INSTRUCTIONS TO CANDIDATES
(Read the Instructions carefully before answering)

1. Separate Optical Mark Reader (OMR) Answer Sheet is supplied to you along with Question Paper Booklet for recording your responses. Please read and follow the instructions on the OMR Sheet, fill up the required data and mark your responses.

2. Candidate should write the Hall Ticket Number only in the space provided on this page and the OMR Answer Sheet. DO NOT WRITE HALL TICKET NUMBER ANYWHERE ELSE.

3. Immediately on opening this Question Paper Booklet, please check for (i) the same booklet code (A/B/C/D) on each page (ii) serial number of the questions (1 – 200) (iii) the number of pages and (iv) correctness of printing.

IN CASE OF ANY DEFECT, PLEASE REPORT TO THE INVIGILATOR AND ASK FOR REPLACEMENT WITHIN FIVE MINUTES FROM THE COMMENCEMENT OF THE TEST.

4. Adoption of any kind of unfair means at the time of the test or any act of impersonation will result in the invalidation of the claim of the candidate for taking the test and he/she will be subjected to prosecution under the AP Public Examination (Prevention of Malpractice and Unfair means) Rules, 1997.

5. Use of Calculators, Mathematical Log Tables, Pagers, any other Electronic gadgets and loose sheets of paper is strictly prohibited.

6. Darken the appropriate circles of 1, 2, 3 or 4 in OMR Answer Sheet only with the “Blue or Black Ball-Point Pen” corresponding to correct answer to the relevant question number in the sheet. Hence, enough care has to be taken while answering the questions in OMR Answer Sheet by darkening the circles. DARKENING OF MORE THAN ONE CIRCLE AGAINST ANY QUESTION AUTOMATICALLY MAKES THE ANSWER INVALID.

7. Rough work should be done only in the space provided for this purpose in Question Paper Booklet.

8. Once the candidate enters the Examination Hall, he/she shall not be permitted to leave the Hall till the END of the Examination.

9. Ensure that the Invigilator puts his/her signature in the space provided on the OMR Answer Sheet. The Candidate should sign in the space provided on the OMR Answer Sheet.

10. The candidate should write the Question Paper Booklet number and sign in the space provided in the Nominal Rolls.

11. Return the OMR Answer Sheet to the Invigilator before leaving the Examination Hall.

This booklet consists of 32 printed pages (for 200 Questions) including page for Rough Work. Candidate should check this before beginning to answer and bring any discrepancy in this regard to the notice of the Invigilator.
SECTION - A
Analytical Ability

Questions : 75          Marks : 75

(i) Data Sufficiency          (Marks : 20)

Note: • In questions numbered 1 to 20, a question is followed by data in the form of two statements labelled as I and II. You must decide whether the data given in the statements are sufficient to answer the questions. Using the data make an appropriate choice from (1) to (4) as per the following guidelines:

(a) Mark choice (1) if the statement I alone is sufficient to answer the question.
(b) Mark choice (2) if the statement II alone is sufficient to answer the question.
(c) Mark choice (3) if both the statements I and II are sufficient to answer the question but neither statement alone is sufficient.
(d) Mark choice (4) if both the statements I and II together are not sufficient to answer the question and additional data is required.


(a) ఉపరిసరి రేఖాపటాన్ని విశ్లేషించండి. I సమాచారం సాధనంగా విచిత్రం ఉంది. (1) నుంచి (4) వరకు ప్రత్యేక చివరి సమాచారాన్ని నిర్ణయించండి.

(b) ఉపరిసరి రేఖాపటాన్ని విశ్లేషించండి. II సమాచారం సాధనంగా విచిత్రం ఉంది. (2) నుంచి (4) వరకు ప్రత్యేక చివరి సమాచారాన్ని నిర్ణయించండి.

(c) ఉపరిసరి రేఖాపటాన్ని విశ్లేషించండి. I, II చివరి సమాచారాలు సాధనంగా విచిత్రం ఉంది. (3) నుంచి (4) వరకు ప్రత్యేక చివరి సమాచారాన్ని నిర్ణయించండి.

(d) ఉపరిసరి రేఖాపటాన్ని విశ్లేషించండి. I, II చివరి సమాచారాలు సాధనంగా విచిత్రం ఉంది. (4) నుంచి (4) వరకు ప్రత్యేక చివరి సమాచారాన్ని నిర్ణయించండి.
1. What is the positive integer n not exceeding 180?
   180 లక్షణ ఉపేరడానికి మినంతి నూనే ఎంత?
   I. n is divisible by 7.
      7 లు నూనెంచుకుంటుంది.
   II. n is divisible by 13.
      13 లు నూనెంచుకుంటుంది.

2. If ABCD is a square and E is a point on BC, then what is the area (in square units) of AEC?
   ABCD మైగా ABCD మైగా E అనే పేది BC పై రే, తదు ఆ ఎంచుకుంటుంది AEC విస్తీర్ణం (చతురస్ర దప్పలు) ఎంత?
   I. BE = 6
   II. BE : EC = 1 : 2

3. What is the shape of the playground?
   ప్లేగర్డాయ్ శామ్భావ్ ఎంచుకుంటుంది?
   I. The perimeter of the playground is 440 m
      ప్లేగర్డాయ్ వంటి 440 మీ. ఉపయోగించబడింది.
   II. The area of the ground is 15400 sq. m.
      ప్లేగర్డాయ్ స్థాయి ప్రాంభికత పరిమితి 15400 చ. మీ.

4. What is the remainder when n is divided by 8?
   n లు నూనెంచబడితే అయితే 8 ద్వారా లేను బట్టి ఎంత?
   I. The digit in units place of n is 8.
      n లు వంటి చివరు సంఖ్య 8 ఉంది.
   II. n is the product of eight consecutive positive integers.
      n యు ఆறే స్థాయి తొలి సంఖ్యల వంటి 8 కాకిదశాలు ఉండాయి.

5. What is the greatest common divisor of numbers a and b?
   a మరియు b అంటే సంఖ్యల మధ్య మినము ఎంత?
   I. The least common multiple of a and b is 15.
      a మరియు b ని మినము వంటి 15 ఉంది.
   II. a + b = 15.

6. What is the average of a, b, c and 5?
   a, b, c, 5 ని మధ్యవర్గ ఎంత?
   I. 5(a + b + c) + 4 = 45.
   II. a + b = c + d.

7. What is the value of \( \frac{x^2}{y^2} + \frac{y^2}{z^2} \)?
   \( \frac{x^2}{y^2} + \frac{y^2}{z^2} \) ఎంచుకుంటుంది?
   I. \( \frac{(x+y)^2}{yz} = 100 \)
   II. \( x = 2z \)
8. Is \( xy < 0 \) ?
   \( xy < 0 \) ఎంచుకోవచ్చు?
I. \( 5|x| + 3|y| = 0 \)
II. \( 5|x| = 3|y| \)

9. How much time did A take to reach the destination?
   వాటి రెండు బాయిటులు లో ఎందుకు నడుమాడవచ్చు?
I. The ratio between the speeds of A and B is 3 : 4.
   ఆ, బి గాను విధానం ఉంది 3 : 4.
II. B takes 36 minutes to reach the same destination.
   బి నేటికీ ఎత్తు వేళ్ళు ఉద్యమిత్తున్నది 36 మనిషిలు నిల్వమైనది.

10. What is the slope of a straight line?
   ఒత్తిడి రేఖ గుండర ఎక్కడ ఉండది?
I. The straight line passes through the origin.
   కొన్ని రేఖ ప్రవహించడం ప్రబలానికి అభివృద్ధి ఉంది.
II. The straight line makes an angle 30° with the positive direction of the X-axis.
   రేఖ ప్రవహించడం ప్రభుత్వ దిశ ఉంది 30° నుంచి నిల్వమైనది.

