Young Scholors Foundation

MATHEMATICS

GRADE 10

Prizes

1st Rank	2nd Rank	3rd Rank
Trip to Dubai	₹ 25000	₹ 10000
+	+	+
Gold Medal + Certificate of Excellence	Silver Medal + Certificate of Excellence	Bronze Medal + Certificate of Excellence

4th TO 10th Rank
Rs 1100
+ Certificate of Excellence

11th TO 50th Rank
Wrist Watch

+ Certificate of Excellence

Instructions

Time : 1 hour **Maximum Marks : 100**

1. Maximum Time is 1 hour & You will get additional ten minutes to fill up information about yourself on the OMR Sheet, before the start of the exam.
2. Write your **Name, School Code, Class, Roll No.** and **Mobile Number** clearly on the **OMR Sheet** and do not forget to sign it.
3. The Question Paper comprises four sections:
   Mathematical Reasoning (15 Questions), **General Maths** (15 Questions), **Logical Reasoning** (10 Questions) and Wise Wizard (10 Questions). Each question carries two marks.
4. All questions are compulsory. There is no negative marking. Use of calculator is not permitted.
5. To mark your choice of answers by darkening the circles on the OMR Sheet, use **HB Pencil** or **Blue / Black ball point pen** only.

Roll No | | | | | | |

Student Name | | | | | | | | | | |

Father's Name | | | | | | | | | | |

SECTION - A (MATHEMATICAL REASONING)

Q1. $\frac{sin\,(-x)}{cos\,(-x)}$ cannot be equal to

a. $\frac{-sin\,x}{cos\,x}$ b. tan (-x) c. –cot $\left(\frac{\pi}{2}-x\right)$ d. tan x

Q2. If the points (–1, 2), (3, *p*) and (5, –1) are collinear, then the value of *p* is

a. $\frac{5}{6}$ b. 0 c. 1 d. $-\frac{5}{3}$

Q3. Sum of n terms of the series

$\sqrt{80}$, $\sqrt{45}$, $\sqrt{20}$, ... is .....

a. $\frac{\sqrt{5\,n}}{2}$ (9-n) b. $4\sqrt{5}$ (9-n) c. $2\sqrt{5}$(9 – n) d. $3\sqrt{5}$ (3 - n)

Q4. From an external point *P*, two tangents *PA* and *PB* are drawn to a circle with centre *O*. The measure of $\angle PAB$ is equal to which of the following angle?

a. $\angle APO$ *b.* $\angle AOP$ *c.* $\angle OAP$ *d.* $\angle OBP$

Q5. If sum and product of the zeroes of a cubic polynomial is zero, then one of the zeroes must be

a. 1 b. 0 c. $\frac{1}{2}$ d. -1

Q6. Sum of *n*-terms of $\frac{1}{m}$, $\frac{3m+2}{2m}$, $\frac{3m+1}{m}$, ... is

a. $\frac{m}{2n}(3mn-3n+4)$

b. $\frac{m}{4n}(3mn-3n+4)$

c. $\frac{n}{2m}(3mn-3n+4)$

d. $\frac{n}{4m}(3mn-3m+4)$

Q7. If (–1, –1), (5, –2), (6, 1) and (2, 3) are the coordinates of the vertices of a quadrilateral, then the area enclosed is

a. 45 sq. units b. 30 sq. units c. 22.5 sq. units d. 20.5 sq. units

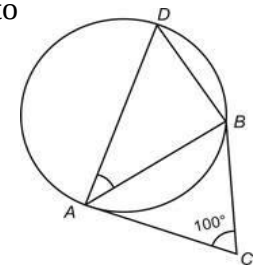
Q8. The sum of 4^{th} and 6^{th} term of an A.P. is $5m + 4$ and the sum of first and seventh term is $5m – 2$, then the common difference is equal to

a. 4 b. 6 c. 3 d. 2

Q9. If the three zeroes of a cubic polynomial $2x^3 + 3x^2 + kx – 2$ are in AP, then the value of *k* is equal to

a. 3 b. 2 c. -2 d. -3

Q10. In the given figure, $BD = AB$, AC and BC are the tangents at A and B respectively. The measure of $\angle DAB$ is equal to



a. 50 ° b. 40 ° c. 60 ° d. 70 °

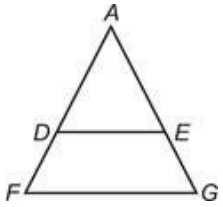
Q11 . For what possible value of P the following pair of linear equations has infinitely many solutions?

