

MIZORAM PUBLIC SERVICE COMMISSION

GENERAL COMPETITIVE EXAMINATIONS FOR RECRUITMENT TO THE POST OF STATION OFFICER (FIRE & EMERGENCY SERVICES) UNDER HOME DEPARTMENT, OCTOBER, 2018.

MATHEMATICS

Time Allowed : 3 hours

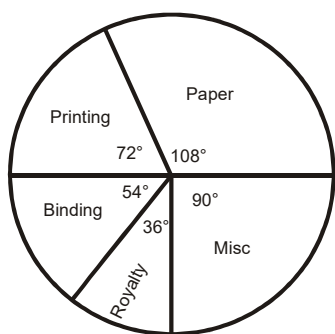
Full Marks : 100

Pass Marks : 40

All questions carry equal mark of 1 each. Attempt all questions.

- In a Junior School there are 240 pupils and 35% have free school dinners. Work out the number of children who do not have free school dinners.
(a) 156 (b) 200
(c) 167 (d) 175
- The value of $(2^{-1} \times 5^{-1})^{-1} \div 4^{-1}$ is -
(a) 2.5 (b) 40
(c) $\frac{4}{10}$ (d) $\frac{10}{4}$
- The present worth of Rs. 11025 due 1 year hence at 10% p.a, compounded half yearly is -
(a) Rs. 11000 (b) Rs. 10500
(c) Rs. 10000 (d) None of these
- Roots of $x^2 - x - 2 = 0$ are -
(a) (-2, 1) (b) (1, 2)
(c) (2, -1) (d) (-2, -1)
- What number group of numbers will come next in the given group of sequences (2, 4), (3, 9), (4, 16), ..
(a) (5, 10) (b) (5, 15)
(c) (5, 21) (d) (5, 25)
- A school calculated that it had given merits to boys and girls in the ratio of 4:1. There were a total of 680 merits given. How many merits did the girls get?
(a) 124 (b) 136
(c) 145 (d) 152

7. The adjoining pie chart shows the expenditure incurred by a publisher in bringing out a book. If a book costs Rs. 120 to the publisher, then the expenditure on binding the book is -



- (a) Rs. 16
(b) Rs. 18
(c) Rs. 26
(d) Rs. 38
8. If the arithmetic mean of 6, x, 13, 17 and 18 is 13, the value of 'x' is -
(a) 8
(b) 9
(c) 10
(d) 11
9. The nth term of an AP is $\frac{n^2 - 1}{19}$, the value of 20th term is -
(a) 17
(b) 19
(c) 21
(d) 23
10. In a committee, 50 people speak French, 20 speak Spanish and 10 speak both Spanish and French. How many speak at least one of these languages?
(a) 10
(b) 60
(c) 50
(d) 80
11. A bus travelled a distance of 180 m in 12 seconds. The speed of bus is -
(a) 15 km/hr
(b) 15 m/s
(c) 10 km/hr
(d) 10 m/s
12. The time taken to cover 102 km at 34 km/hr is -
(a) 6 hrs
(b) 5 hrs
(c) 4 hrs
(d) 3 hrs
13. A and B together can do a piece of work in 12 days, while B alone can finish it in 30 days. Then the work done by A in 1 day is -
(a) $\frac{1}{20}$
(b) $\frac{1}{12}$
(c) $\frac{1}{30}$
(d) $\frac{1}{60}$
14. You get a wage increase of 4% plus an extra £5 per week. Your present wages are £250 per week. What will your new wage be?
(a) £ 255
(b) £ 265
(c) £ 275
(d) £ 270