11. In the matrix \( A = \begin{bmatrix} -5 & 20 \\ 2 & -x \end{bmatrix} \), what is the value of \( x \)?
   మెట్‌స్పెసియిల్ \( A = \begin{bmatrix} -5 & 20 \\ 2 & -x \end{bmatrix} \) ఉద్యమిత్తున్నది \( x \) ఎంచుకోవచ్చు?
I. \( A \) is singular.
   \( A \) సంబంధితం.
II. \( A \) is symmetric.
   \( A \) సమాధానం.

12. What is the value of \( a + b \)?
   \( a + b \) ఎంచుకోవచ్చు?
I. \( a \neq b \)
II. \( a^2 - b^2 = a - b \)

13. Is the quadrilateral a square?
   కృతిసుమారు ఎంపు ఉంటాయి?
I. All the sides of the quadrilateral are of equal length.
   కృతిసుమారు వల్ల ఉంటాయి ప్రమాణం వేరు వేరు ఉంది.
II. The diagonals of the quadrilateral are of equal length.
   కృతిసుమారు మిత్రం వల్ల ఉంటాయి వేరు వేరు ఉంది.

14. For positive integers \( x, y \) and \( z \), is the product \( xyz \) even?
   ఉంది ప్రకార ఎంపు ఉంటాయి కొనసాగి ఉంటాయి \( xyz \) ఎంపు ఉంటాయి?
I. \( x + y \) is odd.
   \( x + y \) సింగార ఉంది.
II. \( x + y + z \) is divisible by 7.
   \( 7 \) కంటే \( x + y + z \) ఉంటాయి.
15. What is the monthly salary of A?
   A = Rs. $x$ lakhs?
   I. A gets 15% more than B and B gets 10% less than C.
   B = Rs. $y$ lakhs, C = Rs. $z$ lakhs.
   II. C’s monthly salary is Rs. 2,500.
   C = Rs. $y$ lakhs = Rs. 2,500.

16. Among the real numbers a and b, is b a rational number?
   $a + b$ is a rational number, $a - b$ is a rational number?
   I. $a + b$ is a rational number.
   a + b = $x$ lakhs.
   II. $a - b$ is a rational number.
   a - b = $y$ lakhs.

17. How many persons are there in the library?
   कोण संख्या की लोग हैं ग्राहक?
   I. If 3 persons leave the library, then the library has less than 8 persons.
   यदि 3 बाइले लेते हैं तो शरणार्थी की संख्या 8 से कम रहेगी?
   II. If 3 persons enter the library, then it has more than 12 persons.
   यदि 3 लोग शरणार्थी आते हैं तो तो आवश्यक होगी 12 से अधिक शरणार्थी रहेगी?

18. In the figure given below, what is the value of $\alpha + \beta + \gamma + \delta$?
   $\alpha + \beta + \gamma + \delta$ कौन सा है?
   \[\begin{align*}
   \alpha + \beta &= 90^\circ \\
   \theta + \phi &= 90^\circ
   \end{align*}\]

19. How much is $(x + y) : (x - y)$?
   $(x + y) : (x - y)$ कितना है?
   I. $x : y = 3 : 2$
   II. $x > 0$, $y > 0$

20. If $p(x)$ is a polynomial, is $(x - 2)$ a factor of $p(2x^2 - 1)$?
   $p(x)$ एक बहुपद है तो $(x - 2)$ $p(2x^2 - 1)$ का पूरक है?
   I. $x - 1$ is a factor of $p(x)$.
   $p(x)$ एक विभाज्य है?
   II. $x - 7$ is a factor of $p(x)$.
   $p(x)$ एक विभाज्य है?
A

(ii) Problem Solving

(Marks : 55)

(a) Sequences and Series

(Marks : 25)

Note: In each of the questions numbered 21 to 30 a sequence of numbers and letters that follow a definite pattern is given. Each question has a blank space. This blank space is to be filled by the correct answer from one of the four given options to complete the sequence without breaking the pattern.

21. 7 : 49 : : _____ : 63
   (1) 5    (2) 6    (3) 9    (4) 11

22. 81 : 64 : : _____ : 9
    (1) 16    (2) 18    (3) 24    (4) 34

23. AEF : BIJ : : _____ : OUV
    (1) NOP    (2) MPQ    (3) NOQ    (4) NQR

24. DRIVE : EIDRV : : BEGUM : 
    (1) BGMEU    (2) MGBEU    (3) UEBGM    (4) BGMUE

25. E × I : 5 × 9 : : _____ : 15 × 21
    (1) L × K    (2) K × L    (3) O × U    (4) U × O

    (1) BOX    (2) BRB    (3) FSB    (4) FTB

27. BCEH, _____, DGKP, EINT
    (1) CDJG    (2) CJEK    (3) CFIM    (4) CEHL

    (1) I 13 K    (2) I 14 J    (3) I 12 J    (4) I 13 M

29. HOSPITAL : PATIENTS : : SCHOOL : 
    (1) TEACHERS     (2) CLASS ROOMS
    (3) STUDENTS     (4) BLACK BOARDS

30. If the letters D and E are removed from the English alphabet, then the fourth letter is 
    (1) F    (2) C    (3) G    (4) H
15RW-13

Note: In questions 31 to 35 pick the odd thing out:

31. (1) 147 (2) 125 (3) 103 (4) 84
32. (1) (3, 4, 5) (2) (5, 12, 13) (3) (6, 8, 10) (4) (10, 12, 15)
33. (1) April (2) May (3) November (4) September
34. (1) 19/15 (2) 13/11 (3) 7/5 (4) 3/2
35. (1) C 4 E (2) G 8 I (3) L 15 N (4) T 21 V

Note: Each of the questions from 36 to 45 follow a definite pattern. Observe the same and fill in the blanks with suitable answers.

36. 111\(\frac{1}{9}\) 125, 142\(\frac{6}{7}\), ____, 200, 250
   (1) 166\(\frac{2}{3}\) (2) 178\(\frac{4}{7}\) (3) 181\(\frac{2}{5}\) (4) 192\(\frac{3}{7}\)
37. 0, 2, 3, 5, 8, 10, 15, ____, 24, 26, 35
   (1) 19 (2) 18 (3) 17 (4) 16
38. \[\begin{array}{cccc}
1 & 1 & 1 & 1 \\
3 & 5 & 7 & 9 \\
12 & 15 & 18 & 21 \\
25 & 29 & 33 & 37
\end{array}\]
   (1) \(\frac{1}{50}\) (2) \(\frac{1}{51}\) (3) \(\frac{1}{52}\) (4) \(\frac{1}{53}\)
39. 5, 11, 21, 43, 85, ____. 
   (1) 181 (2) 180 (3) 171 (4) 170
40. 75, 105, 165, 195, ____, 285
   (1) 255 (2) 235 (3) 225 (4) 215
41. \[\begin{array}{ccc}
3 & 5 & 9 \\
5 & 9 & 13 \\
3 & 13 & 17
\end{array}\]
   (1) \(\frac{11}{13}\) (2) \(\frac{17}{27}\) (3) \(\frac{15}{19}\) (4) \(\frac{21}{32}\)
42. (1, Z), (8, Y), (27, X), (125, W), ____. 
   (1) (243, U) (2) (243, V) (3) (343, V) (4) (343, U)
43. AEI, CGK, ____, GKO, IMQ 
   (1) ENJ (2) ENJ (3) EIM (4) EMI
44. If \(\{a_n\}_{n=1}^{\infty}\) is such that \(a_1 = a_2 = 1\) and \(a_k = a_1 + a_2 + \cdots + a_{k-1}\) for \(k \geq 3\), then \(a_7 = \) 
   (1) 16 (2) 32 (3) 64 (4) 128
45. The \(n^{th}\) term in the sequence
   \(1, -2, 3, -4, 5, -6, 7, -8, \ldots\) is
   (1) \((-1)^n\) (2) \((-1)^{n-1}\) \(n\)
   (3) \(n\) (4) \((-1)^{n-1} \cdot n\)

P.T.O.
(b) Data Analysis

Note: An automobile company produces four types of vehicles (Cars, Motor bikes, Scooters and Mopeds) at different branches in the country. The production at these units from 2007 to 2012 are given in the table below. Answer the questions 46 to 48 using the table.

