Roll No. | | | | | | | | | | | | | **Total No. of Pages : 02**

Total No. of Questions : 18

B.Sc. (Non Medical) (2018 Batch) (Sem.–3)

ANALYSIS-I

Subject Code : BSNM-305-18

M.Code : 76904

Time : 3 Hrs. **Max. Marks : 50**

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying ONE marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

Write briefly :

1. Test for the convergence of series $\sum_{n=2}^{\infty} \frac{1}{(\log n)^n}$.

2. Define conditional convergence.

3. Define lower Riemann sum.

4. Prove that $L(P, f, a) \leq U(P, f, a)$, where P is partition.

5. Evaluate the improper integral $\int_0^4 \frac{dx}{\sqrt{x}}$, if exists.

6. Discuss improper integral of second kind.

7. Discuss convergence or divergence of series $\sum \frac{1}{\sqrt{n}} \sin \frac{1}{n}$.

8. Test whether the series $1 - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} \ldots$. is absolutely convergent.

9. Prove that $\Gamma(\alpha + 1) = \alpha\Gamma\alpha$.

10. What do you mean by Beta function?

SECTION-B

11. Show that the series $\frac{\log 2}{2^3} - \frac{\log 3}{3^3} + \frac{\log}{4^3}$ .... is absolutely convergent.

12. State and prove first mean value theorem of integral Calculus.

13. Discuss the convergence of improper integral $\int_1^\infty \frac{dx}{x^p}$.

14. Using integral test, discuss the convergence of $\sum_{n=2}^{\infty} \frac{1}{n\sqrt{n^2-1}}$.

15. Prove that $\Gamma\frac{1}{2} = \sqrt{\pi}$.

SECTION-C

16. Discuss the convergence or divergence of harmonic series $\sum \frac{1}{n^p}$, when $p > 1, p \leq 1$.

17. State and prove Abel's test.

18. State and prove the relation between Beta and Gamma function. Also prove

$$\beta\left(m, \frac{1}{2}\right) = 2^{2m-1}\ \beta(m, m)$$

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.