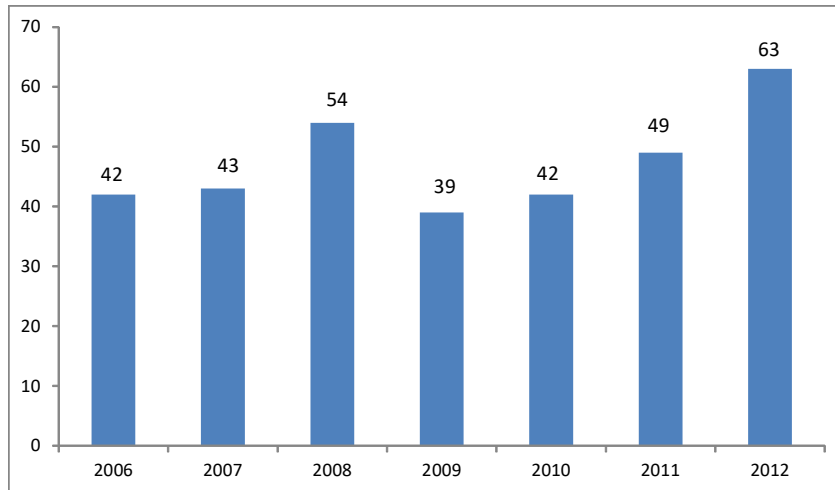
15. What is the missing number? $56/7 = ? - 5$?

- (a) 7 (b) 10
(c) 13 (d) 15

16. If oranges cost 5 for 75p how many can you buy for Rs. 2.70? (Assuming they can be bought singly)

- (a) 18 (b) 19
(c) 20 (d) 21

17. Pupils who succeeded in getting Maths GCSE at Grade C or above were analysed from 2006 to 2012.



The mean percentage from 2009 to 2012 was -

- (a) 45% (b) 46.25 %
(c) 48.25% (d) 49 %

18. The value of $\frac{\sqrt{243}}{\sqrt{363}}$ is -

- (a) $\frac{\sqrt{9}}{\sqrt{11}}$ (b) $\frac{\sqrt{81}}{\sqrt{121}}$
(c) $\sqrt{\frac{81}{121}}$ (d) $\frac{9}{11}$

19. If $x=2$ is one of the roots of the equation $kx^2 + 2x - 3 = 0$, then the value of 'k' is -

- (a) $\frac{1}{4}$ (b) $\frac{-1}{4}$
(c) 4 (d) -4

20. Solution set of equations $x+y=3$ and $4x-3y=26$ is -

- (a) (2, -5) (b) (-2, 5)
(c) (5, -2) (d) (-5, 2)

