PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
BSc DEGREE EXAMINATION DECEMBER 2018
(First Semester)

Branch - **MATHEMATICS**

CLASSICAL ALGEBRA AND TRIGONOMETRY

Time : Three Hours   Maximum : 75 Marks

SECTION-A (20 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (10 x 2 = 20)

1   Define a convergent sequence, say whether the sequence i $\dfrac{}{\{2n+2>\}}$ l is convergent or m

2   When do you say a series as a divergent series?

3   If E u_n and Z 9_n are two series of positive terms and if $\dfrac{+\,*}{u_n} < \dfrac{+!}{}$ and

   $\dfrac{u}{}$ is a constant when can E u_n be convergent.

4   Say whether the series $1 - \dfrac{1}{2^2} + \dfrac{1}{3^2} + -\dfrac{1}{4^2} +$ is absolutely convergent or not.

5   State remainder theorem.

6   If a,pW and the roots of the equation $x^3+px^2+qx+r=0$ find $E\alpha^2$.

7   If x = costf-Wsin# find $x^2 - -V$.
                                     x

8   Prove that $\sin h2x = 2\sinh x \cosh x$.

9   Write down the principal value of $\log(x + iy)$.

10   Write down the gregor's series of $\tan^{-1} x$.

SECTION - B (25 Marks!
Answer **ALL** Questions
ALL Questions Carry **EQUAL** Marks (5 x 5 = 25)

11 a Show that $\dfrac{n}{\backslash n+1}$ is a monotonic increasing sequence.

OR

   b   Discuss tne convergence of the series Z -r-

12 a   Test for convergence the series
         $a+b+a^2+b^2+a^3+b^3+\ldots\ldots$
OR
    b   Prove that an absolutely convergent series is convergent.

13 a   Form a rational cubic equation which shall have for roots 1, 3-*4-2* .
OR
        Show that if the roots of the equation $x^3+px^2+qx+r=0$ are in arithmetic
        progression then $2p^3 - 9\,pq + 27\,r = 0$.

14 a   Ėvaluate hm $\dfrac{\tan 2x - 2\tan x}{-X}$ r-------.

        $x \longrightarrow 0$
OR
   b Expand $\cosh^8\theta$ in terms of hyperbolic cosines of θ.

15 a Find the value of log (4+3i)

OR

b Sum n terms the series $\sin a + \sin^2 2a + \sin 3\, a+....$ * 2

SECTION - C (30 Marks)
Answer any **THREE** Questions
ALL Questions Carry **EQUAL** Marks (3 x 10 = 30)

16 Show that the series $]T + \wedge r + \wedge r+---$ *IS* convergent when k is greater then unity and divergent when k is equal to or less then unity.

17 Discuss the convergency of the series

$$\frac{—}{1+x} + \frac{—}{1+2x^2} + \frac{—-}{1+3;c^3} + \frac{—-}{1+4x^4} +.......... \text{ for positive values of x.}$$

18 Solve the equation $6x^5-x^4-43x^3+43x^2+x-6 = 0$.

19 Expand $\cos^5 0 \sin^3 9$ in a series of sines of multiples of 0.

20 Show that log tan (% + i ^) = i tan ''(sinhx).

Z-Z-Z **END**