge self-understanding, free inquiry, and often a humanist ethic staunchly opposed to the competitive forces which shape the society, then one hardly wonders at the confusion of the young who learn only the lesson that the adult world thrives on contradiction and a self-serving hypocrisy. Consider the possibility of whether the dismantling of the competitive apparatus of the school and the establishment of the faculty in the position of respondents would not also eliminate much of the contradiction in the public conversation and in turn reduce the number of voices needed to be reconciled by the students.

The exigency of the modern school, that tuition requires simultaneity of time and place, will not be a restraining structure of the postmodern school. Through the use of advanced systems of electronic mail students can log queries addressed to their teachers or classmates and, then, check for their answers when they can. This exchange is of course not constrained by geography. Questions can be logged from either within the school through a network or from without via modem. The same technology facilitates scheduling live exchanges. Without the tyranny of the single focus of the textbook as the information core of the process, one could imagine in a networked computer environment attentional foci changing as the teacher and students shift from attending to a large screen suitable for a hundred to working in small groups around workstations to individuals pursuing research on notebook computers linked to a server by a radio coupling. This requires a flexibility in the learning environment-walls which are soundproof and move, computer stations which are comfortable for four but recede when a group of the whole is formed, work surfaces which are suitable for notebooks but disappear when necessary.

The information logistics of the curriculum, the quantity and quality available without travail, decrease or increase the capacity of the curriculum to act as a competitive game-board. In the modern school each student focuses as much on others as on the work at hand in order to catch a glimpse of where colleagues are in the race to master the same information. In the postmodern
school the information resources will be expanded and the points of departure multiplied to a degree that each student will travel a path distinctly her own, albeit within the orbit of a single question/area of investigation. The learning environment will be composed of students seeking to pursue individual questions and then coming together to coordinate their results. Cooperation will follow the natural need to understand. When a students travel individual paths within a single complex and multidimensional subject area, they will, out of their own deep sense of insufficiency, seek to complement their own work with that of others.
56. According to the passage, the role of the teacher gradually undergoes a change, because

1. One gets unacquainted with what lies ahead.
2. The unpredictable nature of students helps their progress.
3. They were good students so they are natural teachers
4. They begin to mature with age.
5. They consider feedback with implication to situations.
6. The author cites 'confinement' as key to the teacher's success because according to the passage
7. It's important to work out a matrix.
8. Mastery of a discipline is essential
9. The intellectual structure of the text offers a sense of development.
10. The textbooks need to be mastered.
11. Constraint within the textbook endows adeptness
12. According to the author, as a teacher, what is the intrinsic reason for Virgil's greatness?
13. Virgil seldom offered tutelage to the students.
14. He responded directly to the students' questions.
15. He displayed perspicacity in all his dealings with students.
16. Virgil understood student experience and exposure.
17. Virgil inferred that deliberation followed experience.
18. Which of the following cannot advance the reversal of the progressive de-skilling the profession has undergone?
19. The process of preparing for intense travel experiences.
20. The process of responding to student queries.
21. The introduction of inquiry into the discourses.
22. Responding to students' experiences.
23. Assuming the Socratic mantle.
24. Which of the following will be an appropriate title for the passage:
25. The modern school.
26. Old wine in new bottles
27. New wine in new bottles
28. Teaching: a noble profession
29. Pedagogy down the ages.

## SECTION - III

## Number of questions $=\mathbf{3 0}$

61. If $\left|2-\frac{3}{x}\right| \leq \frac{1}{3}$ and $\left|3-\frac{x}{y}\right| \leq \frac{1}{6}$, where $x$ and $y$ are positive real numbers, then which of the following can be a possible value of $\frac{x^{2}}{2 x-y}$ ?
62. $\sqrt{3}-1$
63. $\sqrt{2}$
64. $\frac{1}{\sqrt{2}}$
65. $\frac{\sqrt{3}}{2}$
66. $\sqrt{\frac{3}{2}}$

DIRECTIONS for Questions 62 and 63: Answer the questions on the basis of the information given below.
Ayesha started running from one end of a straight road at 0500 hrs . Bhumika, standing at the other end of the road, started running towards Ayesha at 0600 hrs and met Ayesha at a point P on the road. They continued running till they reached the opposite ends, turned back immediately and coincidently met again at the same point $P$.
62. If they met at the point P for the first time at 0700 hrs , then what is the ratio of the speeds of Ayesha and Bhumika?

