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Total No. of Questions : 09

B.Sc. (Non Medical) (Sem.–4)

ANALYSIS-II

Subject Code : BSNM-405-18

M.Code : 77683

Date of Examination : 11-07-22

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

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying ONE mark 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

1. Write briefly :

a) What do you mean by uniform convergence of sequences?

b) State Weierstrass approximation theorem.

c) Prove that $\sum \frac{(-1)^{n-1}}{n}$ is uniformly convergent in [0, 1].

d) What do you mean by pointwise convergence of sequence of functions?

e) Evaluate grad e^{r^2} where $r^2 = x^2 + y^2 + z^2$.

f) Find div $\vec{F}$, at (1, –1, 1) where $\vec{F} = xy^2\,\hat{i} + 2x^2y\,\hat{j} - 3xyz^2\,\hat{k}$.

g) State Drichlet's test.

h) If $\vec{\upsilon}$ is constant prove that curl $\vec{\upsilon} = \vec{o}$.

i) Write Euler formulae for Fourier Series.

j) State Drichlet conditions for fourier series.

SECTION-B

2. Apply W.M. test to show that the series $\sum \frac{a_n x^n}{1+x^{2n}}$ convergence uniformly $\forall\ x \in$ R if $\sum a_n$ is absolutely convergent.

3. Prove that the sequence $\{f_n(x)\}$ when $f_n(x) = x^{n-1}(1-x)$ converges uniformly in [0, 1].

4. If $r = \sqrt{x^2 + y^2 + z^2}$, show that div [grad $f(r)$] $= f''(r) + \frac{2}{r} f'(r)$.

5. State and prove Green's theorem.

6. Find the fourier series in the interval (–2, 2) when $f(x) = \begin{cases} 0, & -2 < x < 0 \\ 1, & 1 < x < 0 \end{cases}$.

SECTION-C

7. Prove that the series $\cos x + \frac{\cos 2x}{2^2} + \frac{\cos 3x}{3^2} + \ldots..$ converges uniformly on R.

8. Verify Gauss's Divergence theorem for $\vec{F} = x\hat{i} + y\hat{j} + z\hat{k}$ over the region bounded by the planes $x = 0$, $x = a$, $y = 0$, $y = a$, $z = 0$, $z = a$.

9. Obtain the fourier series for $f(x) = e^{-x}$ in the interval $0 < x < 2\pi$.

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.