XAT - 2010

Name _____ Test Booklet No.

XAT ID _____ Booklet Series: **D**

INSTRUCTIONS

1. **DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE ASKED TO DO SO.**

2. Fill in the information required on the answer sheet. Your test may not be evaluated if the required details are not entered on the answer sheet.

3. **This booklet consists of three sections A, B and C with 30, 31, and 40 questions respectively, i.e. a total of 101 questions.** If there is a problem with your test booklet, immediately inform the invigilator/supervisor. You will be provided with a replacement.

4. Do not seek clarification on any item in the test booklet from the test invigilator or the centre supervisor. Use your best judgement.

5. You are required to answer questions from all three sections and expected to maximize scores in each section.

6. Each question has five alternatives. Answer each question by darkening the appropriate alternative letter against the question number on the answer sheet. For example if your answer to question number 1 is 'B', darken fully the circle 'B' against question 1.

7. All answers are to be marked only on the (OMR) answer sheet. Use the margin in the test booklet for rough work. No other piece of paper is permitted to be used for rough work.

8. Use only HB pencil.

9. **NEGATIVE MARKS (one fifth of a mark) may be deducted for the first six incorrect answers in each section and 0.25 (quarter of a mark) for each incorrect answer thereafter.**

10. Failure to follow instructions and examination norms will lead to disqualification.

To open the test booklet, insert a pencil beneath this page and tear open along the right side of the test booklet as indicated by the arrow at the bottom of the page.

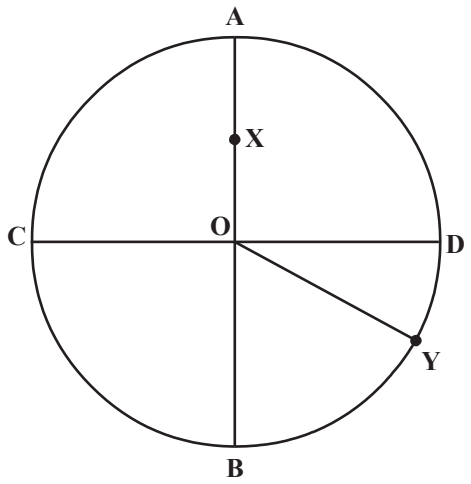
PLEASE WAIT FOR THE SIGNAL TO OPEN THE TEST BOOKLET.

BEST OF LUCK!

Open from this side 

Section C – Data Interpretation and Quantitative Ability

62.



In a circular field, AOB and COD are two mutually perpendicular diameters having length of 4 meters. X is the mid-point of OA. Y is the point on the circumference such that ∠YOD = 30°. Which of the following correctly gives the relation among the three alternate paths from X to Y?

(1) XOBY : XODY : XADY :: 5.15 : 4.50 : 5.06
(2) XADY : XODY : XOBY :: 6.25 : 5.34 : 4.24
(3) XODY : XOBY : XADY :: 4.04 : 5.35 : 5.25
(4) XADY : XOBY : XODY :: 5.19 : 5.09 : 4.04
(5) XOBY : XADY : XODY :: 5.06 : 5.15 : 4.50

63. If x and y are real numbers, then the minimum value of $x^2 + 4xy + 6y^2 - 4y + 4$ is

(1) −4 (2) 0 (3) 2 (4) 4 (5) None of the above

64. Let X be a four-digit positive integer such that the unit digit of X is prime and the product of all digits of X is also prime. How many such integers are possible?

(1) 4 (2) 8 (3) 12 (4) 24 (5) None of the above

65. There are two types of employees in Sun Metals, general graduates and engineers. 40% of the employees in Sun Metals are general graduates, and 75% of the engineers earn more than Rs. 5 lakh/year. If 50% of the organisation's employees earn more than Rs. 5 lakh/year, what proportion of the general graduates employed by the organisation earn Rs. 5 lakh or less?

(1) 3/5 (2) 3/4 (3) 1/2 (4) 2/5 (5) None of the above

66. In an equilateral triangle ABC, whose length of each side is 3 cm, D is the point on BC such that BD = ½ CD. What is the length of AD?

(1) $\sqrt{5}$ cm (2) $\sqrt{6}$ cm (3) $\sqrt{7}$ cm (4) $\sqrt{8}$ cm (5) None of the above

67. Two poles of height 2 meters and 3 meters, are 5 meters apart. The height of the point of intersection of the lines joining the top of each poles to the foot of the opposite pole is,

(1) 1.2 meters (2) 1.0 meters (3) 5.0 meters (4) 3.0 meters (5) None of the above

68. A manufacturer has 200 litres of acid solution which has 15% acid content. How many litres of acid solution with 30% acid content may be added so that acid content in the resulting mixture will be more than 20% but less than 25%?