21. The multiplicative inverse of $\frac{x+1}{x-2}$ is -

(a) $\frac{x+2}{x-1}$

(b) $-\frac{x+1}{x-2}$

(c) $\frac{x-2}{x+1}$

(d) $\frac{x-1}{x+2}$

22. If $x : 9 = 4 : 3$, then the value of x is -

(a) 15

(b) 14

(c) 13

(d) 12

23. What same number must be added to each term of ratio 14:25 so that the ratio becomes 2:3?

(a) 6

(b) 7

(c) 8

(d) 9

24. The mean of first 8 odd numbers is -

(a) 3

(b) 5

(c) 4

(d) 8

25. The 9th term from the end of the AP 4, 9, 14, 254 is -

(a) 214

(b) 209

(c) 200

(d) 198

26. If $A = \{1, 2, 3\}$ and $B = \{3, 5, 7\}$, then $(A \cup B)$ is -

(a) $\{3\}$

(b) $\{1, 2\}$

(c) $\{5, 7\}$

(d) $\{1, 2, 3, 5, 7\}$

27. In a throw of a die, the probability of getting a prime number is -

(a) $\frac{1}{2}$

(b) $\frac{3}{2}$

(c) $\frac{1}{3}$

(d) $\frac{2}{3}$

28. How many non square numbers lie between 11^2 and 12^2 ?

(a) 21

(b) 23

(c) 22

(d) 20

29. Which smallest number should be added to 80 so as to make it a perfect square?

(a) 2

(b) 3

(c) 1

(d) 4

30. The HCF of $(x-3)^2(x+4)^2$ and $(x-1)(x+4)(x-3)^2$ is:

(a) $(x-1)(x-3)(x+4)$

(b) $(x-3)(x+4)^2$

(c) $(x+4)(x-3)^2$

(d) $(x+4)(x-3)$

31. A and B can do a piece of work in 8 days which B can complete it in 12 days. A alone can complete the work in:
- (a) 6 days (b) 24 days
(c) 12 days (d) $\frac{1}{12}$ days.
32. A 250m long train running at a speed of 60km/hr will cross a pole in:
- (a) 15 seconds (b) 15 minutes
(c) 1.5 minutes (d) 1.5 seconds.
33. Two pipes A and B can fill a cistern in 24 minutes and 30 minutes respectively. The cistern has an outlet C also. If all the three pipes are opened together, the cistern is filled in 20 minutes. The outlet pipe C can empty the full cistern in:
- (a) 30 minutes. (b) 44 minutes
(c) 40 minutes (d) 34 minutes.
34. A quadratic polynomial, whose zeroes are -3 and 4 is:
- (a) $2x^2 + 2x - 24$ (b) $x^2 + x + 12$
(c) $x^2 - x + 12$ (d) $x^2 - x - 12$
35. The common difference of an AP in which $a_{19} - a_{15} = 36$ is:
- (a) 4 (b) -4
(c) -9 (d) 9
36. The sum of the first 100 natural numbers is:
- (a) 4650 (b) 5000
(c) 5050 (d) 4750
37. The length of the diagonals of a rhombus are 16 cm and 12 cm. Then the length of the side of the rhombus is:
- (a) 9 cm (b) 8 cm
(c) 20 cm (d) 10 cm
38. Sides of two similar triangles are in the ratio $4 : 9$. Area of these triangles are in the ratio:
- (a) $2 : 3$ (b) $4 : 9$
(c) $16 : 81$ (d) $81 : 16$
39. The distance of the point P $(-6, 8)$ from the origin is:
- (a) 8 units (b) 6 units
(c) 10 units (d) $2\sqrt{7}$ units
40. If the area of a circle is 616 cm^2 , then its radius is:
- (a) 14 cm (b) 7 cm
(c) 15.2 cm (d) 16.5 cm
41. If the circumference of a circle is 132 cm, then the radius of the circle is:
- (a) 2.1 cm (b) 18 cm
(c) 20 cm (d) 21 cm

42. If two solid hemispheres of same base radius r units are joined together along their bases, then curved surface area of this new solid is:
- (a) $3\pi r^2$ sq. units (b) $4\pi r^2$ sq. units
(c) $6\pi r^2$ sq. units (d) $8\pi r^2$ sq. units

43. The times, in seconds, taken by 180 candidates in an Army Recruitment camp to run a 100 m race are tabulated below:

Class	13.8 – 14	14 – 14.2	14.2 – 14.4	14.4 – 14.6	14.6 – 14.8	14.8 – 15
Frequency	5	7	8	68	72	20

The number of athletes who completed the race in less than 14.6 seconds is:

- (a) 20 (b) 88
(c) 68 (d) 140
44. The probability of getting a rotten apple in a lot of 200 is 0.035. The number of rotten apples in the lot is:
- (a) 6 (b) 9
(c) 8 (d) 7
45. An article is available for Rs. 1500 or for cash down payment of Rs 700 followed by two equal instalments of Rs 500 each. The total interest charged is:
- (a) Rs 300 (b) Rs 100
(c) Rs 200 (d) 250
46. Rema goes to his village by his car at the speed of 20 km/h and comes back to the same point at the speed of 40 km/h. His average speed for the whole journey is:
- (a) 26.67 km/h (b) 20 km/h
(c) 40 km/h (d) 30 km/h
47. A tank which has a leak in its bottom is filled in 20 hours. Had there been no leak in the bottom, it would have been filled in 15 hours. The leak can empty the tank in:
- (a) 20 hours (b) 60 hours
(c) 75 hours (d) 15 hours
48. In an AP, if $a = 1$, $a_n = 20$ and $S_n = 399$, then n is:
- (a) 17 (b) 21
(c) 42 (d) 38
49. From a point Q, the length of tangent to a circle is $2\sqrt{7}$ cm and the distance of Q from the centre of the circle is 8 cm. The radius of the circle is:
- (a) 6 cm (b) 11 cm
(c) 12 cm (d) 15 cm
50. The mid-point of the line segment joining the points A(- 1, 7) and B(-5, -3) is:
- (a) (- 3, 2) (b) (3, 1)
(c) (1, 5) (d) (-3, -5)