$Px + (P + 1)y = 12$

$6x + (4P + 1)y = 36$

a. 1 b. 3 c. 2 d. 4

Q12 . In the given figure, $DE \| FG$ and $\frac{DE}{FG} = \frac{2}{3}$ then the ratio of area of ΔADE to that of quadrilateral ($DEGF$) is



a. 4 : 1 b. 4 : 9 c. 4 : 5 d. 3 : 5

Q 13. How many spherical bullets can be made by melting a solid cube of volume 1 m^3. If there is a loss of 12% in the process, given that diameter of the bullets is 2 cm?

a.226500 b. 256200 c. 262500 d. 210000

Q14 . Pipes 'A' and 'B' can fill a tank in 6 hours and 8 hours respectively. Pipe 'C' can empty it in 12 hours. If all the three pipes are opened together, then the tank will be filled in

a. $4\frac{4}{5}$ hours b. $4\frac{1}{5}$ hours c. $5\frac{2}{5}$ hours d. $4\frac{3}{5}$

Q15 . If the HCF of two natural numbers is 42, then their LCM cannot be

a. 84 b. 126 c. 105 d. 210

SECTION - B (GENERAL MATHS)

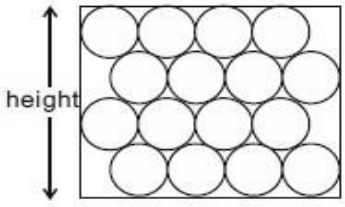
Q16. 16 circular rings of diameter 4 cm each are pasted tightly in a rectangular sheet as shown in the figure. The height of the sheet is

a. $4 (2\sqrt{3} + 3)$ cm

b. $2 (3\sqrt{3} + 2)$ cm

c. $3 (6\sqrt{3} + 4)$ cm

d. $2 (3\sqrt{3} + 4)$ cm



Q17. If height of a cone is doubled and radius of the cone is halved, then the volume is decreased by

a. 100 % b. 50 % c. 0 % d. 75 %

Q18 . The area of a triangular field whose coordinates of vertex are (–3, –7), (7, 9) and (1, 1) is

a. 4 sq. units b. 6 sq. units c. 8 sq. units d. 16 sq. units

Q 19. The observations 42, 37, 59, 48, 45, 42, 43, 59, 58, 45, 69, 56, x, y, z where x, y,z are distinct. If the data has only one mode, then the mode of the data cannot be

a. 42 b. 59 c. 45 d. 56

Q20. If odds against an event is $\frac{19}{15}$, then the probability of occurrence of the event is equal to

a. $\frac{19}{15}$ b. $\frac{15}{19}$ c. $\frac{15}{34}$ d. $\frac{19}{34}$

Q 21. A boat goes 24 km downstream in 4 hrs and 12 km upstream in 3 hrs. Ratio of the speed of the boat in still water and the speed of the stream is

a. 1 : 5 b. 4 :1 c. 5:1 d. 1:6

Q22 . Rahul plays a game in which two dice are thrown together. Rahul wins if the product of the two numbers appearing on their tops is even and a multiple of 3. The probability of Rahul losing the game is

a. $\frac{1}{4}$ b. $\frac{2}{3}$ c. $\frac{3}{4}$ d. $\frac{7}{12}$

Q23. Father's age is equal to square of his daughter's age. Three years ago, he was eleven times to his daughter's age, then his daughter's minimum age will be

a. 4 years b. 6 years c. 5 years d. 8 years

Q24. If $\cot^4\theta - \cot^2\theta = 1$ $(\theta \neq 0°)$, then $\cos^4\theta$ is

a. $\cos^2\theta$ b. $\sin^4\theta$ c. $\sin^2\theta$ d. $\sin\theta$

Q25. The value of the expression $\frac{\tan(30^\circ - \theta)\tan(30^\circ + \theta)}{\tan\theta}$ is equal to

a. $\tan3\theta$ b. $\tan\theta$ c. $\cot3\theta$ d. $\cot\theta$

Q26. A 12 metres high tower casts a shadow 30 metres long at a certain time and at the same time, another pole casts a shadow 20 metres long, then the height of another pole is

