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# Exam Paper - 1

# Quantitative

# Abilities

# held on 12-4-2015

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Test Form No.
टेस्ट फॉर्म संख्या

# MA-2015    YY-

## PAPER - I (QUANTITATIVE ABILITIES)
### प्रश्न पत्र – I (परिमाणात्मक अभिरुचि)

Time Allowed : 2 Hours  (For V.H. and Cerebral Palsy Candidates : 2 hrs. 40 Min.)    Maximum Marks : 200
निर्धारित समय : 2 घण्टे  (दृष्टिबाधित और सेरिब्रल पाल्सी उम्मीदवारों के लिए : 2 घण्टे 40 मिनट)    अधिकतम अंक    : 200

**Read the following instructions carefully before you begin to answer the questions.**
**This Booklet contains questions in English as well as in Hindi Language.**
**प्रश्नों के उत्तर देने से पहले नीचे लिखे अनुदेशों को ध्यान से पढ़ लें ।**
**इस पुस्तिका में प्रश्न अंग्रेजी तथा हिन्दी दोनों भाषा में दिये गये हैं ।**

### INSTRUCTIONS TO CANDIDATES

1. This Booklet contains **100** questions.

2. In questions set bilingually in English and Hindi language, in case of discrepancy, the English version will prevail.

3. All questions are compulsory and carry equal marks.

4. *The paper carries negative marking. 0.50 mark will be deducted for each wrong answer.*

5. Before you start to answer the questions you must check up this Booklet and ensure that it contains all the pages (1-24) and see that no page is missing or repeated. If you find any defect in this Booklet, you must get it replaced *immediately*.

6. You will be supplied the Answer-Sheet separately by the Invigilator. You must complete and code the details of *Name, Roll Number, Ticket Number and Test Form Number* on Side-I of the Answer-Sheet carefully. You must also put your signature and Left-Hand thumb impression on the Answer-Sheet at the prescribed place before you actually start answering the questions. These instructions must be fully complied with, failing which, your Answer-Sheet will not be evaluated and you will be awarded 'ZERO' mark. (V.H. and Cerebral Palsy candidates will have to ensure that these details are filled in by the scribe. However, all V.H. and Cerebral Palsy candidates must put their left-hand thumb impression at the space provided in the Answer-Sheet. Those V.H. and Cerebral Palsy candidates who can sign should also put their signatures in addition to thumb impression.)

7. Answers must be shown by completely blackening the corresponding circles on Side-II of the Answer-Sheet against the relevant question number by **Black/Blue Ball Point Pen** only. Answers which are not shown by Black/Blue Ball-point Pen will not be awarded any mark.

8. A machine will read the coded information in the OMR Answer-Sheet. In case the information is incomplete or different from the information given in the application form, such candidate will be awarded 'ZERO' mark.

9. The Answer-Sheet must be handed over to the Invigilator before you leave the Examination-Hall.

10. Failure to comply with any of the above instructions will render a candidate liable to such action / penalty as may be deemed fit.

11. The manner in which the different questions are to be answered has been explained at the back of this Booklet (Page No. 24), which you should read carefully before actually answering the questions.

12. Answer the questions as quickly and as carefully as you can. Some questions may be difficult and others easy. Do not spend too much time on any question.

13. In lieu of Question Nos. 96 to 100 relating to figural portions, alternate questions have been provided to be attempted by V.H./ Cerebral palsy candidates only.

14. No rough work is to be done on the Answer-Sheet. Space for rough work has been provided below the questions.

15. *"Mobile phones and wireless communication devices are completely banned in the examination halls/rooms. Candidates are advised not to keep mobile phones/any other wireless communication devices with them even switching it off, in their own interest. Failing to comply with this provision will be considered as using unfair means in the examination and action will be taken against them including cancellation of their candidature."*

### उम्मीदवारों के लिए अनुदेश

1. इस पुस्तिका में कुल **100** प्रश्न हैं ।

2. अंग्रेज़ी और हिन्दी भाषा में तैयार किए गए द्विभाषी प्रश्नों में कोई विसंगति होने की स्थिति में अंग्रेज़ी विवरण मान्य होगा ।

3. सभी प्रश्न अनिवार्य हैं तथा सबके बराबर अंक हैं ।

4. प्रश्न पत्र में नकारात्मक अंकन होगा । हर गलत उत्तर के लिए 0.50 अंक कटा जाएगा ।

5. प्रश्नों के उत्तर देने से पहले आप इस पुस्तिका की जाँच करके देख लें कि इसमें पूरे पृष्ठ (1-24) हैं तथा कोई पृष्ठ कम या दुबारा तो नहीं आ गया है । यदि आप इस पुस्तिका में कोई त्रुटि पायें, तो तत्काल इसके बदले दूसरी पुस्तिका ले लें ।

