



# Rise 'n' Shine Convent School - Dhamdha

## II - PERIODIC ASSESSMENT - 2020

Class - XI

Subject - Mathematics

Roll No:

Date:- 10/01/2020

Time:-3 hrs

Max. Marks : 80

*General Instructions :-*

1. All questions are compulsory.
2. The question paper consists of 36 questions divided into four Sections A, B, C and D **Section-A** comprises of 20 questions of one mark each, **Section - B** comprises of 6 questions of 2 marks each, **Section - C** comprises of 6 questions of 4 marks each and **Section - D** comprises of 4 questions of 6 marks each
3. Use of calculator is not permitted.

### SECTION - A

(Q1 - Q10 are multiple choice type questions. Select the correct option)

- Q.1 The value of  $\lim_{x \rightarrow 0} \left[ \frac{(x+1)^5 - 1}{x} \right]$  is (1M)  
 (A) 0 (B) 4 (C) 5 (D) 3
- Q.2 The derivative of  $\sin^2 x$  with respect to  $x$  is  
 (A)  $\sin 2x$  (B)  $\cos 2x$  (C)  $\sin^3 x$  (D)  $2\cos x$
- Q.3 The domain of  $f = \sqrt{x^2 - 4}$  is (1M)  
 (A)  $[-2, \infty]$  (B)  $[2, \infty]$  (C)  $[-2, 2]$  (D)  $\mathbb{R} - (-2, 2)$
- Q.4 If  $3\tan^2\theta = 1$  then the general value of  $\theta$ , where  $n \in \mathbb{Z}$  (1M)  
 (A)  $2n\pi \pm \frac{\pi}{3}$  (B)  $n\pi \pm \frac{\pi}{3}$  (C)  $n\pi + (-1)^n \frac{\pi}{3}$  (D)  $n\pi \pm \frac{\pi}{6}$
- Q.5 The value of  $i^{108}$  is (1M)  
 (A) 0 (B) 1 (C)  $i$  (D)  $-i$
- Q.6 The solution of given inequalities  $3(2 - x) \geq 2(1 - x)$  (1M)

- (A)  $(-\infty, -4]$       (B)  $[4, \infty)$       (C)  $(-\infty, 4]$       (D)  $[0, 4]$

Q.7 How many numbers are lying between 100 and 1000 which can be formed with the digits 0, 1, 2, 3, 4, 5 if repetition of digits is not allowed. (1M)

- (A) 100      (B) 120      (C) 60      (D) 300

Q.8 The coefficient of  $x$  in middle term of the expansion of  $[2x - 3]^6$  is (1M)

- (A) 2160      (B) -4320      (C) 4860      (D) -4220

Q.9 The 10<sup>th</sup> term of the sequence 2, 4, 8, 16, ..... is (1M)

- (A) 512      (B) 2048      (C) 4096      (D) 1024

Q.10 The slope of the line  $2x + 2\sqrt{3}y - 5 = 0$  is (1M)

- (A)  $-\frac{1}{\sqrt{3}}$       (B) 2      (C)  $\frac{5}{2}$       (D)  $-\sqrt{3}$

(Q.No 11 to Q. No 15 fill in the blank)

Q.11  $\frac{d}{dx}x^5 = \dots\dots\dots$  (1M)

Q.12 The locus of a point in a plane, whose distance from a fixed point is equal to its distance from fixed straight line is called .....

Q.13 The coordinate of centre of circle  $x^2 + y^2 - 8x + 4y - 5 = 0$  is..... (1M)

Q.14 Let  $A = \{1, 2, 3, \{3, 4\}\}$ . Insert the appropriate symbol  $\in$  or  $\notin$  in the blank space:  $\{3, 4\} \dots\dots\dots A$  (1M)

Q.15 The coordinate of foot of perpendicular drawn from the point  $(1, 3, -2)$  to  $yz$ - plane is .....