(1) More than 100 litres but less than 300 litres
(2) More than 120 litres but less than 400 litres
(3) More than 100 litres but less than 400 litres
(4) More than 120 litres but less than 300 litres
(5) None of the above

Answer question nos. 69-71 based on the following information:

An automobiles company's annual sales of its small cars depends on the state of the economy as well as on whether the company uses some high profile individual as its brand ambassador in advertisements of its product. The state of the economy is "good", "okay" and "bad" with probabilities 0.3, 0.4 and 0.3 respectively. The company may choose a high profile individual as its brand ambassador in TV ads or may go for the TV ads without a high profile brand ambassador.

If the company fixes price at Rs. 3.5 lakh, the annual sales of its small cars for different states of the economy and for different kinds of TV ads are summarized in table 1. The figures in the first row are annual sales of the small cars when the company uses a high profile individual as its brand ambassador in its TV ads and the ones in the second row are that when the company does not use any brand ambassador in TV ads, for different states of the economy.

Table 1:

	"Good"	"Okay"	"Bad"
With brand ambassador	100000	80000	50000
Without brand ambassador	80000	50000	30000

Without knowing what exactly will be the state of the company in the coming one year, the company will either have to sign a TV ad contract with some high profile individual, who will be the company's brand ambassador for its small car for the next one year, or go for a TV ad without featuring any high profile individual. It incurs a cost of Rs. 3.45 lakh (excluding the payment to the brand ambassador) to put a car on the road.

When the company's profit is ascertain, the company makes decisions on basis of its expected profit. If the company can earn a profit x_i with probability p_i (the probability depends on the state of economy), then the expected profit of the company is $\sum_i x_i p_i$.

69. The maximum that the company can afford to pay its brand ambassador is

(1) Rs. 10.0 crore (2) Rs. 10.6 crore (3) Rs. 10.8 crore
(4) Rs. 12.0 crore (5) Rs. 16.4 crore

70. Mr. Khan a popular film actor, agrees to sign the contract to become the company's brand ambassador for Rs. 9 crore. The cost to the company of putting a car on the road also got escalated. The maximum escalation in cost of putting a car on the road, for which the company can afford to sign the contract with Mr. Khan is

(1) Rs. 900 (2) Rs. 967 (3) Rs. 1250
(4) Rs. 1267 (5) Rs. 1333

71. Mr. Khan a popular film actor, agrees to sign the contract to become the company's brand ambassador for Rs. 9 crore. The cost to the company of putting a car on the road also got escalated by Rs. 1000. If the company signs the contract with Mr. Khan, its profit will

(1) increase by Rs. 40 lakh (2) increase by Rs. 60 lakh (3) decrease by Rs. 20 lakh
(4) decrease by Rs. 40 lakh (5) decrease by Rs. 50 lakh

72. Determine the value(s) of "a" for which the point (a, a^2) lies inside the triangle formed by the lines: $2x + 3y = 1$, $x + 2y = 3$ and $5x - 6y = 1$

(1) $(-3, -1) \cup (1/2, 1)$ (2) $(-\infty, 1/3) \cup (1/2, \infty)$ (3) $(-3/2, -1) \cup (1/2, 1)$
(4) $(-\infty, 1) \cup (1/3, 6)$ (5) None of the above

73. The supervisor of a packaging unit of a milk plant is being pressurised to finish the job closer to the distribution time, thus giving the production staff more leeway to cater to last minute demand. He has the option of running the unit at normal speed or at 110% of normal-"fast speed". He estimates that he will be able to run a t the higher speed 60% of time. The packet is twice as likely to be damaged at the higher speed which would mean temporarily stopping the process. If a packet on a randomly selected packaging runs has probability of 0.112 of damage, what is the probability that the packet will not be damaged at normal speed?

(1) 0.81 (2) 0.93 (3) 0.75 (4) 0.60 (5) None of the above

Directions for questions 74 to 75:
Let $A_1, A_2, \ldots A_n$ be the n points on the straight-line $y = px + q$. The coordinates of A_k is (x_k, y_k), where k = 1, 2, ... n such that $x_1, x_2, \ldots x_n$ are in arithmetic progression. The coordinates of A_2 is (2, -2) and A_{24} is (68, 31).