1. $1: 1$
2. $1: \sqrt{2}$
3. $\sqrt{2}: \sqrt{3}$
4. $\sqrt{3}: 2$
5. $1: 2$
6. If speeds of Ayesha and Bhumika are $7 \sqrt{3} \mathrm{~km} / \mathrm{hr}$ and $14 \mathrm{~km} / \mathrm{hr}$ respectively, then what is the approximate length of the straight road?
7. 90.5 kms
8. 87.5 kms
9. 75 kms
10. 85 kms
11. 77.5 kms
12. Two concentric circles are drawn with O as the center as shown in the figure given below. The ratio of the area of the annular ring bounded by these two circles and the quadrilateral EBCH is $3 \pi: 2$. Find the ratio of the radii of the smaller circle to the larger circle.

13. $1: 4$
14. $2: 7$
15. $1: 6$
16. $3: 19$
17. $1: 7$
18. There are two numbers A and B . A can be expressed as a product of 13 and a two-digit prime number and B can be expressed as a product of 17 and a two-digit prime number. If the unit's digit of the product of A and B is 7 , then how many distinct products of A and B are possible?
19. 48
20. 55
21. 80
22. 110
23. 120

DIRECTIONS for Questions 66 and 67: Answer the questions on the basis of the information given below.
10 beads and two similar diamond pendants are required to form a diamond necklace.
66. If the beads are similar, then how many different diamond necklaces can be formed?

1. 1
2. 5
3. 6
4. 8
5. 10
6. If the beads are of different sizes, then how many different diamond necklaces can be formed?
7. $\frac{11!}{2}$
8. 11 !
9. 10 !
10. $\frac{11!}{4}$
11. None of these
12. Assume the given sum of the series, $7.5+15.5+10.5+13.0+13.5+10.5 \ldots .+x-y+z$ is 20634, ( $x, y, z>0$ ) then what is the value of the expression $(2 x+3 y+5 z)$ ?
13. 1084
14. 1284
15. 1464
16. 1684
17. None of these
18. A semicircle with center at C and radius equal to 4 units is drawn with AB as the diameter as shown in the figure given below. CDEF is a rectangle such that the ratio of area of the semicircle to the area of the rectangle is $2 \pi: 3$. CE cuts the semicircle at $P$. Find the length of the line segment PB .

19. $\frac{8}{5} \sqrt{5}$ units
20. $\frac{5}{3} \sqrt{5}$ units
21. $\frac{17}{9} \sqrt{5}$ units
22. $\frac{9}{5} \sqrt{5}$ units
5
$\frac{17}{11} \sqrt{5}$ units
23. A customer ordered a fruit seller to prepare a fruit basket with three kinds of fruits namely mangoes, oranges and apples. He instructed him to put 20 fruits, and the fruit seller offered him the basket immediately that contained 20 fruits. Later on, when he returned back to home, his wife asked him if the number of apples are less than the number of oranges; and the number of oranges are less than the number of mangoes in the basket. He answered, "YES". What is the probability that his answer was correct?
24. $\frac{1}{7}$
25. $\frac{13}{77}$
26. $\frac{3}{7}$
27. $\frac{10}{77}$
28. $\frac{3}{19}$
29. Find the sum of the series $S$, where $S=\frac{7}{2 \times 3}+\frac{5}{1 \times 6}+\frac{21}{3 \times 12}+\frac{87}{9 \times 24}+\frac{357}{27 \times 48}+\ldots \ldots . . \infty$.
30. $\frac{13}{3}$
31. $\frac{11}{3}$
32. $\frac{25}{6}$
33. $\frac{23}{6}$
34. 4

DIRECTIONS for Questions 72 and 73: Answer the questions on the basis of the information given below.
Three identical regular hexagons with side $2 \sqrt{3}$ units are drawn on a plane side-by-side as shown in the following figure.