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cars</td>
<td>3600</td>
<td>6300</td>
<td>8100</td>
<td>10800</td>
<td>16200</td>
<td>19800</td>
</tr>
<tr>
<td>Motor bikes</td>
<td>7000</td>
<td>12250</td>
<td>15750</td>
<td>21000</td>
<td>31500</td>
<td>38500</td>
</tr>
<tr>
<td>Scooters</td>
<td>8000</td>
<td>14000</td>
<td>18000</td>
<td>24000</td>
<td>36000</td>
<td>44000</td>
</tr>
<tr>
<td>Mopeds</td>
<td>9000</td>
<td>15750</td>
<td>20250</td>
<td>27000</td>
<td>40500</td>
<td>49500</td>
</tr>
</tbody>
</table>

46. The ratio of the number of Cars produced in 2008 to the number of Scooters produced in 2011 is
(1) 37 : 40   (2) 27 : 40
(3) 17 : 40   (4) 7 : 40

47. In which year the total number of the four types of vehicles produced was 62100?
(1) 2007   (2) 2008
(3) 2009   (4) 2010

48. If k : 1 is the ratio of the number of Scooters produced in the year 2011 to the number of Scooters produced in 2007, then k =
(1) 3   (2) 4
(3) 9/2  (4) 2/9
Note: The expenditure under six heads A, B, C, D, E, and F in an year are as given in the following Pie diagram. Answer the questions 49-53 using the diagram.

49. If the total expenditure in an year is ₹ 54,00,000, then the expenditure (in rupees) under the head E in that year is
   (1) 3,60,000  (2) 4,20,000  (3) 6,30,000  (4) 7,20,000

50. If the expenditure under the heads A and B together is ₹ 18,00,000 in an year, then the expenditure under the head D in that year is
   A, B दोनों व्यक्तित्वांशी  ₹ 18,00,000, तरी क्षेत्र D  किती मूल्यांश?
   (1) ₹ 4,20,000  (2) ₹ 4,80,000  (3) ₹ 5,50,000  (4) ₹ 8,50,000

51. If the difference in the expenditure under the heads A and B in an year is ₹ 2.5 lakhs, then the total expenditure (in lakhs of rupees) in that year is
   A, B मध्ये व्यवस्थित व्यवस्थित एकत्र ₹ 2.5 लाख, तरी क्षेत्र A व B किती मूल्यांश?
   (1) 90  (2) 81  (3) 72  (4) 63

52. If the expenditure under the head E in an year is ₹ 3.5 lakhs, then the expenditure (in lakhs of rupees) under the head D in that year is
   E किती मूल्यांश, तरी क्षेत्र D किती मूल्यांश?
   (1) 3  (2) 3.5  (3) 4  (4) 4.5

53. In any year the expenditure under the heads C and F together is equal to
   C, F मध्ये व्यवस्थित एकत्र किती मूल्यांश?
   (1) half of the expenditure on B and F together.
   (2) double the expenditure on C.
   (3) the expenditure on D and E.
   (4) the expenditure on A.
Note:

Given that 
\[ A = \{ n: n \text{ prime}, \ 1 \leq n \leq 20 \} \]
\[ B = \{ n: n \text{ odd}, \ 1 \leq n \leq 20 \} \]
\[ C = \{ n: n \text{ square}, \ 1 \leq n \leq 20 \} \]

Using this answer the questions 54 and 55.

54. \[ B \cap C = \]
   (1) \{1, 4, 9, 16\}   (2) \{1, 3, 5, 7, 9, 11, 13, 15, 17, 19\}
   (3) \phi               (4) \{1, 9\}

55. The number of integers between 1 and 20 which do not lie in \( A \cup B \cup C \) is
   \( A \cup B \cup C \)
   (1) 8              (2) 7           (3) 6              (4) 5

(c) Coding and Decoding Problems

Note:
The letters A, B, C, ........, Z of English alphabet are numbered 1, 2, 3, ........, 26 respectively. A code is designed by shifting the \( r^{th} \) letter to \((14 - r)^{th}\) letter if \( 1 \leq r \leq 13 \) and \( s^{th} \) letter to \((40 - s)^{th}\) letter if \( 14 \leq s \leq 26 \). The reverse process is used for decoding. Using this answer questions 56-60 given below.

56. The code word for HYDERABAD is
   “HYDERABAD” \( \rightarrow \) \( \overline{\text{హైదరాఖాబాద్}} \)
   (1) FOJIVLMLJ  (2) FOJIVMLMLJ  (3) FIJOVLMLJ  (4) FIOJMLVLMJ

57. The code word for WARANGAL is
   “WARANGAL” \( \rightarrow \) \( \overline{\text{వారాంగాల్}} \)
   (1) QMUMZBGM  (2) QVMZGBM  (3) VQZMBG  (4) QVMZMBGM

58. Which word is coded as IPKFMZGI ?
   IPKFMZGI \( \rightarrow \) \( \overline{\text{ఇప్కమ్ఫ్మ్య్జీ}} \)
   (1) ENTRANCE  (2) ELEGANCE  (3) EXCHANGE  (4) EMPATHIE

59. Which word is coded as UBIKTEYZ ?
   UBIKTEYZ \( \rightarrow \) \( \overline{\text{యుబీక్టీఎస్యు}} \)
   (1) SEDUCTION  (2) SELECTION  (3) SUGGESTED  (4) SHOCKINGS

60. The code word for TIRUPATI is
   TIRUPATI \( \rightarrow \) \( \overline{\text{తిరుపాతి}} \)
   (1) TEMXVSTE  (2) TESVXMTE  (3) TESVXTE  (4) TEVSMXTE
61. If TEACHER is coded as UFBDIFS, then the code word for PARENT is
TEACHER 8 7 6 5 4 3 2 1 0
UFBDIFS 8 7 6 5 4 3 2 1 0
(1) QSBOFU (2) QBSFOU (3) RBSENU (4) QRAESU

62. If BOMBAY is coded as OBZONL, then the code for DELHI is
BOMBAY 8 7 6 5 4 3 2 1 0
OBZONL 8 7 6 5 4 3 2 1 0
(1) QRYVU (2) QYRUUV (3) QRYUV (4) RQYUV

63. If COMMERCE is coded as DONNESDE, then the code for BIOLOGY is
COMMERCE 8 7 6 5 4 3 2 1 0
DONNESDE 8 7 6 5 4 3 2 1 0
(1) CJPMPHZ (2) CIOMOHZ (3) CIOOMHZ (4) CIOMOZH

64. If FAILURE is coded as EZHKTQD, then the code for SUCCESS is
FAILURE 8 7 6 5 4 3 2 1 0
EZHKTQD 8 7 6 5 4 3 2 1 0
(1) RSDDFRR (2) RTDDFRR (3) RTBBDRR (4) RTCBRDR

65. If TRIANGLE is coded as USJBOHMF, then the code word for SQUARE is
TRIANGLE 8 7 6 5 4 3 2 1 0
USJBOHMF 8 7 6 5 4 3 2 1 0
(1) TRUBSF (2) TRVSBF (3) TRUSBF (4) TRVBSF

(d) Date, Time & Arrangement Problems
(Marks : 10)

66. If 26th January of a non-leap year falls on a Sunday, the day on which 15th August of that year falls is
26 January 8 7 6 5 4 3 2 1 0
26 August 8 7 6 5 4 3 2 1 0
(1) Sunday (2) Monday (3) Friday (4) Saturday

67. What is the angle between the two hands of a clock when the time is 5.15 a.m.?
(1) 72½° (2) 67½° (3) 64° (4) 58½°

68. A clock strikes once at 1 O’clock, twice at 2 O’clock and so on. The total number of strikes it makes in a day is
1 strike at 1 O’clock, 2 strikes at 2 O’clock, 3 strikes at 3 O’clock, .......... 12 strikes at 12 O’clock.
(1) 78 (2) 112 (3) 132 (4) 156

69. D is the only son of his father C. A is B’s brother and B is C’s sister. How is D related to A?
D is the only son of C. A is B’s brother and B is C’s sister. A is also B is B’s sister, B is also C’s sister.
(1) Sister (2) Brother (3) Niece (4) Brother’s son

11
P.T.O.
70. A meeting is scheduled at 11.00 am for which a person P who is away at 100 kms from the venue has to attend. If P starts at 9.45 a.m. in a car which moves with a speed of 60 kmph, then the P is late to the meeting by how many minutes?