6. निरीक्षक द्वारा आपको उत्तर-पत्रिका अलग से दी जायेगी । उत्तर-पत्रिका के Side-I में नियमावली के अनुसार ध्यानपूर्वक अपना *नाम, रोल नम्बर, टिकट नम्बर और टेस्ट फॉर्म संख्या* अवश्य लिखें । प्रश्नों के उत्तर वास्तव में शुरू करने से पहले उत्तर-पत्रिका पर निर्धारित स्थान में आप अपने हस्ताक्षर एवं बाएँ हाथ के अंगूठे का निशान भी अवश्य लगाएँ । उपर्युक्त अनुदेशों का पूरी तरह अनुपालन किया जाए, अन्यथा आपकी उत्तर-पत्रिका को जाँचा नहीं जाएगा और 'शून्य' अंक दिया जाएगा । (दृष्टिबाधित और सेरिब्रल पाल्सी उम्मीदवार सुनिश्चित करें कि यह विवरण लिपिक द्वारा भरा जाए । परन्तु सभी दृष्टिबाधित और सेरिब्रल पाल्सी उम्मीदवार उत्तर-पत्रिका में निर्धारित स्थान पर अपने बाएँ हाथ के अंगूठे का निशान अवश्य लगाएँ । जो दृष्टिबाधित और सेरिब्रल पाल्सी उम्मीदवार हस्ताक्षर कर सकते हैं, वे अंगूठे के निशान के अलावा अपने हस्ताक्षर भी कर दें ।)

7. उत्तर-पत्रिका में सभी उत्तर Side-II में प्रश्न संख्या के सामने दिये गये सम्बन्धित गोलाकार खानों को केवल काले/नीले बॉल-पॉइंट पेन से पूरी तरह काला करके दिखाएँ । जो गोलाकार खाने काले/नीले बॉल-पॉइंट पेन से नहीं भरे जाएँगे, उनके लिए कोई अंक नहीं दिया जाएगा ।

8. ओ.एम.आर. उत्तर-पत्रिका में भरी गई कूट सूचना को एक मशीन पढ़ेगी । यदि सूचना अपूर्ण है अथवा आवेदन प्रपत्र में दी गई सूचना से भिन्न है, तो ऐसे अभ्यर्थी को 'शून्य' अंक दिया जाएगा ।

9. परीक्षा हॉल छोड़ने से पहले परीक्षार्थी को उत्तर-पत्रिका निरीक्षक के हवाले कर देनी चाहिए ।

10. ऊपर के अनुदेशों में से किसी एक का भी पालन न करने पर उम्मीदवार पर विवेकानुसार कार्यवाही की जा सकती है या दण्ड दिया जा सकता है ।

11. विभिन्न प्रश्नों के उत्तर देने की विधि इस पुस्तिका के पीछे (पृष्ठ संख्या 24) में छपे हुए निर्देशों में दे दी गई है; इसे आप प्रश्नों के उत्तर देने से पहले ध्यानपूर्वक पढ़ लें ।

12. प्रश्नों के उत्तर जितनी जल्दी हो सके तथा ध्यानपूर्वक दें । कुछ प्रश्न आसान तथा कुछ कठिन हैं । किसी एक प्रश्न पर बहुत अधिक समय न लगाएँ ।

13. आकृति से सम्बन्धित प्रश्न संख्या 96 से 100 के बदले में केवल दृष्टिबाधित और सेरिब्रल पाल्सी उम्मीदवारों द्वारा हल किए जाने के लिए वैकल्पिक प्रश्न दिए गए हैं ।

14. कोई रफ़ कार्य उत्तर-पत्रिका पर नहीं करना । रफ़ कार्य के लिए स्थान प्रश्नों के नीचे दिया गया है ।

15. "परीक्षा हॉलों/कमरों में मोबाइल फोन तथा बेतार संचार साधन पूरी तरह निषिद्ध हैं । उम्मीदवारों को उनके अपने हित में सलाह दी जाती है कि मोबाइल फोन/किसी अन्य बेतार संचार साधन को स्विच ऑफ करके भी अपने पास न रखें । इस प्रावधान का अनुपालन न करने को परीक्षा में अनुचित उपायों का प्रयोग माना जाएगा और उनके विरुद्ध कार्रवाई की जाएगी, उनकी अभ्यर्थिता रद्द कर देने सहित ।"

