Global Indian International School

GLOBAL INDIAN INTERNATIONAL SCHOOL

PRE-BOARD EXAMINATION

2019-2020

MATHEMATICS (CODE -041)

Grade: X **Max. Marks: 80**

Date : 20/01/2020 **Duration: 3 hours**

General Instructions

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i) *All questions are compulsory.*

ii) *The time given at the head of this paper is the time allowed for writing the answers. An extra 10 minutes will be given for reading the question paper.*

iii) *This question paper contains 6 printed pages.*

iv) *This question paper contains 40 questions divided into four sections – A, B, C and D*

v) *Section A contains 20 questions of 1 mark each. Section B contains 6 questions of 2 marks each. Section C contains 8 questions of 3 marks each and Section D contains 6 questions of 4 marks each.*

vi) *There is no overall choice. However, there is an internal choice has been provided in two questions of 1 mark each , two questions of 2 marks each, three questions of 3 marks each and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.*

vii) *Use of calculators is not permitted.*

Section A

Q 1-10 are multiple choice questions. Select most appropriate answer from the given options

1. If two positive integers A and B are written as A=x^3y^2 and B= xy^3 , where x, y are prime numbers, then the HCF(A,B) is

a) xy b) xy^2 c) x^3y^3 d) x^2y^2

2. If $\propto$ and $\frac{1}{\propto}$ are the zeroes of the polynomial $6x^2+11x$ −(k-2), then the value of k is

a) -4 b) -6 c) 6 d) 4

3. The pair $3x = 7y + 4$ and $14y = 6x - 8$ of linear equations represents two lines which are

a) Intersecting b) coincident c) parallel d) none

4. If the equation $2x^2$-$6x + p$ =0 has real and distinct roots, then the values of p are given by

a) $p < \frac{9}{2}$ b) $p \leq \frac{9}{2}$ c) $p > \frac{9}{2}$ d) $p \geq \frac{9}{2}$

5. If k-1, k+1 and 2k+3 are in A.P, then the value of k is

a) -2 b) 0 c) 2 d) 4

6. If in triangles ABC and DEF, $\frac{AB}{DE} = \frac{BC}{FD}$, then they will be similar when

a) $< B = < E$ b) $< A = <$D c) $< B = < D$ d) $< A = <$F

7. The area of a triangle with vertices (a, b+c), (b, c+a) and (c, a+b) is

a) 0 b)1 c) $(a + b + c)$ d) $(a + b + c)^2$

8. The value of $\tan 1^0 \tan 2^0 \tan 3^0 \ldots\ldots\ldots \tan 89^0$ is

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

9. A number is selected from numbers 1 to 25.The probability that it is prime is

a) $\frac{7}{25}$ b) $\frac{8}{25}$ c) $\frac{6}{25}$ d) $\frac{9}{25}$

10.If the difference of mode and median of a data is 24 , then the difference of median and mean is

a) 12 b) 24 c) 8 d) 36

(11-15) Fill in the blanks.

11. The decimal expansion of the number $\frac{441}{2^2 5^3 7}$ has .....decimal representation.

12. The distance between the points $(a\cos\theta + b\sin\theta, 0)$ and $(0, a\sin\theta - b\cos\theta)$ is .....Units.

13. The 9th term from the end of the AP: 5, 9, 13, ... 185 is.....

14. If $\sin\theta + \cos\theta = \sqrt{3}\ \cos\theta$, then $\tan\theta$ is.....

15. If the circumference of a circle is increased by 50%, then its area will be increased by .....

(16-20) Answer the following.

16. If the HCF of 65 and 117 is expressible in the form of $65m - 117$, then find the value of m.

17. If the areas of two similar triangles are in the ratio 841:289, then find the ratio of their corresponding sides.

18.a) Find the perimeter of a triangle with vertices (0,4) ,(0,0) and (3,0).

OR

b) Find the centroid of a triangle whose vertices are (3,-7), (-8,6), and (5,10).

19.a) What is the value of $(1 + tan^2\theta)(1 - sin\ \theta)(1 + sin\theta)$?

OR

b)If $\tan\theta+\cot\theta = 5$, find the value of $tan^2\theta + cot^2\theta$.

20. Two tangents inclined at an angle of 60^0 are drawn to a circle of radius 3 cm. Find the length of each tangent.

SECTION B

21.a) Find the number of natural numbers between 101 and 999 which are divisible by both 2 and 5.

OR

b) The sum of three numbers in AP is 12 and sum of their cubes is 288. Find the numbers.

22. A street light bulb is fixed on a pole 6 m above the level of the street. If a woman of height 1.5 m casts a shadow of 3 m, find how far she is away from the base of the pole.

23(a) ~~Find the value of $sin^25^0+sin^210^0+sin^215^0+\ldots\ldots\ldots+sin^285^0$~~

If $cosec\theta - Sin\theta = M$ and $Sec\theta - cos\theta = N$, Prove that $(M^2N)^{\frac{2}{3}} + (MN^2)^{\frac{2}{3}} = 1$

~~OR~~

~~b) If $2sin^2\theta = cos^2\theta$=2 then find the value of θ (where $0 \leq \theta \leq 90^0$)~~

24. In two concentric circles, length of the chord of the outer circle that touches the inner circle is 56 cm. Find the area of the circular path.