9.45 - 11.00 = 1.55 hours = 90 minutes

90 minutes = 1 hour, 30 minutes

9.45 + 1 hour, 30 minutes = 11.15 am

11.15 - 11.00 = 15 minutes

(1) 5 (2) 15 (3) 25 (4) 35

71. If $t_1$ is the time elapsed between 11.10 am to 3.50 pm; and if $t_2$ is the time elapsed between 10.15 am to 4.05 pm, then $t_1 : t_2$ =

$11.10 - 10.15 = 1.55 \text{ hours} = 90 \text{ minutes}$

$3.50 - 4.05 = -0.55 \text{ hours} = -33 \text{ minutes}$

$t_1 = 90 \text{ minutes}$

$t_2 = -33 \text{ minutes}$

$t_1 : t_2 = 90 : -33 = 30 : 11 = 2 : 3$

(1) 5:4 (2) 2:3 (3) 4:5 (4) 3:2

72. A, B, C, D and E sit around a table such that A is between B and C and is left to B; D is to the right of B; and E is between C and D. Then the person to the immediate left of C is:

A possible arrangement is A-B-C-D-E

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

73. Given that $a \Delta b = \frac{a^2 + b^2}{ab}$ and $a \Delta b = \frac{a^2}{b}$ for any real numbers $a$ and $b$.

If $x \cdot y = 2 \Delta 2$, then $x =$

$x \cdot y = 2 \Delta 2 = \frac{a^2 + b^2}{ab}$

$x = \frac{\sqrt{2}}{2}$

(1) $y$ (2) $\frac{y}{2}$ (3) $2y$ (4) $\frac{3y}{2}$

74. For real numbers $a$ and $b$, if $a \circ b = (ab)^{1/5}$, then $(243) \circ (16807) =$

$(a \circ b)^{1/5} = (ab)^{1/5}$

(1) 31 (2) 29 (3) 22 (4) 21

75. If $a \circ b = (a + b - 1)^2 - 1$, then $(1 \circ 2) \circ (3 \circ 3) =$

$a \circ b = (a + b - 1)^2 - 1$

(1) 576 (2) 625 (3) 675 (4) 676
Questions : 75
Marks : 75

(i) Arithmetical Ability

76. \[
\left(\frac{1}{a-x}\right) \cdot \frac{1}{x-y} \cdot \frac{1}{a-y} \cdot \frac{1}{x-z} \cdot \frac{1}{y-x} =
\]

(1) a \hspace{1cm} (2) 0 \hspace{1cm} (3) xyz \hspace{1cm} (4) 1

77. If \[
\left(\frac{3}{5}\right)^a = \left(\frac{625}{81}\right)^{\frac{a+3}{2}},
\]
then a =

\[
\left(\frac{3}{5}\right)^a = \left(\frac{625}{81}\right)^{\frac{a+3}{2}}, \text{ and so } a =
\]

(1) 2 \hspace{1cm} (2) 1 \hspace{1cm} (3) -1 \hspace{1cm} (4) -2

78. In a mixture of 35 litres the ratio of milk and water is 4 : 1. If one litre of water is added to the mixture the ratio of milk and water in the new mixture is

35 రైటులు దానిలో మానసేనులు, పైంది 4 : 1 మిశ్రమం. ఒక రైటు పైంది దానిలో మానసేనులు ముఖ్యం మిశ్రమం దానిలో మానసేనులు

(1) 2 : 7 \hspace{1cm} (2) 7 : 2 \hspace{1cm} (3) 4 : 3 \hspace{1cm} (4) 2 : 1

79. The salaries of two persons are in the ratio 4 : 7. Both spend 80% of their salaries and save the rest. The ratio of their savings is

మానెల్లు ఇవి రేఖించింది 4 : 7 ఉన్నాం. ఒక మానెం సుమారు 80% సుమారు ఇవి రెండు మానెల్లు పూరించడం జాతిత్వం ఉన్నాం

(1) 8 : 2 \hspace{1cm} (2) 7 : 5 \hspace{1cm} (3) 5 : 3 \hspace{1cm} (4) 4 : 7

80. If \[
(\sqrt{2})^{x+5} = \left(\frac{1}{\sqrt{2}}\right)^{2x^2-2}, \text{ then a value of } (x^2 - 1)
\]
is

\[
(\sqrt{2})^{x+5} = \left(\frac{1}{\sqrt{2}}\right)^{2x^2-2}, \text{ then } (x^2 - 1)
\]
is

(1) 2 \hspace{1cm} (2) 4 \hspace{1cm} (3) 6 \hspace{1cm} (4) 8

P.T.O.
81. \[ \sqrt{10 + 2\sqrt{6} + 2\sqrt{10 + 2\sqrt{15}}} + \sqrt{10 - 2\sqrt{6} - 2\sqrt{10 + 2\sqrt{15}}} = \]

(1) \( 2(\sqrt{3} + \sqrt{5}) \)  
(2) \( 2\sqrt{3} \)  
(3) \( 2\sqrt{5} \)  
(4) \( 2\sqrt{10} \)

82. The least value of \( k \) such that \( 315 \times k \) is a perfect square is

\[ 315 \times k \text{ పరిమిత సంఖ్య ఏమిటి యొక్క మందు} \]

(1) \( 35 \)  
(2) \( 31 \)  
(3) \( 21 \)  
(4) \( 15 \)

83. Which among the following numbers leaves remainders 1, 2 and 2 respectively when divided by 2, 3 and 7?

\[ \text{అంశాలు యొక్క శేఖర రిమాన్యాలు ఉండాలి} \]

(1) \( 130 \)  
(2) \( 68 \)  
(3) \( 65 \)  
(4) \( 57 \)

84. The L.C.M. of two integers is 144 and their G.C.D is 12. If one of the integers is 36, then the other integer is

\[ \text{సాధృష్ఠ సంఖ్యల ల.క.మం యొక్క గ.చ.మం 144, జాతి 36 ఉంది ప్రతి సంఖ్య ఉండాలి} \]

(1) \( 18 \)  
(2) \( 24 \)  
(3) \( 48 \)  
(4) \( 432 \)

85. The least number that is to be subtracted from 2580 so that it leaves a remainder 4 when divided by 9, 11 and 13 is

\[ \text{గురించి ఇది రాసిన చంపాలి వీటి కాదంప్పు శేఖర రిమాన్యాలు ఉండాలి} \]

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

86. Three numbers are in the ratio 1 : 2 : 3 and the sum of their squares is 504. The largest of the numbers is

\[ \text{మూడు సమానురూపాలు 1 : 2 : 3 మంచు సంఖ్య ఏమిటి యొక్క రిమాన్యాలు 504 యొక్క మంచు సంఖ్య} \]

(1) \( 6 \)  
(2) \( 12 \)  
(3) \( 18 \)  
(4) \( 24 \)
87. The ascending order of the fractions: \( \frac{5}{7}, \frac{6}{8}, \frac{9}{11}, \frac{11}{14} \) is