**इस पुस्तिका की पॉलीथीन बैग/सील तब तक न खोलें जब तक कहा न जाए**

**MA-2015**

# Paper – I
## Quantitative Abilities

1. If the product of two positive numbers be 1575 and their ratio is 7:9, then the greater number is
   (A) 35  (B) 63  (C) 45  (D) 135

2. The average weight of first 11 persons among 12 persons is 95 kg. The weight of 12th person is 33 kg more than the average weight of all the 12 persons. The weight of the 12th person is
   (A) 128 kg  (B) 97.45 kg
   (C) 128.75 kg  (D) 131 kg

3. The average of the largest and smallest 3 digit numbers formed by 0, 2 and 4 would be
   (A) 213  (B) 303  (C) 312  (D) 222

4. The average of six numbers is 3.95. The average of two of them is 3.4, while the average of the other two is 3.85. The average of the remaining two numbers is
   (A) 4.5  (B) 4.7  (C) 4.6  (D) 4.8

5. If the average of eight consecutive even numbers be 93, then the greatest number among them is
   (A) 86  (B) 98  (C) 100  (D) 102

6. If the arithmetic mean of 3a and 4b is greater than 50, and a is twice b, then the smallest possible integer value of a is
   (A) 18  (B) 19  (C) 20  (D) 21

7. The average (arithmetic mean) of $3^{30}$, $3^{60}$ and $3^{90}$ is
   (A) $3^{60}$
   (B) $3^{177}$
   (C) $3^{27} + 3^{57} + 3^{87}$
   (D) $3^{29} + 3^{59} + 3^{89}$

8. Pooja wants to sell a watch at a profit of 20%. She bought it at 10% less and sold it at ₹ 30 less, but still she gained 20%. The cost price of watch is
   (A) ₹ 220  (B) ₹ 225
   (C) ₹ 240  (D) ₹ 250

9. A shopkeeper sold his goods at half the list price and thus lost 20%. If he had sold on the listed price, his gain percentage would be
   (A) 20%  (B) 35%
   (C) 60%  (D) 72%

10. Two types of tea costing ₹ 180/kg and ₹ 280/kg should be mixed in the ratio so that the mixture obtained, sold at ₹ 320/kg to earn a profit of 20% is
    (A) 1:13  (B) 2:13
    (C) 3:13  (D) 4:13

11. A profit of 12% is made when a mobile phone is sold at ₹ P and there is 4% loss when the phone is sold at ₹ Q. Then Q : P is
    (A) 4:5  (B) 3:1  (C) 1:1  (D) 6:7

**SPACE FOR ROUGH WORK**

12. A sells a cycle to B at a profit of 20% and B sells it to C at a loss of 25%. If C bought the cycle for ₹ P, then the cost price of it for A was

(A) ₹ $\frac{9}{10}$ P

(B) ₹ $\frac{10}{9}$ P

(C) ₹ $\frac{1}{20}$ P

(D) ₹ $\frac{9}{20}$ P

13. A man buys a toy for ₹ 25 and sells it for ₹ 30. His gain percent is

(A) 5%

(B) 2.5%

(C) 20%

(D) 10%

14. From 1980-1990, the population of a country was increased by 20%.

From 1990-2000, the population of the country was increased by 20%.

From 2000-2010, the population of the country was increased by 20%. Then the overall increased population (in percentage) of the country from 1980-2010 was

(A) 60%

(B) 62.8%

(C) 72.2%

(D) 72.8%

15. A supply of juice lasts for 35 days. If its use is increased by 40% the number of days would the same amount of juice lasts, is

(A) 30 days

(B) 27 days

(C) 25 days

(D) 24 days

16. A store offers a variety of discounts that range between 20% and 25% inclusive. If a book is discounted to a price of ₹ 270, then its greatest possible original price was

(A) ₹ 324

(B) ₹ 337.5

(C) ₹ 345.5

(D) ₹ 360

17. If the ratio of cost price to selling price is 10 : 11, then the rate of percent of profit is

(A) 0.1%

(B) 1%

(C) 1.1%

(D) 10%

18. A boat takes half time in moving a certain distance downstream than upstream. The ratio of the speed of the boat in still water and that of the current is

(A) 1:2  (B) 3:1  (C) 2:1  (D) 4:3

19. A tank has two pipes. The first pipe can fill it in 4 hours and the second can empty it in 16 hours. If two pipes be opened together at a time, then the tank will be filled in

(A) 10 hours

(B) $5\frac{1}{3}$ hours

(C) $5\frac{1}{2}$ hours

(D) 6 hours

20. A farmer travelled a distance of 61 km in 9 hours. He travelled partly on foot at the rate 4 km/hour and partly on bicycle at the rate 9 km/hour. The distance travelled on foot is

