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Code No. : 13111 S

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

B.E. (CBCS) III-Semester Supplementary Examinations, June-2019

Engineering Mathematics-III

(Civil, CSE, EEE, ECE & Mech. Engg.)

Time: **3** hours Max. Marks: **60**

*Note: i) Answer **ALL** questions in **Part-A** and any **FIVE** from **Part-B***
ii) t-table and normal table are permitted

Part-A (10 × 2 = 20 Marks)

1. Evaluate Fourier coefficient a_0 for the function f(x)=x defined in $0 \le x \le 2\pi$
2. Write the Dirichelt's conditions for a Fourier series.
3. Form the partial differential equation by eliminating arbitrary function from $xyz=f(x^2+y^2+z^2)$
4. Find the complete solution of $\sqrt{p}+\sqrt{q}=1$
5. Write the Newton's forward and backward interpolation formula.
6. Write the formula for Runge-Kutta method of fourth order to solve a differential equation.
7. Define discrete and continuous random variable.
8. Define Null hypothesis and Alternative hypothesis.
9. Write the normal equations for fitting a straight line.
10. Define correlation and regression.

Part-B (5 × 8 = 40 Marks)

11.a) Define Even and Odd functions with an example. [2]

b) Expand the function f(x) = x^2 as Fourier series in the interval $-\pi \le x \le \pi$. [6]

12.a) Solve $p(1+q)=qz$. [4]

b) Solve $2xz-px^2-2qxy+pq=0$ using Charpit's method. [4]

13.a) Write the Lagrange's interpolating formula and use it to find u_3, if $u_0=580$, $u_1=556$ and $u_4=385$. [4]

b) Using Euler's method, find an approximate value of y corresponding to x=2, given that $\frac{dy}{dx}=x+2y$ and y=1 when x=1. [4]

14.a) A random variable X has the following probability function: [4]

X	0	1	2	3	4	5	6
P(X)	k	3k	5k	7k	9k	11k	13k

Find $P(X<4), P(X \ge 5), P(3<X \le 6)$.

580
586
1136

Contd...2

b) A machine runs on an average of 125 hours/year. A random sample of 10 machines has an annual average of 126.9 hours with standard deviation 8.4 hours. Does this suggest believing that machines are used on the average more than 125 hours annually at 0.05 level of significance? [4]

15.a) Write short notes on least square method for fitting a curve to the data. [3]

b) Find the Karl Pearson's coefficient of correlation from the following data. [5]

Wages	100	101	102	102	100	99	97	98	96	95
Cost of living	98	99	99	97	95	92	95	94	90	91

16.a) Express $f(x) = x$ as a half-range sine series in $0 < x < 2$. [4]

b) Solve $x^2(y-z)p+y^2(z-x)q=z^2(x-y)$ [4]

17. Answer any ***two*** of the following:

a) Using Runge-Kutta method of fourth order, find an approximate value of y corresponding to x=0.2, given that $\frac{dy}{dx} = x + y$ and y=1 when x=0. [4]

b) If X is a normal variate with mean 30 and standard deviation 5, then find the probabilities that $(i)\ 26 \leq X \leq 40, (ii)\ X \geq 45$. [4]

c) Fit a least square straight line to the following data. [4]

x	2	7	9	1	5	12
y	13	21	23	14	15	21