72. Find the minimum possible distance between the points X and Y .

1. $7 \sqrt{5}$ units
2. $9 \sqrt{3}$ units
3. $12 \sqrt{2}$ units
4. $6 \sqrt{7}$ units
5
$10 \sqrt{2}$ units
5. Find the minimum possible distance that an ant needs to cover to reach point $Y$ from point X , if it is not allowed to enter inside any of the three given hexagons.
6. $12 \sqrt{3}$ units
7. $(10+5 \sqrt{3})$ units
8. $(8+6 \sqrt{3})$ units
9. $(9+5 \sqrt{3})$ units
10. $(12+4 \sqrt{3})$ units
11. If the sum of the digits of a three-digit number is subtracted from that number, it results in a two-digit number. This process of subtracting the sum of digits of a number from that number is continued further with that resulting two-digit number also, till we get a factor of the original three-digit number. Which of the following is a factor of the original three-digit number?
12. 5
13. 6
14. 7
15. 11
16. 13
17. Consider the following system of linear equations, in variables $\mathrm{x}, \mathrm{y}$ and z , where $\mathrm{x}, \mathrm{y}$ and z belong to real numbers.

$$
\begin{aligned}
& 2 x+3 y-2 z=0 \\
& 4 x+3 y-3 z=0 \\
& 14 x-6 y-5 z=0
\end{aligned}
$$

Find the number of integral values of $z$ such that $-43 \leq(2 z+y+x) \leq 15$.

1. 21
2. 22
3. 23
4. 20
5. 19
6. In the following figure, the equilateral triangle ABC has an area of $900 \sqrt{3} \mathrm{~m}^{2}$. Points P and Q are the mid-points of AB and AC respectively. Find the area of the shaded region.

7. $64 \sqrt{3} \mathrm{~m}^{2}$
8. $80 \sqrt{3} \mathrm{~m}^{2}$
9. $75 \sqrt{3} \mathrm{~m}^{2}$
10. $72 \sqrt{3} \mathrm{~m}^{2}$
11. $60 \sqrt{3} \mathrm{~m}^{2}$
12. Two numbers have 36 factors each and HCF of these two numbers is 36 . What is the minimum possible LCM of these two numbers if the power of any prime factor in these two numbers is not more than 3 ?
13. $2^{3} \times 3^{3} \times 5^{2} \times 7$
14. $2^{2} \times 3^{2} \times 5^{3} \times 7^{3}$
15. $2^{3} \times 3^{3} \times 5^{2} \times 7^{2}$
16. $2^{3} \times 3^{2} \times 5^{3} \times 7^{2}$
17. $2^{3} \times 3^{2} \times 5^{2} \times 7^{2}$
18. Given that $\mathrm{p}, \mathrm{q}$ and r are the length of three sides of a scalene triangle. If the equation $3 x^{2}+\frac{5 p^{2}}{p+q+r} x+2 p^{2} k^{2}=0$ has distinct and real roots, then which of the following is a possible value of k ?
19. -0.55
20. -0.45
21. 0.6
22. 0.75
23. 1
24. In $\triangle \mathrm{ABC}, \mathrm{D}$ and E are points on side AC such that $\mathrm{AD}: \mathrm{DE}: \mathrm{EC}$ is $2: 1: 1 . \mathrm{BD}$ and BE are joined. Point $F$ divides $B D$ in the ratio $1: 2$ and point $G$ divides $B E$ in the ratio $2: 1$. Find the ratio of the area of $(\triangle \mathrm{AFG}+\Delta \mathrm{BFG})$ to the area of the $\triangle \mathrm{ABC}$.
25. $2: 5$
26. $3: 10$
27. $1: 3$
28. $1: 4$
29. $2: 7$

80 The sum of two numbers $(1 \mathrm{P} 1.431)_{8}$ and $(231.213)_{8}$ is $(234.820 \mathrm{Q} 125)_{10}$. What is the sum of $P$ and Q , where P and Q are single digit numbers?

