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VI SVIS-N-328-A-18

B.Sc. 6th Semester Degree Examination

MATHEMATICS

(Fluid Mechanics, Statistical Analysis, Calculus of Variation and Topology)

Paper - 6.2

(New)

Time : 3 Hours Maximum Marks : 80

Instructions to Candidates:

Answer all the sections

SECTION-A

I. Answer any **TEN** of the following **(10× 2 = 20)**

1) Define Compressible and Incompressible fluids
2) Write any four fluid properties
3) With mathematical expression define density of a fluid
4) Define Newtons law of viscosity
5) Define Variate with an example
6) Define Correlation
7) If $\sigma_x = 2, \sigma_y = 3$ and r=0.4 find SD of x-y
8) Define random variable
9) Show that $\frac{d}{dx}(\delta y) = \delta(\frac{dy}{dx})$
10) Define Surface of revolution
11) Define topological space
12) Define Open and a closed set

SECTION-B

II. Answer any **FOUR** of the following **(4× 6= 24)**

13) Derive the continuity equation $\Delta.q = 0$

14) Write energy equation for compressible and incompressible fluids and explain the terms involved in it.

15) Obtain an expression for acceleration of a moving fluid

16) Obtain an expression for variation of a function $f = f(x, y, y')$

17) Find the values of

i) $\delta(f \pm g)$

ii) $\delta(fg)$

iii) $\delta(f / g)$

if f and g are functions of x, y and y'

18) Derive an Euler's equation $\frac{\delta f}{\delta y} = \frac{d}{dx}\left(\frac{\partial f}{\partial y'}\right), \; x \in (x, x_2)$

SECTION-C

III. Answer any **SIX** questions **(6× 6= 36)**

19) Explain how to fit the straight line y=ax+b

20) Find the normal equations to fit the parabola $y = a + bx + c^2$

21) Fit a straight line y=a+bx for the data

x	0	1	2	3	4	5
Y	9	8	24	28	26	20

22) Fit the curve of the form $y = ab^x$ for the data

x	0	1	2	3	4	5	6
y	32	47	65	92	132	190	275

23) Fit a parabola of second degree for the data

x	0	1	2	3	4
y	1	5	10	22	38

24) Find the equation of normal probability curve which may be fitted into the following data

x	6	7	8	9	10	11	12
f	3	6	9	13	8	5	4

25) Give an example of a proper non-empty subset of a topological space which is both open and closed.

26) Show that In a topological space(X,T) a finite intersection of open sets is open

27) Let (X,T) be a topological space and $x \in X$ be arbitrary then show that

i) there exist atleast one neighbouhood of x

ii) for each neighbouhood N of x, $x \in N$

iii) If N_1, N_2 be the neighborhood of x, then $N_1 \cap N_2$ is also a neighbouhood of x.