



22122/A 220

Reg. No.

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**I Semester B.C.A.2 Degree Examination, November/December 2018**  
**MATHEMATICS – I (Repeaters)**

Time : 3 Hours

Max. Marks : 80

- Instructions :* 1) *Question paper has three Parts. Answer all the three Parts.*  
2) *Part I carries 20 marks, Part II carries 30 marks and Part III carries 30 marks.*

PART – I

Answer **any ten** questions.**(10×2=20)**

1. If the first term of an AP is 5 and seventh term is  $-7$ , then find the common difference.
2. If  ${}^n P_3 = 24$ , find 'n'.
3. Find the sum and product of roots of equation  $2x^2 + 4x - 5 = 0$ .
4. Prove that  $\sin\theta \operatorname{cosec}\theta = 1$ .
5. Prove that  $\cos 60^\circ \cdot \cos 30^\circ + \sin 60^\circ \cdot \sin 30^\circ = \sin 60^\circ$ .
6. Evaluate :  $\lim_{x \rightarrow 1} \left( \frac{x^6 - 1}{x - 1} \right)$ .
7. Evaluate :  $\lim_{x \rightarrow 4} \frac{x^3 - 64}{x^2 - 16}$ .
8. If  $y = \operatorname{cosec}^2 2x$  find  $dy/dx$ .
9. Differentiate :  $\frac{d}{dx}(x^2 \cos x)$ .
10. Find the distance between the points (5, 2) and (9, 5).
11. Find the equation of straight line given its intercept on axes (3, 4).
12. Show that  $4x - 7y = 2$  and  $7x + 4y - 5 = 0$  are perpendicular.

PART – II

Answer **any six** questions :**(6×5=30)**

13. If A, G, H be the Arithmetic, Geometric and Harmonic mean between 'a' and 'b' then find relation  $G^2 = AH$ .
14. Resolve into partial fractions  $\frac{3x + 5}{(x - 1)(x + 2)}$ .
15. The elevation of a tower 100 meters away is  $30^\circ$ . Find the height of the tower.
16. Prove that  $\frac{\tan \theta}{\sec \theta - 1} + \frac{\tan \theta}{\sec \theta + 1} = 2 \operatorname{cosec} \theta$ .
17. Evaluate  $\lim_{x \rightarrow 2} \left[ \frac{3x^2 + 5x - 2}{x^2 - 3x + 10} \right]$ .

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18. If  $y = \sqrt{x} - \frac{1}{\sqrt{x}}$ , find the value of  $dy/dx$  when  $x = 1$ .
19. Show that the points  $(1, -8)$ ,  $(-7, -7)$ ,  $(5, 7)$  and  $(13, 6)$  form a parallelogram.
20. Find the coordinates of the point which divides :
- Internally
  - Externally, the line joining the points  $(-3, 6)$  and  $(4, -7)$  in the ratio  $5 : 7$ .

## PART – III

Answer **any three full** questions :

**(3×10=30)**

21. a) Find the 12<sup>th</sup> term in the expansion of  $\left(x + \frac{1}{x}\right)^{13}$ .
- b) Find the number of permutation of the letters of the word “AGUASASSAM” and how many of these begin with S.
22. a) Prove that  $\frac{\tan \theta}{\sec \theta - 1} + \frac{\tan \theta}{\sec \theta + 1} = 2 \operatorname{cosec} \theta$ .
- b) Find the value of  $\tan 75^\circ$ .
23. a) If  $f(x) = \begin{cases} x^2 + 1, & \text{when } x < 2 \\ 5, & \text{when } x = 2 \\ 4x - 3, & \text{when } x > 2 \end{cases}$  find  $\lim_{x \rightarrow 2} f(x)$  if exists.
- b) Solve the triangle ABC, given that  $a = 2$ ,  $c = \sqrt{3} + 1$  and  $B = 60^\circ$ .
24. a) Find  $\frac{d^2y}{dx^2}$  of  $y = ax^3 + bx^2 + cx + d$ .
- b) Find  $\frac{d}{dx} \left[ \frac{x^2 - 1}{x^2 + 1} \right]$  w.r.t. ‘x’.
25. a) Show that the points  $(2, -3)$ ,  $(-6, 5)$  and  $(-8, 7)$  are collinear.
- b) Find the equation of a straight line which passes through  $(3, -4)$  and  $(-2, 5)$ .
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