(A) 14 km

(B) 15 km

(C) 16 km

(D) 17 km

**SPACE FOR ROUGH WORK**

21. A man rows upstream 36 km and downstream 48 km taking 6 hours each time. The speed of the current is

(A) 2 km/hour  (B) 1.5 km/hour

(C) 0.5 km/hour  (D) 1 km/hour

22. On a certain principal the compound interest compounded annually for the second year at 10% per annum is ₹ 132. The principal is

(A) ₹ 1000  (B) ₹ 1320

(C) ₹ 1250  (D) ₹ 1200

23. The principal which gives ₹ 1 interest per day at a rate of 5% simple interest per annum is

(A) ₹ 7300  (B) ₹ 3650

(C) ₹ 5000  (D) ₹ 36500

24. When principal = ₹ S, rate of interest = 2r % p.a, then a person will get after 3 years at compound interest

(A) ₹ $S\left(1+\dfrac{r}{100}\right)^3$

(B) ₹ $3S\left(1+\dfrac{r}{100}\right)^3$

(C) ₹ $\dfrac{6Sr}{100}$

(D) ₹ $S\left(1+\dfrac{r}{50}\right)^3$

25. The sum of money which becomes ₹ 2420 at 10% rate of compound interest after two years is

(A) ₹ 1000  (B) ₹ 1500

(C) ₹ 2000  (D) ₹ 2500

26. From a solid right circular cylinder of length 4 cm and diameter 6 cm, a conical cavity of the same height and base is hollowed out. The whole surface of the remaining solid (in square cm.) is

(A) 15π  (B) 24π  (C) 48π  (D) 63π

27. A spherical ball of radius 1 cm is dropped into a conical vessel of radius 3 cm and slant height 6 cm. The volume of water (in $cm^3$), that can just immerse the ball, is

(A) $\dfrac{\pi}{3}$  (B) $\dfrac{4\pi}{3}$  (C) $\dfrac{5\pi}{3}$  (D) 3π

28. The in-radius of a triangle is 6 cm, and the sum of the lengths of its sides is 50 cm. The area of the triangle (in sq. cm.) is

(A) 50  (B) 56  (C) 150  (D) 300

29. One of the angles of a right-angled triangle is 15°, and the hypotenuse is 1 m. The area of the triangle (in sq. cm.) is

(A) 1200  (B) 1215

(C) 1220  (D) 1250

**SPACE FOR ROUGH WORK**

30. Assume that a drop of water is spherical and its diameter is one-tenth of a cm. A conical glass has a height equal to the diameter of its rim. If 32000 drops of water fill the glass completely, then the height of the glass (in cm.) is

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

31. If the height of a cylinder is 4 times its circumference, the volume of the cylinder in terms of its circumference c, is

    (A) $4\pi c^3$          (B) $2\pi c^3$

    (C) $\dfrac{2c^3}{\pi}$          (D) $\dfrac{c^3}{\pi}$

32. If the ratio of the angles of a quadrilateral is 2:7:2:7, then it is a

    (A) parallelogram  (B) rhombus

    (C) trapezium       (D) square

33. If for an isosceles triangle the length of each equal side is 'a' units and that of the third side is 'b' units, then its area will be

    (A) $\dfrac{a}{2}\sqrt{2a^2 - b^2}$ sq. units

    (B) $\dfrac{b}{2}\sqrt{a^2 - 2b^2}$ sq. units

    (C) $\dfrac{a}{4}\sqrt{4b^2 - a^2}$ sq. units

    (D) $\dfrac{b}{4}\sqrt{4a^2 - b^2}$ sq. units

34. The outer and inner diameter of a circular path be 728 m and 700 m respectively. The breadth of the path is

    (A) 28 m          (B) 20 m

    (C) 7 m           (D) 14 m

35. A piece of wire when bent to form a circle will have a radius of 84 cm. If the wire is bent to form a square, the length of a side of the square is

    (A) 132 cm          (B) 225 cm

    (C) 152 cm          (D) 168 cm

36. If radius of a circle is increased by 5%, then the increase in it's area is

    (A) 10%            (B) 5%

    (C) 10.25%         (D) 5.75%

37. The area of the parallelogram whose length is 30 cm, width is 20 cm and one diagonal is 40 cm is

    (A) $100\sqrt{15}$ cm$^2$   (B) $150\sqrt{15}$ cm$^2$

    (C) $200\sqrt{15}$ cm$^2$   (D) $300\sqrt{15}$ cm$^2$

38. On increasing each side of a square by 50%, the ratio of the area of new formed square and the given square will be

    (A) 9:3.5          (B) 9:4

    (C) 9:5            (D) 9:7

SPACE FOR ROUGH WORK

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**39.** The area of a circle is $324\,\pi$ sq.cm. The length of its longest chord (in cm.) is