1. 8
2. 7
3. 5
4. 3
5. 2

DIRECTIONS for Questions 81 and 82: Answer the questions on the basis of the information given below.
250 chocolates are distributed among five friends namely $\mathrm{A}, \mathrm{B}, \mathrm{C}, \mathrm{D}$ and E such that the number of chocolates with A, B, C, D and E form an increasing Arithmetic Progression and the common difference of the arithmetic progression is 1 . In round 1, A gives 1 chocolate to $\mathrm{B}, \mathrm{B}$ gives two chocolates to $\mathrm{C}, \mathrm{C}$ gives three chocolates to D and D gives four chocolates to E . In round 2, E gives 1 chocolate to $\mathrm{D}, \mathrm{D}$ gives two chocolates to C , C gives three chocolates to B and B gives four chocolates to A. In round 3 the transfer of chocolates is exactly in the same way as it was in round 1 and in round 4 the transfer of chocolates is exactly in the same way as it was in round 2.This process is continued till the number of chocolates with any of the friends becomes zero.
81. Find the number of chocolates with E at the end of 37 rounds.

1. 109
2. 110
3. 111
4. 112
5. 113
6. Which of the following cannot be the number of chocolates with $A$ at the end of any particular round?
1.53
7. 71
8. 93
9. 103
10. 119

83 How many integers less than 300 are relatively prime to either 10 or 18 ?

1. 140
2. 141
3. 142
4. 139
5. 138
6. If the three real roots of equation $x^{3}+\left(\frac{1}{\sqrt{p}+\sqrt{q}}\right) x^{2}+\left(\frac{1}{\sqrt{p}-\sqrt{q}}\right) x-1=0$ (where $p \neq q$ ) are the second, fifth and the eighth terms of a geometric progression, then which of the following is true?
7. $\mathrm{q}=0$
8. $p+2 q=0$
9. $q+3 p=0$
10. $p+q=0$
11. None of these
12. Let P be the product of all natural numbers between 45 and 293 that have an odd number of factors. Find the highest power of 12 in P .
13. 9
14. 5
15. 7
16. 8
17. 6
18. Assume $r$, $s$ and $t$ be three distinct integers between 0 and 10 . If $\frac{1}{r}+\frac{1}{s}-\frac{3}{t}=\frac{2}{5 r}$, then find the number of distinct values of $(r+s-t)$.
19. 1
20. 2
21. 3
22. 4
23. 5

DIRECTIONS for Questions 87 and 88: Answer the questions on the basis of the information given below.
There are 170 members in a club. Each one of them belongs to one or more categories out of the four categories viz. Service holder, Professional degree holder, Physically challenged and Married. There are 60 Service holders, 40 Professional degree holders, 50 Physically challenged and 70 Married members.
87. If the number of members who belong to all four categories is maximum possible, then how many members belong to at least three categories?

1. 18
2. 17
3. 16
4. Either (1) or (2) 5.
Either (2) or (3)
5. If there are exactly 10 members who belong to all four categories, then find the maximum possible number of members belonging to only Physically challenged category.
6. 40
7. 35
8. 30
9. 38
10. Cannot be determined
11. A three-digit natural number ' $a$ ' when divided by another natural number N gives remainder 4. Another natural number ' $b$ ' when divided by N gives remainder 3. If ' $b$ ' is twice of ' $a$ ' and the remainder when $(100 a+11 b)$ is divided by 55 is 23 , then find the number of possible values of ' $a$ '.
12. 20
13. 19
14. 18
15. 17
16. 16
17. If $b(a-1)=\sqrt{3} b-1$, then find the value of
$6 a^{2}-4 a+12 \frac{a}{b}+\frac{6}{b^{2}}-\frac{4}{b}$. ['a' and ' $b$ ' are real numbers]
18. $18+9 \sqrt{3}$
19. $20+7 \sqrt{3}$
20. $18+10 \sqrt{3}$
21. $20+8 \sqrt{3}$
22. None of these