51. A building is 50 m high. The angle of elevation of its top from a point which is 50 m away from the foot, is:
- (a) 30° (b) 45°
(c) 60° (d) 90°
52. A solid piece of iron in the form of a cuboid of dimensions (49 cm X 33 cm X 24 cm), is moulded to form a solid sphere. The radius of the sphere is:
- (a) 21 cm (b) 19 cm
(c) 23 cm (d) 25 cm
53. The LCM of $f(x) = (x + 3)^2(x + 1)^2(x - 2)$ and $g(x) = (x + 1)^3(x + 3)(x + 4)$ is:
- (a) $(x + 1)^2(x + 3)(x + 4)$ (b) $(x + 1)^2(x + 1)(x + 4)$
(c) $(x + 3)^2(x + 1)^3(x - 2)(x + 4)$ (d) $(x + 1)(x - 2)(x + 3)(x + 4)$
54. The additive inverse of $\frac{x-3}{x+7}$ is:
- (a) $\frac{x-7}{x+3}$ (b) $\frac{x+3}{x-7}$
(c) $-\frac{(x-3)}{x+7}$ (d) $\frac{x+7}{x-3}$
55. Which of the following equations has 2 as a root?
- (a) $x^2 - 5x + 5 = 0$ (b) $x^2 + 3x - 11 = 0$
(c) $2x^2 - 7x + 6 = 0$ (d) $3x^2 - 6x - 2 = 0$
56. If $\frac{6}{5}$, a, 4 are in AP, the value of a is:
- (a) $\frac{13}{5}$ (b) 13
(c) 1 (d) $\frac{26}{5}$
57. If θ is the angle (in degrees) of a sector of a circle of radius r, then area of the sector is:
- (a) $\frac{\pi r^2 \theta}{180^\circ}$ (b) $\frac{\pi r^2 \theta}{360^\circ}$
(c) $\frac{2\pi r \theta}{180^\circ}$ (d) $\frac{2\pi r \theta}{360^\circ}$
58. A wire is made into a rectangle of length 84 cm and breadth 70 cm. The same wire is made into a circle. The radius of the circle is:
- (a) 48 cm (b) 45 cm
(c) 47 cm (d) 49 cm

59. In $\triangle ABC$, $AB = 6\sqrt{3}$ cm, $BC = 6$ cm, $AC = 12$ cm. Then angle B is:
- (a) 60° (b) 120°
(c) 45° (d) 90°
60. If $n(A) = 40$, $n(A \cup B) = 60$, $n(A \cap B) = 10$, then $n(B) =$
- (a) 70 (b) 50
(c) 60 (d) 30
61. In an examination, 63% of the candidates failed in English and 42% failed in Mathematics. If 25% failed in both English and Mathematics, then the percentage of those who passed in both the subjects is:
- (a) 37% (b) 58%
(c) 30% (d) 20%
62. In $\triangle ABC$, right-angled at B, $AB = 24$ cm, $BC = 7$ cm, then AC is equal to:
- (a) 25cm (b) 26cm
(c) 21cm (d) 12cm
63. David has invested money in some shares that have a projected accumulated increase of 3.5% a year. In five years' time, how much money will David have if he invested £450?
- (a) £530 (b) £534.46
(c) £528.75 (d) £525.5
64. What is 12.5% of 380 Kilograms?
- (a) 47.5 (b) 35.8
(c) 53.2 (d) 60.3
65. The head of English created the following table showing the number of pupils in each year group who had additional help in English. What is the percentage of pupils in all the year groups combined that are having additional tuition. Give your answer rounded to a whole number.