(A) 28    (B) 32    (C) 36    (D) 38

**40.** The area of a rhombus is 256 sq.cm. and one of its diagonal is twice the other in length. Then length of its larger diagonal is

(A) 16 cm      (B) 24 cm

(C) 32 cm      (D) 48 cm

**41.** If $m = \sqrt{5 + \sqrt{5 + \sqrt{5 + \ldots}}}$ and $n = \sqrt{5 - \sqrt{5 - \sqrt{5 - \ldots}}}$, then among the following the relation between m & n holds is

(A) $m + n - 1 = 0$

(B) $m - n - 1 = 0$

(C) $m - n + 1 = 0$

(D) $m + n + 1 = 0$

**42.** If $\dfrac{3-5x}{2x} + \dfrac{3-5y}{2y} + \dfrac{3-5z}{2z} = 0$, then the value of $\dfrac{2}{x} + \dfrac{2}{y} + \dfrac{2}{z}$ is

(A) 5    (B) 15    (C) 20    (D) 10

**43.** The distance between 2 places R and S is 42 km. Anita starts from R with a uniform speed of 4 km/h towards S and at the same time Romita starts from S towards R also with same uniform speed. They meet each other after 6 hours. The speed of Romita is

(A) 6 km/hour      (B) 8 km/hour

(C) 18 km/hour      (D) 20 km/hour

**44.** If the side of a square is $\dfrac{1}{2}(x + 1)$ units and its diagonal is $\dfrac{3-x}{\sqrt{2}}$ units, then the length of the side of the square would be

(A) $\dfrac{1}{2}$ units      (B) 2 units

(C) $\dfrac{4}{3}$ units      (D) 1 unit

**45.** If $2s = a + b + c$, then the value of $s(s - c) + (s - a)(s - b)$ is

(A) abc      (B) $\dfrac{a + b + c}{2}$

(C) ab      (D) 0

**46.** If $p + m = 6$ and $p^3 + m^3 = 72$, then the value of pm is

(A) 12    (B) 8    (C) 6    (D) 9

**47.** When $x^m$ is multiplied by $x^n$, product is 1. The relation between m and n is

(A) $m = n$      (B) $m = -n$

(C) $mn = 1$      (D) $m + n = 1$

**48.** The area (in sq. unit) of the triangle formed by the graphs of the equations $x = 4$, $y = 3$ and $3x + 4y = 12$; is

(A) 12    (B) 3    (C) 24    (D) 6

**SPACE FOR ROUGH WORK**

49. If $\dfrac{2p}{p^r - 2p + 1} = \dfrac{1}{4}$, then the value of $\left(p + \dfrac{1}{p}\right)$ is

(A) $\dfrac{2}{5}$   (B) 10   (C) 7   (D) 1

50. If the ordinate and abscissa of the point $(K^r, 2K - 1)$ be equal, then the value of K is

(A) $-1$   (B) $\dfrac{1}{2}$   (C) 0   (D) 1

51. ABC is a triangle in which DE ∥ BC and AD:DB = 5:4 . Then DE : BC is

(A) 4:9   (B) 5:9   (C) 4:5   (D) 9:5

52. The radii of two concentric circles are 17 cm and 25 cm. A straight line PQRS intersects the larger circle at the points P and S and intersects the smaller circle at the points Q and R. If QR = 16 cm, then the length (in cm.) of PS is

(A) 32   (B) 40   (C) 41   (D) 33

53. AB is a diameter of a circle with centre O. The tangents at C meets AB produced at Q. If ∠CAB = 34°, then measure of ∠CBA is

(A) 34°   (B) 124°   (C) 56°   (D) 68°

54. For an equilateral triangle, the ratio of the in-radius and the outer-radius is

(A) $1:\sqrt{2}$        (B) $1:\sqrt{3}$

(C) 1:2        (D) 1:3

55. If a and b are the lengths of the sides of a right triangle whose hypotenuse is 10 and whose area is 20, then the value of $(a + b)^2$ is

(A) 180   (B) 160   (C) 140   (D) 120

56. The circumference of a triangle is 24 cm and the circumference of its in-circle is 44 cm. Then the area of the triangle is (taking $\pi = \dfrac{22}{7}$)

(A) 84 square cm.     (B) 68 square cm.

(C) 56 square cm.     (D) 48 square cm.