74. The y-ordinates of A_8 is

(1) 13 (2) 10 (3) 7 (4) 5.5 (5) None of the above

75. The number of point(s) satisfying the above mentioned characteristics and not in the first quadrant is/are

(1) 1 (2) 2 (3) 3 (4) 7 (5) None of the above

76. The operation (x) is defined by
(i) (1) = 2
(ii)$(x + y) = (x).(y)$
for all positive integers x and y.

If $\sum_{x=1}^{n} (x) = 1022$ then $n =$

(1) 8 (2) 9 (3) 10 (4) 11 (5) None of the above

77. Amarendra and Dharmendra are brothers. One day they start at the same time from their home for Tatanagar railway station in their respective cars. Amarendra took 25 minutes to reach the station. After reaching the

station Amarendra found that Dharmendra is 2500 m away from the station. The distance of Tatanagar Station from their home is 15 km. Next day Dharmendra decided to start 7 minutes early. If they drive at the speed same as the previous day then Amarendra will reach the station

(1) 120 seconds earlier than Dharmendra
(2) 120 seconds later than Dharmendra
(3) 300 seconds earlier than Dharmendra
(4) 300 seconds later than Dharmendra
(5) at the same time with Dharmendra

78. Let S_1, S_2,... be the square such that for each $n \geq 1$, the length of the diagonal of S_n is equal to the length of the side of S_{n+1}. If the length of the side of S_3 is 4 cm, what is the length of the side of S_n?

(1) $2^{\left(\frac{2n+1}{2}\right)}$
(2) $2.(n - 1)$
(3) $2^{(n-1)}$
(4) $2^{\left(\frac{n+1}{2}\right)}$
(5) None of the above

79. In a clock having a circular scale of twelve hours, when time changes from 7:45 A.M. to 7:47 A.M., by how many degrees the angle formed by the hour hand and minute hand changes?

(1) 10 (2) 11 (3) 12 (4) 15 (5) None of these

Questions 80 and 81 are followed by two statements labelled as I and II. Decide if these statements are sufficient to conclusively answer the question. Choose the appropriate answer from the options given below:

A. Statement I alone is sufficient to answer the question.
B. Statement II alone is sufficient to answer the question.
C. Statement I and Statement II together are sufficient, but neither of the two alone is sufficient to answer the question.
D. Either Statement I or Statement II alone is sufficient to answer the question.
E. Both Statement I and Statement II are insufficient to answer the question

80. In the trapezoid PQRS, PS is parallel to QR. PQ and SR are extended to meet at A. What is the value of $\angle PAS$?

I. PQ = 3, RS = 4 and $\angle QPS = 60°$.
II. PS = 10, QR = 5.

81. A sequence of positive integer is defined as $A_{n+1} = A_n^2+1$ for each $n \geq 0$. What is the value of Greatest Common Divisor of A_{900} and A_{1000}?

I. $A_0 = 1$
II. $A_1 = 2$

82. a, b, c, d and e are integers such that $1 \leq a < b < c < d < e$. If a, b, c, d and e are geometric progression and $lcm(m, n)$ is the least common multiple of m and n, then the maximum value of

$$\frac{1}{\text{lcm(a, b)}} + \frac{1}{\text{lcm(b, c)}} + \frac{1}{\text{lcm(c, d)}} + \frac{1}{\text{lcm(d, e)}} \text{ is}$$

(1) 1 (2) $\frac{15}{16}$ (3) $\frac{79}{81}$ (4) $\frac{7}{8}$ (5) None of the above

Directions for questions 83 and 84:
Books and More sells books, music CDs and film DVDs. In December 2009, they earned 40% profit in music CDs and 25% profit in books. Music CDs contributed 35% towards their total sales in rupees. At the same time total sales in rupees from books is 50% more than that of music CDs.

83. If *Books and More* have earned 20% profit overall, then in film DVDs they made

(1) 15.2% profit (2) 10.0% profit (3) 10.0% loss (4) 16.3% loss (5) 23.4% loss

84. If *Books and More* made 50% loss in film DVDs, then overall they made

(1) 12.3% profit (2) 8. 7% profit (3) 0.4% loss (4) 6.25% loss (5) 20% loss

85. ABCD is a parallelogram with $\angle ABC = 60°$. If the longer diagonal is of length 7 cm and the area of the parallelogram ABCD is $15\frac{\sqrt{3}}{2}$ sq.cm, then the perimeter of the parallelogram (in cm) is