25. A vessel is in the form of a hemispherical bowl mounted by a hollow cylinder. The diameter the sphere is 14cm and the total height of the vessel is 13 cm. Find its capacity.($\pi = \frac{22}{7}$).

26.One card is drawn from a well shuffled deck of 52 cards. Find the probability of getting.

(i) Either a red card or a queen.

(ii) Neither a spade nor an ace.

SECTION C

27. The following distribution shows the daily pocket allowance of children of a locality. The mean pocket allowance is ₹18. Find the missing frequency 'p'

Daily pocket allowance	11-13	13-15	15-17	17-19	19-21	21-23	23-25
Number of children	7	6	9	13	p	5	4

Type equation here.

28. Show that $\sqrt{13}$ is an irrational number.

29. If two zeroes of the polynomial $x^4 - 6x^3 - 26x^2 + 138x - 35$ are $2\pm\sqrt{3}$, find other zeroes.

30. For which values of p and q, will the following pair of linear equations have infinitely many solutions? $4x + 5y = 2$ and $(2p+7q)x + (p+8q)y = 2q - p + 1$.

31.a) If m times the m^{th} term of an A.P is equal to n times its n^{th} term, then show that its $(m+n)^{th}$ term is zero.(Where $m \neq n$)

OR

b)In an A.P , the p^{th} term is $\frac{1}{q}$ and the q^{th} term is $\frac{1}{p}$. Find its $(pq)^{th}$ term.

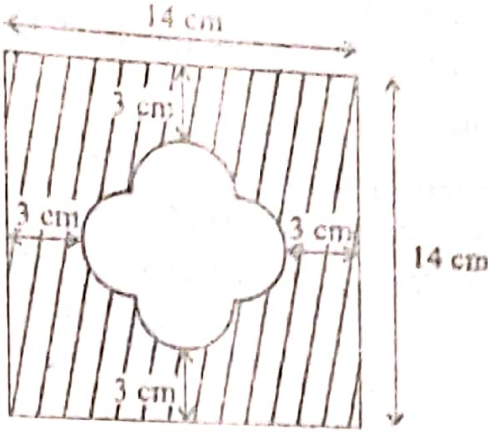
32. If the point P(x, y) is equidistant from the points A (a + b, b – a) and B (a – b, a + b), prove that $bx = ay$.

33. a) If $1 + sin^2\theta = 3sin\theta cos\theta$, prove that: $tan\theta = 1$ or $\frac{1}{2}$.

OR

b)If $cosec\theta = x + \frac{1}{4x}$, prove that: $cosec\theta + cot\theta = 2x$ or $\frac{1}{2x}$.

34. a)Find the area of the shaded region of the figure given below.(Use $\pi = 3.14$)



OR

b) Sides of a right triangular field are 25m, 24 m and 7m. At the three corners of the field, a cow, a buffalo and a horse are tied separately with ropes of 3.5 m each to graze in the field. Find the area of the field that cannot be grazed by these animals.

SECTION D

35.a) A peacock is sitting on the top of a pillar, which is 9 m high. From a point 27 m away from the bottom of a pillar, a snake is coming to its hole at the base of a pillar, seeing the snake ,the peacock pounces on it. If their speeds are equal, at what distance from the hole is the snake caught?

OR

b) A motor boat whose speed is 18 km/h in still water takes 1 hour more to go 24 km upstream then to return downstream to the same spot. Find the speed of the stream.

36.a) State and prove Pythagoras theorem.

OR

b) Prove that the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides.

37. a) An aero plane, when flying at a height of 3125 m from the ground passes vertically below another aero plane at an instant when the angles of elevation of the two planes from the same point on the ground are 30° and 60° respectively. Find the vertical distance between two aeroplanes at that instant.

OR

b)The angle of elevation of a cloud from a point **h** meters above the surface of a lake is α and the angle of depression of its reflection in the lake is β. Prove that the height of the cloud above the lake is $h\left(\frac{tan\beta+tan\alpha}{tan\beta-tan\alpha}\right)$.

38. Let ABC be a right triangle in which AB= 6cm, BC= 8cm and $< B = 90^0$. BD is the Perpendicular from B on AC. The circle through B, C, D is drawn .Construct the tangents from A to this circle.

39. A container opened from the top and made up of a metal sheet, is in the form of a frustum of a cone of height 16cm with radii of its lower and upper ends as 8cm and 20cm respectively. Find the cost of milk which can completely fill the container, at the rate of Rs 20 per litre. Also find the cost of metal sheet used to make the container, if it costs Rs 8 per $100cm^2$. (Take $\pi = 3.14$)

40. The following distribution gives the daily income of 50 workers of a factory.

Daily Income	100-120	120-140	140-160	160-180	180-200
No of Workers	12	14	8	6	10

Convert the distribution above to a less than and more than type cumulative frequency distribution and draw their ogive. By using the graph find the median income of 50 workers. Verify your result by using suitable formula.

Q39.) A conical vessel of radius 6cm and height 8cm is completely filled with water. ~~and its size~~ A sphere is lowered into the water and its size is such that when it touches the sides it is just immersed, what fraction of the water overflows?