57. If the length of each of two equal sides of an isosceles triangle is 10 cm. and the adjacent angle is 45°, then the area of the triangle is

(A) $12\sqrt{2}$ square cm.

(B) $15\sqrt{2}$ square cm.

(C) $20\sqrt{2}$ square cm.

(D) $25\sqrt{2}$ square cm.

58. Let P and Q be two points on a circle with centre O. If two tangents of the circle through P and Q meet at A with ∠PAQ = 48°, then ∠APQ is

(A) 48°   (B) 60°   (C) 96°   (D) 66°

59. The length of the diagonal of a rectangle with sides 4 m and 3 m would be

(A) 7 m   (B) 14 m   (C) 12 m   (D) 5 m

**SPACE FOR ROUGH WORK**

60. If the sides of a triangle are in the ratio $3 : 1\frac{1}{4} : 3\frac{1}{4}$, then the triangle is

- (A) Obtuse triangle
- (B) Acute triangle
- (C) Right triangle
- (D) Equiangular triangle

61. The value of $\theta$ $(0 \leq \theta \leq 90°)$ satisfying $2\sin^2\theta = 3\cos\theta$ is

(A) 30° (B) 45° (C) 60° (D) 90°

62. a, b, c are the lengths of three sides of a triangle ABC. If a, b, c are related by the relation $a^2 + b^2 + c^2 = ab + bc + ca$, then the value of $(\sin^2 A + \sin^2 B + \sin^2 C)$ is

(A) $\frac{3\sqrt{3}}{2}$ (B) $\frac{9}{4}$ (C) $\frac{3}{4}$ (D) $\frac{3}{2}$

63. If $a\sin\theta + b\cos\theta = c$, then $a\cos\theta - b\sin\theta$ is equal to

(A) $\pm\sqrt{a^2 + b^2 + c^2}$

(B) $\pm\sqrt{c^2 + a^2 - b^2}$

(C) $\pm\sqrt{a + b - c}$

(D) $\pm\sqrt{a^2 + b^2 - c^2}$

64. If $\sin\theta + \cos\theta = \sqrt{2}\sin(90° - \theta)$ then the value of $\cot\theta$ is

(A) $\sqrt{2} - 1$ (B) $-\sqrt{2} + 1$

(C) $-\sqrt{2} - 1$ (D) $\sqrt{2} + 1$

65. If $\theta$ is positive acute angle and $3(\sec^2\theta + \tan^2\theta) = 5$, then the value of $\cos 2\theta$ is

(A) $\frac{1}{\sqrt{2}}$ (B) 1 (C) $\frac{1}{2}$ (D) $\frac{\sqrt{3}}{2}$

66. If $x\cos^2 30° \cdot \sin 60° = \dfrac{\tan^2 45° \cdot \sec 60°}{\csc 60°}$ then the value of $x$ is

(A) $\frac{1}{\sqrt{2}}$ (B) $\frac{1}{2}$ (C) $\frac{1}{\sqrt{3}}$ (D) $2\frac{2}{3}$

67. If $\tan\alpha = 2$, then the value of $\dfrac{\csc^2\alpha - \sec^2\alpha}{\csc^2\alpha + \sec^2\alpha}$ is

(A) $-\frac{3}{5}$ (B) $\frac{17}{5}$ (C) $-\frac{15}{9}$ (D) $\frac{3}{5}$

68. If $\sin(\theta + 30°) = \dfrac{3}{\sqrt{12}}$, then the value of $\cos^2\theta$ is

(A) $\frac{\sqrt{3}}{2}$ (B) $\frac{1}{2}$ (C) $\frac{1}{4}$ (D) $\frac{3}{4}$

69. In a right angled triangle $\triangle PQR$, PR is the hypotenuse of length 20 cm, $\angle PRQ = 30°$, the area of the triangle is

(A) $100\sqrt{3}$ cm$^2$ (B) $100/\sqrt{3}$ cm$^2$

(C) $50\sqrt{3}$ cm$^2$ (D) $25\sqrt{3}$ cm$^2$

70. If $0 \leq \theta \leq 90°$ and $4\cos^2\theta - 4\sqrt{3}\cos\theta + 3 = 0$, then the value of $\theta$ is

(A) 45° (B) 60° (C) 30° (D) 90°

**SPACE FOR ROUGH WORK**

**71.** If $x : y = 3 : 2$, then value of $\dfrac{x+y}{x-y}$ is

(A) $1 : 3$  (B) $3 : 1$

(C) $5 : 1$  (D) $1 : 5$

**72.** If 50% of $x = 30\%$ y, then $x : y$ is

(A) $5 : 3$  (B) $3 : 5$

(C) $2 : 3$  (D) $3 : 2$

**73.** The value of $\dfrac{1}{1+\sqrt{2}} + \dfrac{1}{\sqrt{2}+\sqrt{3}} +$

$\dfrac{1}{\sqrt{3}+\sqrt{4}} + \dfrac{1}{\sqrt{4}+\sqrt{5}} + \dfrac{1}{\sqrt{5}+\sqrt{6}} +$