(1) 15 (2) $15\sqrt{3}$ (3) 16 (4) $16\sqrt{3}$ (5) None of the above

Directions for questions 86 and 87:
OABC is a square where O is the origin and AB = 1. Consider the set of points S = $\{(x_i, y_i)\}$ in the square such that $x_i + y_i \leq 1$. Let P (x_1, y_1) and Q (x_2, y_2) be two such points. Two operations addition (+) and multiplication (.) on S are defined as
P + Q = $(x_1 + x_2 - x_1 x_2,\ y_1 y_2)$
P.Q = $(x_1 x_2,\ y_1 + y_2 - y_1 y_2)$

86. For a very large number n, $P^n + Q^n$ is

(1) close to (0, 0) (2) close to (1,0) (3) close to (0, 1)
(4) any point in the region $x + y < 1$ (5) None of the above

87. For a very large number n, $nP + nQ$ is

(1) close to (0, 0) (2) close to (1,0) (3) close to (0, 1)
(4) Any point in the region $x + y < 1$ (5) None of the above

Answer the questions nos. 88-90 based on the information given below.
Cost and price data for Portland cement manufactured by Paharpur Cement and Bahsin Cement, for four consecutive quarters, are given in table 2:

Table 2

	Paharpur Cement		Bahsin Cement	
	Cost (as % of sales revenue)	Price (Rs./bag)	Cost (as % of sales revenue)	Price (Rs./ bag)
Oct-Dec 2008	92.11	352	94.21	438
Jan-Mar 2009	87.56	304	91.34	440
Apr-Jun 2009	91.03	340	89.96	430
Jul-Sep 2009	90.42	322	90.38	434

Sales Revenue = Price × Sales Quantity
Profit = Sales Revenue – Cost
Profit Rate = Profit / Sales Quantity

88. Profit rate of Paharpur Cement is more than the profit rate of Bahsin Cement in:

(1) Oct-Dec 2008 and Jan-Mar 2009
(2) Jan-Mar 2009 and Apr-Jun 2009
(3) Oct-Dec 2008 only
(4) Jan-Mar 2009 only
(5) Apr-Jun 2009 only

89. If between Jan-Mar 2009 and Apr-Jun 2009 sales of Paharpur Cement increased from 543278 to 698236 and that of Bahsin Cement decreased from 526532 to 499874, then which of the following is true?

(1) Between Jan-Mar 2009 and Apr-Jun 2009, profit and profit rate of Paharpur Cement increased, whereas profit and profit rate of Bahsin Cement decreased.
(2) Between Jan-Mar 2009 and Apr-Jun 2009, profit rate of Paharpur Cement increased but its profit decreased, whereas both profit and profit rate of Bahsin Cement increased.
(3) Between Jan-Mar 2009 and Apr-Jun 2009, both profit and profit rate of Paharpur Cement decreased, whereas profit rate of Bahsin Cement decreased but its profit increased,
(4) Between Jan-Mar 2009 and Apr-Jun 2009, profit of Paharpur Cement increased but its profit rate decreased, whereas profit rate of Bahsin Cement increased but its profit decreased.
(5) Between Jan-Mar 2009 and Apr-Jun 2009, profit rate of Paharpur Cement decreased but its profit increased, whereas both profit and profit rate of Bahsin Cement increased.

90. If between Apr-Jun 2009 and Jul-Sept 2009 sales of Paharpur Cement increased by 2.25%, it profit increased by

(1) 2.08% (2) 2.25% (3) 2.96% (4) 3.28% (5) 3.42%

Directions for questions 91 - 93:
Answer the questions based on the information given below.

Madhubala Devi, who works as a domestic help, received Rs. 2500 as Deepawali bonus from her employer. With that money she is contemplating purchase of one or more among 5 available government bonds - A, B, C, D and E.

To purchase a bond Madhubala Devi will have to pay the price of the bond. If she owns a bond she receives a stipulated amount of money every year (which is termed as the coupon payment) till the maturity of the bond. At the maturity of the bond she also receives the face value of the bond.

Price of a bond is given by: $P = \left[\sum_{t=1}^{T} - \frac{C}{(1+r)}\right] + \frac{F}{(1+r)^T}$, where C is coupon payment on the bond.

which is the amount of money the holder of the bond receives annually; F is the face value of the bond, which is the amount of money the holder of the bond receives when the bond matures (over and above the coupon payment for the year of maturity); T is the number of years in which the bond matures; r = 0.25, which means the market rate of interest is 25%.

Among the 5 bonds the bond A and another two bonds mature in 2 years, one of the bonds matures in 3 years, and the bond D matures in 5 years.

The coupon payments on bonds A, E, B, D and C are in arithmetic progression, such that the coupon payment on bond A is twice the common difference, and the coupon payment on bond B is half the price of bond A.