(Q16 - Q20) Direct answer the following questions)

Q.16 Find the last term in the expansion  $(2x^2 - \frac{1}{x})^{20}$  (1M)

Q.17 Find the perpendicular distance from origin to the line  $3x + 4y = 20$  (1M)

Q.18 Which term in the sequence 15, 19, 23, ..... is 63? (1M)

Q.19 If  ${}^n C_{n-8} = {}^n C_5$  then find value of  $n$  (1M)

Q.20 Evaluate  $\sec 1020^\circ$  (1M)

OR

Find the maximum value of a if  $a = 1 - \cos x$

**SECTION - B**

Q.21 For the set A and B describe below into theoretical notation in set (2M)  
 ( i ) B but not A (ii) neither A nor B

Q.22 Find the value of the expression  $\frac{\tan^2 15^\circ - 1}{\tan^2 15^\circ + 1}$  (2M)

OR

Find the value of  $\tan 1^\circ \tan 2^\circ \tan 3^\circ \tan 4^\circ \dots \dots \dots \tan 89^\circ$

Q.23 From a committee of 8 person , in how many ways can we choose a chairman and vice chairman assuming one person can not hold more then one position ? (2M)

Q.24 Find the coefficient of  $x^5$  in expansion of  $(x + 3)^8$  (2M)

Q.25 The sum of n terms of two arithmetic progressions are in ratio  $3n - 1 : 3n + 1$  Then the ratio of their 5<sup>th</sup> terms (2M)

Q.26 If origin is the centroid of the triangle whose vertices are  $(2a, 2, 6)$   $(-4, 3b, -10)$  and  $(8, 14, 4)$  find the value of a and b (2M)

OR

Find the coordinate of the point which divides the line joining the points  $(-2, 0, 6)$  and  $(10, -6, -12)$  internally in ratio 5 : 1

**SECTION - C**

Q.27 Find the coordinate of foot of perpendicular drawn from the point  $(-1, 3)$  to the line  $3x - 4y - 16 = 0$  (4M)

Q.28 Find the domain and range of the function  $f(x) = \frac{x+1}{x-2}$  (4M)

Q.29 Find the sum of n terms of the series  $1^2 + (1^2 + 2^2) + (1^2 + 2^2 + 3^2) + \dots$  (4M)

OR

If a , b , c are in G.P. and  $a^{1/x} = b^{1/y} = c^{1/z}$  , prove that x, y , z are in A.P

Q.30 The second ,third and fourth term in the binomial expansion  $(x + a)^n$  are (4M)

240,720 and 1080 respectively . Find  $x$  ,  $a$  and  $n$

- Q.31 Solve the following system of inequalities graphically : (4M)  
 $3x + 2y \leq 150$  ,  $x + 4y \leq 80$  ,  $x \leq 15$  ,  $x \geq 0$  ,  $y \geq 0$
- Q.32 If a parabolic reflector is 20 cm in diameter and 5 cm deep find its focus . (4M)

OR

Using first principle find the derivative of  $f(x) = \cos x$

**SECTION - D**

- Q.33 Find the distance of the point (3,5) from the line  $2x + 3y - 14 = 0$  (6M)  
 parallel to the line  $x - 2y - 1 = 0$
- Q.34 Prove that  $\cos 20^\circ \cos 40^\circ \cos 60^\circ \cos 80^\circ = \frac{1}{16}$  (6M)

OR

Find the modulus and arguments of the following complex number and

convert into polar form  $\frac{i-1}{\cos \frac{\pi}{3} + i \sin \frac{\pi}{3}}$

- Q.35 How many words, with or without meaning, can be formed using letter of word **EXCUTIVE** assuming that no letter is repeated ,if (6M)  
 (i) Vowels and Consonants are come together  
 (ii)The word start with T and end with E
- Q.36 Prove that by Principle of Mathematical Induction  $p(n) = n(n + 1)(n + 5)$  (6M)  
 is multiple of 3 for every  $n \in N$