Year Group	No. of pupils	No. of pupils receiving additional help in English
7	96	15
8	108	21
9	111	16
10	98	9
11	116	15

- (a) 13.5% (b) 14%
(c) 15.2% (d) 16%

66. Sum of $\frac{-9}{16}$ and $\frac{5}{12}$ is -

(a) $\frac{-7}{18}$

(b) $\frac{7}{28}$

(c) $\frac{-7}{48}$

(d) $\frac{7}{48}$

67. In which quadrant does the coordinates of the midpoint of the line segment joining the points A (-2, 0) and B (0, 8) -

(a) I quadrant

(b) II quadrant

(c) III quadrant

(d) IV quadrant

68. If 36 and 16 are mode and median respectively, then the value of mean of the data is -

(a) 4

(b) 6

(c) 2

(d) 3

69. If A and B are two sets that $n(A) = 10$ and $n(A - B) = 4$, the value of $n(A \cap B)$ is -

(a) 4

(b) 6

(c) 14

(d) 10

70. A bag contains 3 white, 4 red and 5 black balls. One ball is drawn at random. The probability that the ball drawn is neither black nor white is -

(a) $\frac{1}{4}$

(b) $\frac{1}{2}$

(c) $\frac{1}{3}$

(d) $\frac{3}{4}$

71. Subtracting $7x + y$ from $-x + y$ gives

(a) $6x + 2y$

(b) $8x + 2y$

(c) $8x$

(d) $-8x$

72. The value of $\left(\frac{a}{b}\right)^0$ is -

(a) -1

(b) 1

(c) 0

(d) ∞

73. The product of the roots of the equation $x^2 - 3x + 2 = 0$ is -

(a) 3

(b) $\frac{-2}{3}$

(c) 2

(d) $\frac{-3}{2}$

74. In a two digit number, if 'a' is the digit in the unit's place and 'b' in the ten's place, then the two digit number must be -
(a) ab (b) 10 ab
(c) 10a+b (d) 10b+a
75. The age of A and B are in the ratio 6:11. Twenty years ago their ages were in the ratio of 2:7. Their present ages are -
(a) 30 yrs & 55 yrs (b) 26 yrs & 31 yrs
(c) 36 yrs & 41 yrs (d) 26 yrs & 91 yrs
76. Median class of the above frequency distribution table is -

C.I	0-10	10-20	20-30	30-40	40-50
f	6	10	11	2	1

- (a) 10-20 (b) 20-30
(c) 30-40 (d) 40-50
77. Which term of the AP 4, 9, 14, 19, is 124?
(a) 20th term (b) 22nd term
(c) 23rd term (d) 25th term
78. The expansion of a^3 is -
(a) $3 \times a$ (b) $a + a + a$
(c) $3 \times 3 \times 3$ (d) $a \times a \times a$
79. If zero of the polynomial $(x^2 + 3x + k)$ is 2, then the value of k is :
(a) 5 (b) - 5
(c) 10 (d) - 10
80. The roots of the equation $x^2 + px + q = 0$ are equal if:
(a) $p^2 = 2q$ (b) $p^2 = - 4q$
(c) $p^2 = - 2q$ (d) $p^2 = 4q$
81. If radii of two concentric circles are 4 cm and 5 cm, then the length of each chord of one circle which is tangent to the other circle is:
(a) 9 cm (b) 6 cm
(c) 3 cm (d) 1 cm
82. The distance between the points A (6, 5) and B (0, - 3) is:
(a) 10 units (b) 8 units
(c) 14 units (d) 40 units
83. If $\sec^2 \theta (1 + \sin \theta) (1 - \sin \theta) = k$, the value of k is:
(a) 1 (b) - 1
(c) 0 (d) 2