The face value of bond B is twice the face value of bond E, but the price of bond B is 75% more than the price of bond E. The price of bond C is more than Rs. 1800 and its face value is same as the price of bond A. The face value of bond A is Rs. 1000.

Bond D has the largest face value among the five bonds.

91. The face value of bond E must be

(1) Rs. 1406.25 (2) Rs. 1686.25 (3) Rs. 2250.50
(4) Rs. 2812.50 (5) Rs. 3372.50

92. Madhubala Devi purchased one or more of the 5 available bonds from her bonus pay and spent the remainder. She made the purchase decision such that her return from the bonds is maximized. Her return from the bonds is

(1) Rs. 3000.00 (2) Rs. 3250.00 (3) Rs. 3656.25
(4) Rs. 3906.25 (5) Rs. 4531.25

93. The price of bond C must be

(1) Rs. 1825 (2) Rs. 1874 (3) Rs. 1925
(4) Rs. 1976 (5) Rs. 2342

94. If all letters of the word "CHCJL" be arranged in an English dictionary, what will be the 50^{th} word?

(1) HCCLJ (2) LCCHJ (3) LCCJH
(4) JHCLC (5) None of the above

95. A manufacturer produces two types of products- A and B, which are subjected to two types of operations, viz. grinding and polishing. Each unit of product A takes 2 hours of grinding and 3 hours of polishing whereas product B takes 3 hours of grinding and 2 hours of polishing. The manufacturer has 10 grinders and 15 polishers. Each grinder operates for 12 hours/day and each polisher 10 hours/day. The profit margin per unit of A and B are Rs. 5/- and Rs. 7/- respectively. If the manufacturer utilises all his resources for producing these two types of items, what is the maximum profit that the manufacturer can earn?

(1) Rs. 280/- (2) Rs. 294/- (3) Rs.515/-
(4) Rs. 550/- (5) None of the above

96. A tank internally measuring 150cm × 120cm × l00cm has $1281600cm^3$ water in it. Porous bricks are placed in the water until the tank is full up to its brim. Each brick absorbs one tenth of its volume of water. How many bricks, of 20cm × 6cm × 4cm, can be put in the tank without spilling over the water?

(1) 1100 (2) 1200 (3) 1150
(4) 1250 (5) None of the above

97. The chance of India winning a cricket match against Australia is 1/6. What is the minimum number of matches India should play against Australia so that there is a fair chance of winning at least one match?

(1) 3 (2) 4 (3) 5
(4) 6 (5) None of the above

98. A chocolate dealer has to send chocolates of three brands to a shopkeeper. All the brands are packed in boxes of same size. The number of boxes to be sent is 96 of brand A, 240 of brand B and 336 of brand C. These boxes are to be packed in cartons of same size containing equal number of boxes. Each carton should contain boxes of same brand of chocolates. What could be the minimum number of cartons that the dealer has to send?

(1) 20 (2) 14 (3) 42 (4) 38 (5) 16

Answer questions nos. 99-101 based on the information given below.

The retail prices of flowers, consumer expenditure on flowers and sales of flowers for the calendar year 2009, in Phoolgaon, a small town with a population of 70000, is summarized in table 3.

Table 3

Month	Price (retail) of roses (Rs. / dozen)	Average consumer expenditure on roses and carnations (Rs.)	Total consumer expenditure on roses (Rs.)	Sales of carnations (dozens)
Jan	99	47.4	1136916	13848
Feb	112.5	51.9	1051650	20486
Mar	135	49.5	1137915	12928
Apr	130.5	51.6	1315310	14021
May	126	59.4	1116612	18774
Jun	157.5	55.8	979020	17579
Jul	144	56.4	1188432	17521
Aug	117	54.0	940446	20355
Sep	162	55.5	1287900	16031
Oct	126	55.2	772884	22897
Nov	189	52.8	597240	19128
Dec	166.5	56.4	977688	18859

99. Compared to January, the total expenditure on carnations in March

(1) increased by 6.27% (2) decreased by 6.64% (3) increased by 6.69%
(4) decreased by 7.11% (5) did not change

100. Compared to January, the sales of roses in July

(1) decreased by 39.15% (2) decreased by 28.13% (3) increased by 4.53%
(4) increased by 4.33% (5) did not change

101. Compared to January, the price of carnations in December

(1) increased by 26.57% (2) increased by 28.12% (3) increased by 36.19%
(4) increased by 38.16% (5) did not change

[Click here to get the Answer Key]