(1) \( \frac{5}{7}, \frac{6}{8}, \frac{9}{11}, \frac{11}{14} \)  
(2) \( \frac{6}{8}, \frac{9}{11}, \frac{11}{14}, \frac{5}{7} \)  
(3) \( \frac{5}{7}, \frac{11}{14}, \frac{9}{11}, \frac{6}{8} \)  
(4) \( \frac{5}{7}, \frac{6}{8}, \frac{11}{14}, \frac{9}{11} \)

88. The persons A, B, C share a property in such a way that A and B get \( \frac{3}{7} \) and \( \frac{5}{14} \) and C getting the rest. The person or persons who get the least property

(1) C  
(2) B  
(3) A and B  
(4) A and C  
A విభాగం B  
A విభాగం C

89. The descending order of \( \sqrt[3]{10}, \sqrt[6]{6}, \sqrt[3]{3} \) is

(1) \( \sqrt[3]{10}, \sqrt[6]{6}, \sqrt[3]{3} \)  
(2) \( \sqrt[3]{10}, \sqrt[3]{6}, \sqrt[3]{3} \)  
(3) \( \sqrt[3]{3}, \sqrt[6]{6}, \sqrt[10]{3} \)  
(4) \( \sqrt[6]{6}, \sqrt[10]{3} \)

90. In a face to face election the winner got 65% of votes and won by a margin of 12000 votes. The total votes polled (in lakhs) is

(1) 4  
(2) 0.4  
(3) 0.04  
(4) 0.004

91. In a library 23% of the books are in Arts, 30% in Commerce, 35% in Science and the rest are in Telugu language. If there are 1440 books in Telugu language, the number of books in Arts is

(1) 2760  
(2) 3000  
(3) 3600  
(4) 4200
92. A person bought a pen and sold it for a loss of 10%. If he had bought it for 20% less and sold it for ₹ 44 more than earlier sale price he would have made a profit of 40%. The cost price of the pen is (in ₹)

(1) 200   (2) 225   (3) 250   (4) 280

93. If an article is sold at a profit of 15% instead of a profit of 9% the person gets ₹ 60 more. The cost price of the article (in rupees) is

(1) 1200   (2) 1050   (3) 1000   (4) 800

94. A and B started a business investing ₹ 10 lakhs and ₹ 15 lakhs respectively. After 6 months C joined them by investing ₹ 20 lakhs. If the profit at the end of the year is ₹ 5.6 lakhs, then the share of A in the profit (in lakhs of rupees) is

A, B 60% चेहरे 10 लाख में, 15 लाख में. C 20 लाख में. 6 माह बाद एक और 20 लाख इनके साथ. ज्ञात करें A का हिस्सा.

(1) 1.6   (2) 2.4   (3) 3.2   (4) 4.8

95. In a joint business A, B and C invested capital in the ratio 5 : 6 : 8. At the end of the business they shared profits in the ratio 4 : 3 : 12. The ratio of the number of months in which A, B and C kept, their capital is

(1) 2 : 1 : 3   (2) 5 : 3 : 12   (3) 8 : 5 : 15   (4) 25 : 18 : 16
96. Pipe A fills a tank in 8 hours while pipe B empties the full tank in 10 hours. If both the pipes A and B are opened simultaneously the time taken (in hours) to fill the tank is

\[ \text{A fills} \quad 8 \, \text{hours} \quad \text{B empties} \quad 10 \, \text{hours} \]

A, B together will fill the tank 33 1/3 times the time taken by A alone to fill the tank (in hours)

(1) 33 1/3 \quad (2) 36 2/3 \quad (3) 40 \quad (4) 42

97. Two pipes A and B can fill a tank in 10 hours and 15 hours respectively. If they are opened alternately for one hour each and if A is opened first, the time (in hours) required to fill the tank is

(ii) A fills 10 hours, B fills 15 hours

(i) A fills 10 hours, B fills 5 hours, A fills 15 hours, B fills 10 hours.

(1) 10 \quad (2) 11 \quad (3) 12 \quad (4) 13

98. If a man starts at A and walks at 5 kmph he will reach B late by 7 minutes. But if walks at 6 kmph he will reach B early by 5 minutes. The distance between A and B (in km) is

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

99. A train of 270 metres long crosses a platform of 390 metres length in 33 seconds. The speed of the train (in kmph) is

(1) 66 \quad (2) 68 \quad (3) 72 \quad (4) 75

100. Three persons A, B, C together can complete a work in 8 days where as A alone requires 24 days to complete the same work. The number of days required for B and C together to complete the same work is

(1) 18 \quad (2) 16 \quad (3) 12 \quad (4) 10
101. A man completes $\frac{4}{5}$ of the work in 1½ days. The number of hours required to complete the remaining work by him is

(1) 6  
(2) 9  
(3) 7  
(4) 8

102. A circle is inscribed in an equilateral triangle. If the area of the circle is 462 cm², then the perimeter (in cm) of the triangle is

(1) 72  
(2) 84  
(3) 96  
(4) 126

103. The area of a rectangular metal sheet is 60 sq.m. The sum of its length and diagonal is equal to 5 times its breadth. Then the difference (in metres) between length and breadth is

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

104. A cone of height 24 cm and radius of its base 6 cm is made up of clay. If that clay is reshaped in the form of a sphere, then the diameter of that sphere (in cms) is

(1) 6  
(2) 8  
(3) 12  
(4) 14

105. The surface area of a sphere is same as the curved surface area of a right circular cylinder whose height and diameter are 12 cm each. Then the radius of the sphere (in cm) is

(1) 3  
(2) 4  
(3) 5  
(4) 6
106. Let ‘s’ be the surface area of a cube of edge 9 cm. This cube is cut into smaller cubes of edge 3 cm each. If ‘S’ is the sum of the surface areas of all the smaller cubes, then \( s : S = \frac{9}{3} : \frac{3}{3} \times 9 \times 3 \times 3 = 1 : 3 \).
\[
\begin{align*}
(1) & \quad 3 : 1 \\
(2) & \quad 1 : 3 \\
(3) & \quad 3 : 2 \\
(4) & \quad 2 : 3
\end{align*}
\]

107. The number of revolutions made by a wheel of 42 cm diameter in travelling a distance of 1320 meters is
\[
1320 \text{ m} \div \frac{42}{2} \text{ m} = 300\text{ rev}
\]
\[
(1) 300 \\
(2) 400 \\
(3) 500 \\
(4) 1000
\]

108. The radius \( r \) of a right circular cylinder is the same as that of a sphere. If the volume of the sphere is twice that of the cylinder, then the height of the cylinder is \( \frac{4r}{3} \) and \( \frac{2r}{3} \).
\[
(1) \quad \frac{r}{3} \\
(2) \quad \frac{2r}{3} \\
(3) \quad \frac{4r}{3} \\
(4) \quad 2r
\]

109. The digit in the units place of the number \( 13^{400} \) is
\[
(1) \quad 4 \\
(2) \quad 3 \\
(3) \quad 2 \\
(4) \quad 1
\]

110. If \( a^* = k \) denotes that \( k \) is the remainder when \( 8a \) is divided by 7, then \( 100^* = a^* = k \) when \( 8a \) is divided by 7.
\[
(1) \quad 1 \\
(2) \quad 2 \\
(3) \quad 5 \\
(4) \quad 6
\]

P.T.O.
(ii) Algebraic and Geometrical Ability

(Marks : 30)

111. For two statements p, q, it is given that \( p \rightarrow ((\neg p) \vee q) \) is false, then the truth values of p and q are respectively

p, q \( \leftrightarrow \) T, F  \( \neg \) T, T  \( \neg \) F, T

112. Let p, q be two statements. Then the statement \((\neg p) \vee (p \land q)\) is equivalent to

p, q \( \leftrightarrow \) F, T  \( \neg \) T, F  \( \neg \) F, F

113. If \( 1 \leq a \leq 100 \) and \( A = \{ a \mid \text{gcd}(a, 100) = 1 \} \), then the number of elements in A is

1 \leq a \leq 100, A = \{a \mid \text{gcd}(a, 100) = 1\} \text{ elements, A is finite and countable}

(1) 25  (2) 16  (3) 40  (4) 20

114. Let \( f(x) = \begin{cases} x & \text{if } x \in Q \\ 1 - x & \text{if } x \in \mathbb{R} \setminus Q \end{cases} \)

where \( Q \) is the set of all rational numbers.