a.12 m b. 10 m c. 8 m d. 6 m

Q 27. Ram bought a television, at the concession of 28% on the labelled price of television and sold for Rs. 21600 with 20% profit on the price he bought for. The labelled price was

a. 20000 b. 27000 c. 30000 d. 25000

Q28. If the circumference of the base of a toy which is in the shape of a cone is increased from 10π cm to 30π cm and its height is decreased by 45%, then the ratio of the volume of new cone to that of original is

a. 15 : 13 b. 99 : 20 c. 51 : 13 d. 17 : 65

Q29. From a well-shuffled pack of cards, a card is drawn at random. The probability of getting a red coloured face card is

a. $\frac{3}{26}$ b. $\frac{2}{13}$ c. $\frac{3}{13}$ d. $\frac{4}{13}$

Q30. A circle passes through the three vertices of an isosceles triangle that has two sides of length 6 cm and base 4 cm. The area of the circle is

a. $\frac{81\pi}{8}$ cm^2 b. 45π cm^2 c. $\frac{24\pi}{7}$ cm^2 d. $\frac{94\,\pi}{7}$ cm^2

SECTION - C (LOGICAL REASONING)

Q31. The day of the week on 1st January, 2001 was

a. Tuesday b. Sunday c. Monday d. Wednesday

Q32. *Direction :Read the given pattern carefully and answer the following questions.*

a b c d e f g h i j k l m n o p q r s t u v w x y z

If each letter from the left assigned a prime number starting from '2', then which of the following letter is assigned number '23'?

a. h b. j c. K d. i

Q33. In which of the following option, figure X is embedded?

a.  b.  c.  d. 

Q34. *Direction :Read the given information carefully and answer the following question.*

I. Wasim, Ashwani, Deepak, Subir and Rajesh teaches five different subjects which are Computers, Chemistry, Physics, Mathematics and Social Science but order is not same as of the name. No two teacher teaches the same subject.

II. The name of the states from which teachers belongs are Delhi, Rajasthan, Bihar, West Bengal and Uttar Pradesh but order is not same as of the name. Wasim does not teaches Maths or Social Science or Physics and does not belongs to Bihar or Uttar Pradesh or West Bengal. Rajesh teaches Chemistry and belongs to Rajasthan.

III. Ashwani does not teaches Social Science or Physics and does not belongs to Bihar or West Bengal. Deepak does not belong to West bengal and does not teaches Physics. Who is the teacher of Social Science?

a. Wasim b. Subir c. Ashwani d. Deepak

Q35. ***Direction*** *:Read the given information carefully and answer the following question.*

I. Wasim, Ashwani, Deepak, Subir and Rajesh teaches five different subjects which are Computers, Chemistry, Physics, Mathematics and Social Science but order is not same as of the name. No two teacher teaches the same subject.

II. The name of the states from which teachers belongs are Delhi, Rajasthan, Bihar, West Bengal and Uttar Pradesh but order is not same as of the name. Wasim does not teaches Maths or Social Science or Physics and does not belongs to Bihar or Uttar Pradesh or West Bengal. Rajesh teaches Chemistry and belongs to Rajasthan.

III. Ashwani does not teaches Social Science or Physics and does not belongs to Bihar or West Bengal. Deepak does not belong to West bengal and does not teaches Physics. Who is the teacher of Mathematics?

a. Subir b. Wasim c. Ashwani d. Rajesh

Q36. ***Direction*** *: A cube is painted with red only on three surfaces in such a manner that two painted surfaces are opposite to each other. If cube is cut in to 343 smaller cubes of equal size, then answer the following question.*

The total number of smaller cubes of equal size which are painted red exactly on two surfaces is

a. 10 b. 14 c. 28 d. 60

Q37. *Direction : A cube is painted with red only on three surfaces in such a manner that two painted surfaces are opposite to each other. If cube is cut in to 343 smaller cubes of equal size, then answer the following question.*

The total number of smaller cubes of equal size which are painted red exactly on one s urfaces is

a. 119 b. 133 c. 110 d.111

Q38. *Direction : A cube is painted with red only on three surfaces in such a manner that two painted surfaces are opposite to each other. If cube is cut in to 343 smaller cubes of equal size, then answer the following question.*

