Pimpri Chinchwad Education Trust's
S.B. PATIL COLLEGE OF SCIENCE & COMMERCE, RAVET
Sr. no. 110, Gate No 1, Ravet, Pune- 412101
www.sbpatilcollege.com, email-sbpc.science@gmail.com
UDISE NO: 27252001412 College Index No: J.11.16.066

Annual Exam (2019-2020)

Sub :- Mathematics(Science) **Marks-80**

Std- 11th Date :- 18/3/20 **Time-3hr**

General Instructions:- The question paper is divided in to four sections.

1.SectionA : Q.No. 1 contains eight multiple choice type of questions carrying **Two** marks each. Q.No.2 contains four very short answer type of questions carrying **one** mark each.

2.Section B : Q.No.3 to Q.No.14 contains Twelve short answer type of questions carrying **Two** marks each.

3. **Section C :** Q.No.15 to Q.No.26 contains Twelve short answer type of questions carrying **Three** marks each.

4. Section D : Q.No.27 to Q.No.34 contains Eight long answer type of questions carrying **Four** marks each.

5. Use of log table is allowed.Use of calculator is not allowed.

Section - A

Q.1 Select and write the correct answer. **[16]**

1. $(\frac{11\pi}{15})^c$ is equal to ,---------

a) 123^0 b) 132^0 c) 112^0 d) 213^0

2. $\sqrt{-18}$ i= ---------

a) $-3\sqrt{2}$ b) $3\sqrt{2}$ c) $3\sqrt{2}$ i d) $-3\sqrt{2}$ i

3. The sum of three terms of a G.P is $\frac{21}{4}$ and their product is 1 , then the common ratio is

a) 3 b) 2 c) 4 d) -1

4. If $\log_{10}(\log_{10}(\log_{10} x)) = 0$ then x = --------

a) 1000 b) 10^{10} c) 10 d) 0

5. In how many ways 4 boys and 3 girls can be seated in a row such that they are alternate

a) 12 b) 288 c) 144 d) 256

6. If $A = \begin{bmatrix} a & 2 \\ 2 & a \end{bmatrix}$ and $|A^3|$=125, then a=?

a) ± 3 b) ± 2 c) ± 5 d) 0

7. The equation of the line through (2,2) which makes equal intercepts on the axes is ,

a) x + y = 1 b) x + y = 2 c) x + y = 4 d) x+y = 5

8. The length of latus rectum of the parabola x^2-4x-8y+12=0 is

a) 4 b) 6 c) 8 d) 10.

Q.2 Answer the following **[4]**

1. Find the equation of the ellipse whose centre is O (0,0) focus at (2,0) and eccentricity is 1/2
2. Find the value of $\tan 75^0$.
3. Find the number of 4 digit even numbers formed with the digits 1,2,3, & 4
4. If f(x) = x^2 and g(x) = $\frac{5x-6}{7}$ then find the value of g(f(x)) at x=0

Section –B

Attempt any Eight of the following . **[16]**

Q.3 Find m and n if , (2m-n) + (m +2n) i = 8+5i

Q. 4 Find the sum of n terms, 2 + 22 +222 +2222+ --------

Q.5 Find n if ,$23c_{3n} = 23c_{2n+3}$.

Q.6 If f (x) = 2 x^2 + 3 , g(x) = 5x-2 then find ,

a) fog b) gof

Q.7 Evaluate , $\lim_{x\to 0} \frac{\sin x.\tan x}{x\log(1+2x)}$

Q.8 Find the distance of the point(2,2) from the line 3x-4y+10=0

Q.9 If o be the origin and A and B be the point of intersection of the line 3x-5y =15 withn the axes then find the area of the triangle AOB.