Then \( f \) is

\( f(x) = \begin{cases} x & (x \in Q) \\ 1 - x & (x \in \mathbb{R} \setminus Q) \end{cases} \)

\( f \) is

(1) one-one only  (2) onto only

(3) one-one and onto  (4) neither one-one nor onto

\( f \) is defined in \( Q \) and \( \mathbb{R} \setminus Q \) respectively.

115. Suppose A and B are two sets. Then a set, among the following, which is not equal to \( A \cup B \), in general, is

A, B \( \cup \) \( \emptyset \) and \( \mathbb{R} \setminus \{0\} \). \( \emptyset \cup \mathbb{R} \setminus \{0\} \subseteq A \cup B \subseteq A \cup \mathbb{R} \setminus \{0\} \)

(1) \( (A - B) \cup (B - A) \cup (A \cap B) \)  (2) \( (A^c \cap B^c) \)

(3) \( (A - B) \cup B \)  (4) \( A \cup (B - A) \)

116. If the lines \( 3x - ky + 4 = 0 \) and \( 4x + y + 2 = 0 \) are perpendicular to each other, then \( k^2 - 12k + 4 = \)

\( k \) is the root of \( 3x - ky + 4 = 0, \) \( 4x + y + 2 = 0 \) \( \text{then} \) \( k^2 - 12k + 4 = \)

(1) 0  (2) 4  (3) 8  (4) 12
117. The length of the line segment intercepted between the axes by the line joining (6, -4) and (-3, 8) is
(6, -4), (-3, 8) చిన్ని స్థాయి విషయంలో శకలేది వీటి నిండి, అంతరం కనుగొనండి
(1) 4 (2) 5 (3) 6 (4) 7

118. \(\sin 120^\circ \cos 60^\circ \cot 30^\circ \cosec^2 30^\circ =\)
(1) 0 (2) 3 (3) -1 (4) \(\frac{1}{2}\)

119. \(\tan \theta = \frac{5}{12} \Rightarrow \frac{5 \sin \theta + 4 \cos \theta}{4 \sin \theta + 5 \cos \theta} =\)
(1) \(\frac{73}{80}\) (2) \(\frac{80}{73}\) (3) \(\frac{7}{80}\) (4) \(\frac{3}{80}\)

120. \(4 \cos \theta \sin^3 \theta - 4 \sin \theta \cos^3 \theta =\)
(1) 0 (2) 1 (3) \(\sin 4 \theta\) (4) \(-\sin 4 \theta\)

121. A pole subtends angles 30°, 45°, 60° respectively at points A, B and C all lying on a horizontal line through the foot of the pole. Then \(\frac{AB}{BC} = \)
అంశాన్ని 30°, 45°, 60° ఎక్కువగా ప్రతి బిందువు A, B, C అనే తిన్నను అంశాన్ని \(\frac{AB}{BC} = \)
(1) \(\frac{1}{\sqrt{3}}\) (2) \(\sqrt{3} + 1\) (3) \(\sqrt{3}\) (4) \(\sqrt{3} - 1\)

122. \(x^4 - 4x^3 + 6x^2 - 4x + 1 = 0 (x \neq 0)\)
\(\Rightarrow x + \frac{1}{x} =\)
(1) \(\frac{1}{2}\) (2) 2 (3) \(\frac{5}{2}\) (4) \(\frac{3}{2}\)

123. If \(x - 7\) is a factor of the polynomial \(f(x)\), then a factor of \(f(2x^2 - 1)\) among the following is
పోలియన్యిల్ ఫంక్షన్ \(f(x)\) తెలుస్తూ, \(f(2x^2 - 1)\) కొలుపున ఫాక్టర్ అంచు ఉండే ఉండాలి
(1) \(x - 1\) (2) \(x - 2\) (3) \(x + 1\) (4) \(x + 2\)

124. The remainder obtained when \(1! + 2! + 3! + \ldots + (2014)!\) is divided by 7 is
\(1! + 2! + 3! + \ldots + (2014)!\) ని 7 వల్ల పాటిడి భాగం ఉండాలి
(1) 3 (2) 4 (3) 5 (4) 6

125. \(\sqrt{(x+1) (x+2) (x+3) (x+4)} + 1 =\)
(1) \(\pm (x^2 + 5x + 4)\) (2) \(\pm (x^2 + 5x + 5)\)
(3) \(\pm (x^2 + 5x + 6)\) (4) \(\pm (x^2 + 6x + 5)\)
126. The sum of seven consecutive even integers is $s$. Then, in terms of $s$, the greatest of these integers is

\[ a = \frac{s + 20}{5} \quad (1) \quad b = \frac{s + 72}{9} \quad (2) \quad c = \frac{s + 42}{7} \quad (3) \quad d = \frac{s + 30}{6} \quad (4) \]

127. The maximum value of the expression $2 + 8x - x^2$ is

\[ 2 + 8x - x^2 \quad (1) \quad 2 + 8x - x^2 \quad (2) \quad 2 + x^2 \quad (3) \quad 2 - 8x + x^2 \quad (4) \quad 2 
\]

128. \[ \frac{b}{a} = \frac{c}{b} = \frac{d}{c} \Rightarrow (a - c)^2 + (c - b)^2 + (b - d)^2 - (d - a)^2 = \]

\[ 1 \quad (1) \quad 0 \quad (2) \quad -1 \quad (3) \quad 2 \quad (4) \]

129. The sum of first fifty odd natural numbers is

\[ \sum_{n=1}^{50} (2n - 1) = \sum_{n=1}^{50} 2n - \sum_{n=1}^{50} 1 = 2 \cdot \frac{50 \times 51}{2} - 50 = 2275 \]

\[ (1) \quad 2500 \quad (2) \quad 625 \quad (3) \quad 10000 \quad (4) \quad 1600 \]

130. The coefficient of $x^3$ in the expansion of \( \left( x^2 - \frac{1}{x^3} \right)^9 \) is

\[ \binom{9}{3} x^{9-3} \]

\[ (1) \quad \binom{9}{3} \quad (2) \quad -\binom{9}{3} \quad (3) \quad \binom{9}{5} \quad (4) \quad -\binom{9}{4} \]

131. The coefficient of middle term in the expansion of \((1 + x)^{40}\) is

\[ \frac{\binom{40}{20}}{2!} \]

\[ (1) \quad \frac{1.3.5...39}{2!} 2^{20} \quad (2) \quad \frac{1.3.5...39}{2!} 2^{20} \quad (3) \quad \frac{21.22...40}{2!} \quad (4) \quad 40! 2^{20} \]

132. \[ \begin{bmatrix} 2 & 16 \\ -8 & 0 \end{bmatrix} \begin{bmatrix} a \\ b^2 \end{bmatrix}, \quad c < 0, \quad b < 0 \]

\[ \Rightarrow 3a + b + c = \]

\[ (1) \quad 2 \quad (2) \quad -2 \quad (3) \quad 4 \quad (4) \quad 0 \]

133. If $A, B$ are two matrices such that $AB = A, BA = B$, then $A^2 + B^2 = \text{something}$.

\[ A + B \quad (1) \quad A - B \quad (2) \quad 2A + B \quad (3) \quad A + 2B \quad (4) \]

134. \[ \lim_{x \to 0} \frac{\tan x}{x^5} = \]

\[ (1) \quad \frac{180}{\pi} \quad (2) \quad \frac{\pi}{180} \quad (3) \quad 1 \quad (4) \quad -1 \]
135. \( x = \sqrt{x+y} \Rightarrow \frac{dy}{dx} = \)

(1) \(-x\)  
(2) \(1+x\)  
(3) \(-2x\)  
(4) \(2x-1\)

136. In a \(\Delta ABC\), D, E, F are the mid points of the sides AB, BC and CA respectively. If \(AB = 8\) cm, \(BC = 15\) cm and \(AC = 12\) cm, then \(DE + EF + FD = \Delta ABC\).