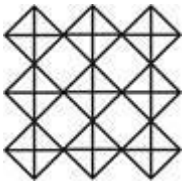
The total number of smaller cubes of equal size which are not painted on any surfaces is

a. 127 b. 200 c. 329 d. 210

Q39. Choose the odd one, out of the following options.

a. NEAR b. DEAR c. DARE d. FEAR

Q 40. The total number of squares in the following figure is



a. More than 19 b. 19 c. 18 d. Less than 18

SECTION - D (WISE WIZARD)

Q 41. The radii of two circles with centre at *O* and *O′*are 16 cm and 7 cm respectively. If *PQ* is the common tangent of the circles and *OO′* = 15 cm, then length of *PQ* is

a. 7 cm b. 12 cm c. 15 cm d. 16 cm

Q42. The area of three adjacent faces of a cuboid are *p*, *q* and *r* and its volume is *V*. The total lengths of its all edges is equal to

a. 4 V [pq + qr + rs]

b. $4v\left[\frac{1}{p}+\frac{1}{q}+\frac{1}{r}\right]$

c. $\frac{V}{4}$ [pqr]

d. $\frac{V}{4}$ [p^2+q^2+r^2]

Q43. The sum of the series 13, 143, 1443, 14443,…..Upto *n* terms is

a. $\frac{13}{81}(10^n-1) - \frac{13}{9}$

b. $\frac{130}{9}(10^n-1) + \frac{13n}{9}$

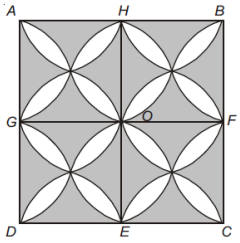
c. $\frac{13(10n-1)-n}{81}$

d. $\frac{130}{81}(10^n-1) - \frac{13n}{9}$

Q44. The value of $\sin^2 1° - \sin^2 3° + \sin^2 5° - \sin^2 7° + ... - \sin^2 87° + \sin^2 89°$ is

a. 1 b. -1 c. $\frac{1}{2}$ d. 0

Q45. In the given figure, AHOG, HBFO, FCEO and GOED are squares each of side 20 cm and semicircles are drawn with each side of the squares as diameter. The area of the shaded region is



a. $\frac{4000}{47}$ b. $\frac{4800}{7}$ c. $\frac{2000}{7}$ d. $\frac{3000}{7}$

Q46. If $\tan\theta + 3\cot\theta = 2\sqrt{3}$ $(\theta \neq 0)$, then the value of $(\sin\frac{\theta}{2})+\cos(\theta - 15°)-cosec(\frac{3}{2}\theta)-\sin\frac{3}{4}\theta$ is

a. 1 b. -1 c. $\frac{1}{3}$ d. $-\frac{1}{2}$

Q47. A Mathematics book contains 1000 pages. A page is chosen at random. The probability that the sum of the digits of that page number is equal to 5 is

a. $\frac{29}{100}$ b. $\frac{27}{100}$ c. $\frac{23}{1000}$ d. $\frac{21}{1000}$

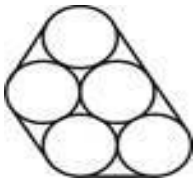
Q48. The sum of the first six terms of an AP is 54. If the ratio of the 12th term to the 19th term of AP is $\frac{2}{3}$, then the 38th term of the AP is

a. $\frac{720}{11}$ b. $\frac{910}{11}$ c. $\frac{800}{11}$ d. $\frac{530}{11}$

Q49. If an isosceles triangle ABC in which AB = AC = 8 cm is inscribed in a circle of radius 10 cm, then the area of the triangle ABC is

a. $\frac{68\sqrt{2}}{25}$ cm^2 b. $\frac{134\sqrt{21}}{25}$ cm^2 c. $\frac{68\sqrt{561}}{37}$ cm^2 d. $\frac{128\sqrt{21}}{25}$ cm^2

Q50. There are five circular rings of iron, kept, close to each other. A string binds them as tightly as possible. If the diameter of each circular ring is 4 cm, then minimum possible length of string required to bind them is



a. 328 cm b. 5(π + 2) cm c. 2(π + 5) cm d. 4(π + 5) cm

Space for rough work

Space for rough work

Space for rough work