84. The value of $\cos 47^\circ \sin 43^\circ + \sin 47^\circ \cos 43^\circ$ is:
(a) 0 (b) $\frac{1}{2}$
(c) 1 (d) 2
85. The area of a circle that can be inscribed in a square of side 6 cm is:
(a) $36p \text{ cm}^2$ (b) $18p \text{ cm}^2$
(c) $12p \text{ cm}^2$ (d) $9p \text{ cm}^2$
86. A and B can do a piece of work in 10 days, B and C in 15 days, C and A in 30 days. In how many days can they do it all working together?
(a) 15 days (b) 8 days
(c) 11 days (d) 10 days
87. From a point outside the circle, the number of tangents that can be drawn to the circle is:
(a) infinitely many (b) 1
(c) 2 (d) 0
88. A kite is attached to a string. If the kite is flying at a height of 45 m and the string makes an angle of 30° with the ground, then the length of the string is:
(a) 60 m (b) 90 m
(c) 120 m (d) 75 m
89. The radii of the ends of a frustum of a cone 40 cm high are 20 cm and 11 cm. Its slant height is:
(a) $\sqrt{521}$ cm (b) 41 cm
(c) $20\sqrt{5}$ cm (d) 49 cm
90. If the common difference of an AP is 4, then what is $a_8 - a_3$?
(a) 4 (b) 8
(c) 16 (d) 20
91. The formula for finding the curved surface area of a right circular cylinder is:
(a) $2p r^2 h$ (b) $2p r h$
(c) $3p r h$ (d) $4p r h$
92. Which one of the following is not the sides of a right angled triangle?
(a) 3 cm, 4 cm, 5 cm (b) 6 cm, 8 cm, 10 cm
(c) 9 cm, 12 cm, 15 cm (d) 11 cm, 12 cm, 17 cm
93. $\triangle ABC \sim \triangle PQR$ and $\frac{BC}{QR} = \frac{1}{3}$. Then $\frac{\text{ar}(\triangle PRQ)}{\text{ar}(\triangle BCA)}$ is equal to:
(a) 9 (b) 3
(c) $\frac{1}{3}$ (d) $\frac{1}{9}$
94. If $a : b = 5 : 8$ and $b : c = 7 : 10$, then $a : b : c =$
(a) $5 : 8 : 10$ (b) $5 : 7 : 10$
(c) $35 : 56 : 80$ (d) $5 : 56 : 10$

95. The mean of 16 numbers is 8. If 2 is added to every number, what will be the new mean?

- (a) 10
- (b) 12
- (c) 14
- (d) 16

96. A gun is fired at a distance of 5.4 km from Liana and he hears the sound after 3 minutes. The speed of sound in metre per second is -

- (a) 60 m/s
- (b) 45 m/s
- (c) 30 m/s
- (d) 90 m/s

97. The modal class of the frequency distribution table given below is -

C.I	0 - 5	5 - 10	10 - 15	15 - 20	20 - 25
f	3	5	8	2	2

- (a) 0-5
- (b) 5-10
- (c) 10-15
- (d) 15-20

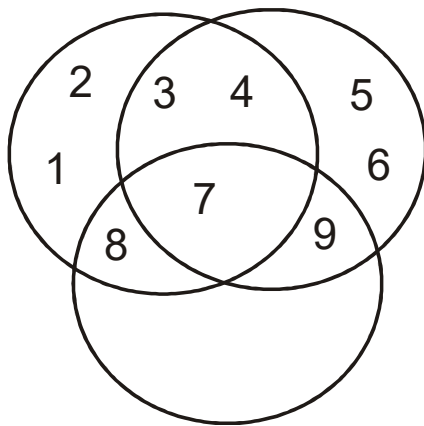
98. What is 454 divided by 0.2?

- (a) 5270
- (b) 4450
- (c) 3370
- (d) 2270

99. Division of Rs 980 in the ratio 12 : 23 is -

- (a) Rs. 335 & Rs. 644
- (b) Rs. 336 & Rs. 634
- (c) Rs. 336 & Rs. 644
- (d) Rs. 335 & Rs. 544

100. In the given diagram, $(A \cap B) \cap C =$



- (a) {1,2,3,4,5,6,7,8,9}
- (b) {3,4,7,8,9}
- (c) {3,4,7}
- (d) {7}