\(BC = 15\) \(\text{cm}\), \(AC = 12\) \(\text{cm}\). Then \(\Delta ABC\) DE + EF + FD =

(1) 16.5 cm  
(2) 17.5 cm  
(3) 25 cm  
(4) 35 cm

137. A, B, C are three points on the circumference of a circle with centre O. If, in \(\Delta ABC\), \(\angle B = 60^\circ\) and \(\angle C = 70^\circ\), then \(\angle BOC =\)

(1) 100°  
(2) 120°  
(3) 90°  
(4) 80°

138. If P, Q, R, S are the mid points of the sides of a quadrilateral ABCD, then the quadrilateral PQRS is a

(1) Square  
(2) Parallelogram  
(3) Rectangle  
(4) Rhombus

139. The points A(3, -5) and B(-5, 4) are given. If C is a point such that \(\frac{AC}{CB} = 2\), then the coordinates of C are

(1) \(\left(\frac{7}{3}, 1\right)\)  
(2) \(\left(-\frac{7}{3}, 1\right)\)  
(3) \(\left(\frac{7}{3}, -1\right)\)  
(4) \(\left(-\frac{7}{3}, -1\right)\)

140. A (4, 2), B (6, 5) and C (1, 4) are the vertices of a \(\Delta ABC\). The median from A meets the side BC at D. Then \(2AD^2 =\)

A(4, 2), B(6, 5), C(1, 4) are the vertices of \(\Delta ABC\). The median from A meets the side BC at D. Then \(2AD^2 =\)

(1) 13  
(2) 14  
(3) 15  
(4) 16
(iii) Statistical Ability

141. The mean of the distribution given below is

<table>
<thead>
<tr>
<th>x</th>
<th>10-20</th>
<th>20-30</th>
<th>30-40</th>
<th>40-50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>5</td>
<td>10</td>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>

(1) 30  (2) 31
(3) 32  (4) 33

142. For a given data, if the mean is 60 and the mode is 66, then the median is

(1) 63  (2) 64
(3) 60  (4) 62

143. The mode of the following data is

6, 9, 13, 10, 16, 13, 13, 14, 15, 11, 13, 12, 14

(1) 11  (2) 12
(3) 13  (4) 14

144. If $\sigma$ is the standard deviation of $x_1, x_2, \ldots, x_n$, then the standard deviation of $9 + 3x_1, 9 + 3x_2, \ldots, 9 + 3x_n$ is

$\sigma (9 + 3x_1, 9 + 3x_2, \ldots, 9 + 3x_n) = 3\sigma$

(1) $3\sigma - 3$  (2) $\sqrt{9\sigma^2 + 3}$
(3) $3\sigma$  (4) $3\sigma + 9$

145. The variance of first $n$ even natural numbers is

$\frac{n^2 - 1}{3}$

(1) $\frac{n^2 - 1}{3}$  (2) $\frac{n^2 - 1}{6}$
(3) $\frac{n^2 - 1}{12}$  (4) $\frac{n^2 + 1}{3}$

146. The mean of first $n$ odd natural numbers is

$\frac{n^2 + 1}{3}$

(1) $n - 1$  (2) $n + 1$
(3) $n + 2$  (4) $n$
147. A number is selected at random from the first 80 natural numbers. The probability that it is divisible by 4 or 6 is

\[ \frac{23}{80}, \quad \frac{29}{80}, \quad \frac{27}{80}, \quad \frac{33}{80} \]

148. Two fair dice are rolled. The probability that the sum of the numbers on the faces shown is 8 is

\[ \frac{5}{36}, \quad \frac{1}{6}, \quad \frac{7}{36}, \quad \frac{1}{9} \]

149. The probability that either of the events A and B to happen is 0.6 and the probability that both of them to happen is 0.2. Then \( P(A') + P(B') = \)

(Here \( A' \) is the complementary event of \( A \).)

\[ 0.4, \quad 0.75, \quad 0.8, \quad 1.2 \]

150. Suppose \( f(x) = (x - 2)(x - 5)(x - 7) \).

If a number \( \alpha \) is chosen from \( \{1, 3, 4, 5, 6, 7, 8, 9, 10\} \) randomly, the probability that it satisfies the equation \( f(\alpha) = 0 \), is

\[ \{1, 3, 4, 5, 6, 7, 8, 9, 10\} \text{ and } \frac{1}{3}, \quad \frac{2}{5}, \quad \frac{3}{7}, \quad \frac{2}{9} \]
SECTION – C
Communication Ability

Questions : 50
Marks : 50

PART – 1

Choose the correct meaning for the word given:

151. radical
   (1) extreme  (2) red
   (3) colourful (4) slow

152. tether
   (1) teeth     (2) together
   (3) restrain  (4) free

153. synergy
   (1) combined size  (2) joined effort
   (3) related parts  (4) organized finances

154. pervade
   (1) conquer     (2) escape
   (3) spread through (4) convince

155. nascent
   (1) smelly    (2) fragrant
   (3) immune   (4) incipient

156. vacuous
   (1) abandon  (2) vacate
   (3) unavailable (4) expressionless

Fill in the blank choosing the correct word:

157. The rains ______ the fields, washing away the crops.
   (1) stormed (2) inundated
   (3) blew    (4) covered

158. Due to the ongoing controversy the political situation in the state is ______.
   (1) upbeat (2) cosy
   (3) turbulent (4) sublime

159. England was a great ______ power in the nineteenth century.
   (1) merchant (2) army
   (3) mercantile (4) navy

160. The ______ mule would not pull the farmer’s plow.
   (1) rigid  (2) sturdy
   (3) rugged (4) stubborn
15RW-13

PART - 2

Choose the correct answer:

161. The process of reviewing the performance of employees periodically is called
   (1) performance management  (2) employee review
   (3) performance appraisal    (4) employee confidential report

162. The interview conducted in a situation not quite pleasant or comfortable to the candidate is called
   (1) unstructured interview  (2) depth interview
   (3) stress interview        (4) distress interview

163. The medium of outdoor poster in which printed ad message is displayed is called
   (1) cutouts                (2) POP
   (3) exhibit                (4) bill board

164. A market which is dominated by a few suppliers is known as
   (1) perfect market         (2) buyer’s market
   (3) oligopoly market       (4) monopolist market

165. PERT is
   (1) Programme Evaluation and Review Technique
   (2) Programme Education and Review Teaching
   (3) Programme Enlightenment and Review Technique
   (4) Progress Evaluation and Review Timing

166. Which of the following is used for modulation and demodulation?
   (1) Modem                   (2) Protocols
   (3) Gateway                 (4) Multiplexer

167. Linkage between CPU and users is provided by
   (1) storage                 (2) control unit
   (3) peripheral devices      (4) software

168. In a computer system, which device is functionally opposite of a keyboard?
   (1) mouse                   (2) track ball
   (3) printer                 (4) pen drive

169. The first mechanical computer designed by Charles Babbage was called
   (1) Abacus                  (2) Processor
   (3) Calculator              (4) Analytical Engine

170. Which of the following is an example of non-volatile memory?
   (1) ROM                     (2) VLSI
   (3) LSI                     (4) RAM
Choose the correct answer:

171. A: "There, that’s what you looked like when you were a month old."
    B: "How awful!"
    In this conversation ‘B’
    (1) is pleased  (2) is disappointed
    (3) is unhappy  (4) thinks he looked ugly

172. A: "Could I borrow some money from you ?"
    B: "What do you need it for ?"
    The conversation implies that ‘B’
    (1) is dodging the issue  (2) is angry
    (3) does not want to give money  (4) wants to know why ‘A’ needs money

173. "It was a knockout. Umesh saw stars in his eyes."
    The speaker implies that Umesh.
    (1) is exuberant  (2) is romantic
    (3) is dreaming  (4) has fallen unconscious

174. The active form of the sentence ‘e-mails have been written by her’ is
    (1) she has written e-mails  (2) she had written e-mails
    (3) write e-mails to her  (4) she sent e-mails

175. A: "I’ve got a new job!"
    B: "Great! That should open doors for you."
    ‘B’ implies that
    (1) ‘A’ can get more opportunities.  (2) The job will be done outdoors.
    (3) The job will fetch a lot of money.  (4) ‘A’ will be able to work well.