$\dfrac{1}{\sqrt{6}+\sqrt{7}} + \dfrac{1}{\sqrt{7}+\sqrt{8}} + \dfrac{1}{\sqrt{8}+\sqrt{9}}$ is

(A) 0  (B) 1  (C) 2  (D) 4

**74.** While solving a problem, by mistake, Anita squared a number and then subtracted 25 from it rather than first subtracting 25 from the number and then squaring it. But she got the right answer. What was the given number ?

(A) 13

(B) 38

(C) 48

(D) Cannot be determined

**75.** A General of Army wants to form a square from 36562 armies. After arrangement, he found some armies left. How many armies were left ?

(A) 36  (B) 65  (C) 81  (D) 97

**76.** Square root of $\dfrac{2+\sqrt{3}}{2}$ is

(A) $\pm\dfrac{1}{2}(\sqrt{3}-2)$

(B) $\pm\dfrac{1}{2}(\sqrt{3}-1)$

(C) $\pm\dfrac{1}{\sqrt{2}}(\sqrt{3}+1)$

(D) None of these

**77.** The value of

$\sqrt{72+\sqrt{72+\sqrt{72+\ldots}}}$ is

(A) 8  (B) 12  (C) 9  (D) 18

**78.** In a farm there are cows and hens. If heads are counted there are 180, if legs are counted there are 420. The number of cows in the farm is

(A) 150  (B) 30  (C) 130  (D) 50

**79.** The number which can be written in the form of n (n + 1) (n + 2), where n is a natural number, is

(A) 3  (B) 6  (C) 7  (D) 5

**80.** The value of $(11111)^2$ is

(A) 121212121  (B) 11344311

(C) 12344321  (D) 123454321

SPACE FOR ROUGH WORK

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81. Two workers A and B are engaged to do a piece of work. A working alone would take 8 hours more to complete the work than when work together. If B worked alone, would take $4\frac{1}{2}$ hours more than when work together. The time required to finish the work together is
   (A) 4 hours      (B) 6 hours
   (C) 5 hours      (D) 8 hours

82. If a man earns ₹ 2000 for his first 50 hours of work in a week and is then paid one and one half times his regular hourly rate for any additional hours, then the hours must he work to make ₹ 2300 in a week is
   (A) 4 hours      (B) 5 hours
   (C) 6 hours      (D) 7 hours

83. If x can finish a job in 4 hours and y can finish the same job in 8 hours independently, then they together will finish the job in
   (A) 160 minutes    (B) 150 minutes
   (C) 140 minutes    (D) 120 minutes

84. A company employed 200 workers to complete a certain work in 150 days. If only $\frac{1}{4}^{th}$ of the work has been done in 50 days, then in order to complete the whole work in time, the number of additional workers to be employed was
   (A) 300          (B) 200
   (C) 100          (D) 600

85. x can copy 80 pages in 20 hours, x and y together can copy 135 pages in 27 hours. Then y can copy 20 pages in
   (A) 3 hours      (B) 12 hours
   (C) 20 hours     (D) 24 hours

86. x does ¼ of a job in 6 days. y completes rest of the job in 12 days. Then x and y could complete the job together in
   (A) $9\frac{3}{5}$ days      (B) $7\frac{1}{3}$ days
   (C) 9 days      (D) $8\frac{1}{8}$ days

87. Mr. x and Mr. y each bought the same motorcycle using a 10% off coupon. Mr. x's cashier took 10% off the price and then added 8.5% sales tax whereas Mr. y's cashier first added the sales tax and then took 10% off the total price. The amount Mr. x paid is
   (A) same as the amount Mr. y paid
   (B) greater than ₹ 850 as the amount Mr. y paid
   (C) less than ₹ 550 as the amount Mr. y paid
   (D) greater than ₹ 85 as the amount Mr. y paid

SPACE FOR ROUGH WORK

88. If a person marked a product 25% above the cost price but allows 10% discount, then the percentage of profit is

    (A) 15%  (B) 12.5%

    (C) 35%  (D) 17.5%

89. The price of an antique is reduced by 20% and then this price is again reduced by 10%. The total reduction of the price is