Q.10 If A+B+C= π then Prove that tanA+tanB+tanC=tanA.tanB.tanC

Q.11 Find x and y if , $\begin{bmatrix} 2x+y & -1 & 1 \\ 3 & 4y & 4 \end{bmatrix} + \begin{bmatrix} -1 & 6 & 4 \\ 3 & 0 & 3 \end{bmatrix} = \begin{bmatrix} 3 & 5 & 5 \\ 6 & 18 & 7 \end{bmatrix}$

Q. 12 Write the equation of line parallel to x+y=2 and at a distance of 4 unit from it.

Q.13 Find the equation of ellipse in the standard form ,if length of major axis 10 and distance between foci is 8.

Q.14 Find the radius and the centre of the circle $x^2 + y^2$ -12x +18y -11 = 0 .

Section C

Attempt any Eight of the following . **[24]**

Q.15 Fin the common ratio of a G.P if sum to infinity is 12 and the first term is 2.

Q.16 Find the distance between the lines 3x -4y -7 = 0 and 6x -8y + 18 = 0.

Q.17 If $\frac{x^2}{25} - \frac{y^2}{16}$ = 1 be the equation of an ellipse then find the length of transverse axis , length of conjugate axis, the eccentricity of hyperbola and the length of its latusrectum.

Q.18 Find the area of the triangle formed by a chord that subtend an angle of 45^0 at the centre of the circle of radius 16 units.

Q.19 Find n , if $\frac{(17-n)!}{(14-n)!}$ = 5!

Q.20 Find the value of , $(\sqrt{3} + i)^4 + (\sqrt{3} - i)^4$

Q.21 If A and B are subsets of universal set X and n(x) = 50 ,n(A) = 35 , n(B) = 20 , n(A'∩B') = 5 find ,
1) n(AUB) 2) n(A ∩B) 3) n (A'∩B)

Q.22 If f(x) = x^2 + 3 $x \leq 2$
= 5x + 7 $x > 2$ then find , 1) f(3) 2) f(2) 3) f(0)

Q.23 Evaluate, $\lim_{x \to 0} \frac{x \tan x}{1 - \cos x}$

Q.24 Test the continuity of the following function at the points indicated against them,
f(x) = $\frac{x^3 - 8}{\sqrt{x+2} - \sqrt{3x-2}}$ for x ≠2
= -24 for x = 2 at x = 2

Q.25 Differentiate with respect to x , y = e^x. logx

Q.26 If A = $\begin{bmatrix} 1 & -1 & 2 \\ -2 & 1 & 0 \end{bmatrix}$ B = $\begin{bmatrix} 2 & -4 \\ 3 & -2 \\ 0 & 1 \end{bmatrix}$ prove that , $(A + B^T)^T = A^T + B$

Section D

Attempt any Five of the following . **[20]**

Q.27 5 students are selected at random from 11 students. How many ways can these be done if-
(a). Two specific students are selected?
(b). Two specific students are not selected?

Q.28 If $\log\left(\frac{x+y}{3}\right) = \frac{1}{2}\log x + \frac{1}{2}\log y$,then show that $\frac{x}{y} + \frac{y}{x} = 7$

Q.29 In a class of 200 students who appeared certain examinations ,35 students failed in CET , 40 in NEET and 40 in JEE ,20 failed in CET and NEET , 17 in NEET and JEE ,15 in CET and JEE and 5 failed in all three examination . find how many students ,

1) Did not fail in any exam
2) Failed in NEET or JEE entrance.

Q.30 Evaluate, $\lim_{x\to 0} \frac{6^x+5^x+4^x-3^{x+1}}{\sin x}$

Q.31 If f(x)= $\frac{24^x-8^x-3^x+1}{12^x-4^x-3^x+1}$, for x ≠0
= k foe x=0 is continuous at x=0, then find k.

Q.32 Find the derivatives of cos x by using first principle.

Q.33 If A = $\begin{bmatrix} 3 & -5 \\ -4 & 2 \end{bmatrix}$ show that A^2 - 5A - 14A =0

Q.34 If the coefficient of x^2 in $(1+2x)^m$ is 112 then find the coefficient of x^6.