176. A: "There is a lot of disunity among the people."
    B: I agree. Unity is the crying need of the hour."
    ‘B’ implies that
    (1) there is no need for unity among the people.
    (2) there is an urgent need for unity among the people.
    (3) a plan may be made for achieving unity.
    (4) unity may be achieved by crying for it, hour by hour.

177. A: "I want to train myself in yoga practices."
    B: "I want to follow suit."
    ‘B’ implies
    (1) that he would put on a suit.
    (2) that he would follow anyone wearing a suit.
    (3) that he would imitate ‘A’.
    (4) that it does not suit his temperament to follow anyone.

Fill in the blanks with the appropriate phrase/verb/preposition:

178. Manish had a poor salary but he didn’t need much to _______.
    (1) live up  (2) live on  (3) live after  (4) live in

179. Anthony ______ his wife to tell her that he would reach home late.
    (1) called up  (2) called on  (3) called at  (4) called away

180. He has to ______ with the eccentricity of his boss.
    (1) put on  (2) put up  (3) put away  (4) put in
181. Great people achieve what the others only dream ______.
(1) by (2) of (3) with (4) out

182. She saved the child ______ drowning.
(1) off (2) from (3) for (4) through

183. She'll be fearful ______ that.
(1) on (2) of (3) with (4) to

184. Being very tired ______ studying.
(1) impinges (2) impeaches (3) inhibits (4) inculcates

185. They ______ cultivating the land for twenty years when they moved to the city.
(1) had been (2) are (3) is (4) have been

PART-4

Read the following passage and answer questions 186-190:

After two decades of growing student enrollments and economic prosperity, business schools in the USA have started to face harder times. Only Havard's MBA school has shown a substantial increase in enrollment in recent years. Both Princeton and Stanford have seen decreases in their enrollments. Since 1990, the number of people receiving MBA degrees has dropped about 3 percent to 75,000 and the trend of lower enrollment rate is expected to continue.

There are two factors causing this decrease in students seeking MBA degree. The first one is that many graduates of four year colleges are finding that an MBA degree does not guarantee a plush job on Wall Street or in other financial districts of major American cities. Many of the entry level management jobs are going to students graduating with Master of Arts degrees in English and the humanities as well as those holding MBA degrees. Students have asked the question, "Is an MBA degree really what I need to be best prepared for getting a good job?" The second major factor has been the cutting of American payrolls and the lower number of entry-level jobs being offered. Business needs are changing, and MBA schools are struggling to meet the new demands.

186. Which of the following business schools has not shown a decrease in enrollment?
(1) Princeton (2) Harvard (3) Stanford (4) Yale

187. What is the duration of an MBA degree?
(1) 4 years (2) 3 years (3) 2 years (4) not mentioned in the text

188. What are the two causes of declining business school enrollments?
(1) Lack of necessity for an MBA and an economic recession.
(2) Low salary and foreign competition.
(3) Declining population and low education standard.
(4) Fewer MBA schools and higher tuition fees.

189. Which are the degrees preferred along with MBA for entry-level management jobs?
(1) Post Graduation in Linguistics
(2) Graduation in humanities
(3) Masters programme in Arts and Literature
(4) Master in English and Humanities

190. What should be done by business schools to change the situation?
(1) Charge lower fee
(2) Examine the changing needs of business
(3) Change the curriculum
(4) Improve placement procedure
Read the following passage and answer questions 191-195:

More businesses are addressing social issues through philanthropy. Companies donate a portion of their revenues to charities or a specific social cause. Education is known to be the favourite object for philanthropy in which 75 percent of companies are participating. Although the donations will help a good cause, many companies use philanthropy primarily to improve their reputation or get a tax deduction. Philanthropy is not limited to the mature markets in the West. In emerging markets philanthropy is even more popular. Asia’s millionaires committed 12 percent of their wealth for social causes. While millionaires in North America only contribute 8 percent and those in Europe 5 percent.

Although philanthropy helps society, we should never over estimate its socio-cultural impact. Recent growth in philanthropy is driven by the changes in the society. Even in a recession, 75 percent of Americans still donate to a social cause.

But philanthropy does not stimulate transformation in the society. Transformation in the society drives philanthropy. That is why addressing social issues with philanthropic activities will have a rather short-term impact.

A more advanced form of addressing social challenges is cause marketing – a practice where companies support a specific cause through their marketing activities.

191. Why do companies set aside money in their budget for charities?
   (1) It helps to reduce their tax liabilities.
   (2) People want to help others.
   (3) Companies do not want to attract attention.
   (4) It makes people in the company happy.

192. What is the change that is coming about now?
   (1) Marketing has become easier.
   (2) Companies have started earning more.
   (3) There are more advertising companies.
   (4) There is a growth in social awareness.

193. What is the most favourite area for donations from companies?
   (1) Healthcare
   (2) Education
   (3) Social Ethics
   (4) Public Relations

194. What according to the author, will have only a limited impact on the transformation of society?
   (1) Philanthropy
   (2) Social change
   (3) Recession
   (4) Marketing strategies

195. What is the main idea of this passage?
   (1) Philanthropy focuses only on education.
   (2) Western countries spend more than others on philanthropy.
   (3) Cause Marketing is a better form of marketing.
   (4) Companies donate some part of their income to charities.
Read the following passage and answer questions 196-200:

To many people growing old seems like the end game in chess; life winding down in a series of small moves with lesser pieces. As I age, I have discovered this is not true. I am not an elderly king stripped of my powers, reduced to a ragtail army of pawns. My life is not a defensive struggle of restricted options. Growing old is a game of verve and imagination and excitement. The outcome is not now a matter of strength, although that still remains, but of faith and courage, hope and wisdom. The aging game is a sport for which childhood and youth and maturity are no more than a preparation. Its scope comes a surprise. It expands my life at a time when I expected it to diminish. It demands an excellence that no longer seemed necessary. It asks me to surpass what I did at the peak of my powers. Age will not accept second best. In the aging game I must be all ever I was and am yet to be. What has gone before is no more than a learning period. A breaking in.

Age is the combat for which I was trained. Now I must take this person I have become and make each new day special. I must make good on the promise of every dawn I am privileged to see. Life goes from a minor to a major key. The game builds to a climax. Every move assumes importance. One feels like a virtuoso, the gifts we have been given, the powers that empower us, the marvels that make us marvellous, are evident as never before. The truth is that we have lost nothing. The problem is not that I am less than I was when young, It is that I am not more. It is past time to become my own person.

196. What does growing old mean to many people?
(1) the end of the challenges
(2) mental degeneration
(3) lack of activity
(4) boredom

197. What does aging mean to the author?
(1) to be negative
(2) to be positive
(3) to laze around
(4) to be depressed

198. What should aging lead to?
(1) perfection
(2) death
(3) illness
(4) a marvellous existence

199. Why is the ‘aging game’ referred to as a ‘sport’?
(1) Old people play games.
(2) Old age makes one young in spirit.
(3) Problems of old age have to be overcome.
(4) It is a game in which one loses or wins.

200. What does childhood and maturity prepare one for?
(1) aging
(2) to face old age with hope and wisdom
(3) to rest in old age
(4) to be prepared for illness in old age