    (A) 30%  (B) 28%

    (C) 25%  (D) 23%

90. A builder purchases 25 windows at 25% off the total price of ₹ 1,20,000. If the builder receives an additional discount of ₹ 7500 for the purchase, then the cost of each window is

    (A) ₹ 3100  (B) ₹ 3200

    (C) ₹ 3300  (D) ₹ 3400

91. If $A : B = \frac{1}{2} : \frac{1}{3}$, $B : C = \frac{1}{5} : \frac{1}{3}$, then $(A + B) : (B + C)$ is equal to

    (A) 9:10  (B) 6:15

    (C) 5:8  (D) 15:16

92. In a partnership business, B's capital was half of A's. If after 8 months, B withdrew half of his capital and after 2 months more A withdrew $\frac{1}{4}$ th of his capital, then the profit ratio of A and B will be

    (A) 10:23  (B) 23:10

    (C) 5:2  (D) 2:5

93. A school group charters three identical buses and occupies $\frac{4}{5}$ of the seats. After $\frac{1}{4}$ of the passengers leave, the remaining passengers use only two of the buses. The fraction of the seats on the two buses that are now occupied is

    (A) $\frac{7}{10}$  (B) $\frac{9}{10}$  (C) $\frac{8}{9}$  (D) $\frac{7}{9}$

94. A and B invest in the ratio 3:5. After 6 months, C joins the business investing an amount equal to B's. At the end of the year what will be the ratio of their profits ?

    (A) 3:5:2  (B) 3:5:5

    (C) 6:10:5  (D) 8:10:5

95. In a library the ratio of story books and other books is 7 : 2 and there are 1512 story books. Due to collection of some more story books the said ratio becomes 15:4. The number of story books collected is

    (A) 100  (B) 97  (C) 108  (D) 205

SPACE FOR ROUGH WORK

Study the bar diagram and answer Question Nos. **96** & **97** :
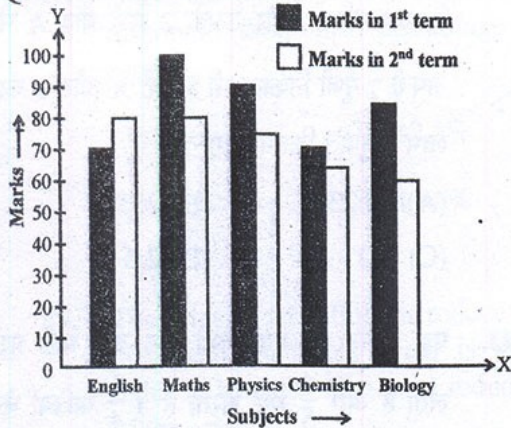


96. Ratio of highest and lowest marks obtained in first term among all the subjects is

(A) 7:9   (B) 9:7   (C) 10:7 (D) 7:10

97. Average marks obtained by the students for all subjects in second term is

(A) 65   (B) 73   (C) 62   (D) 72

In an Institution there are 800 students. Students use different modes of transport for going to the institution and return. The given pie diagram represents the requisite data. Study the diagram carefully and answer the question nos. **98 to 100**.
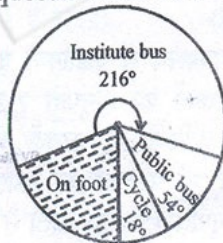


98. Number of students travel in public bus is

(A) 150 (B) 120   (C) 130 (D) 125

99. Number of students who do not use institute bus is

(A) 330 (B) 350   (C) 480 (D) 320

100. Number of students who go to institute on foot is

(A) 160 (B) 170   (C) 120 (D) 106

## For Visually Handicapped/Cerebral Palsy candidates only

96. The average of six numbers is $x$ and the average of three of these is $y$. If the average of the remaining three is $z$, then

(A) $x = y + z$        (B) $2x = y + z$

(C) $x = 2y + z$        (D) $x = 2y + 2z$

97. Which of the following fractions is greater than $\frac{3}{4}$ and less than $\frac{5}{6}$ ?

(A) $\frac{4}{5}$   (B) $\frac{2}{3}$   (C) $\frac{1}{2}$   (D) $\frac{9}{10}$

98. The radii of two right circular cylinders are in the ratio 2:3 and their heights are in the ratio 5:3. The ratio of their volumes is

(A) 4:9        (B) 9:4

(C) 20:27        (D) 27:20

99. The number of diagonals in an octagon is

(A) 8     (B) 16   (C) 18   (D) 20

100. Cost of 10 calculators and 12 watches is ₹ 11100. What is the cost of 40 calculators and 48 watches ?

(A) ₹ 44800        (B) ₹ 44400

(C) ₹ 46400        (D) ₹ 44000

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