Hall Ticket Number:

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VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

B.E. (CBCS) II Year I-Semester Examinations, December-2017

Mathematics-III

(Civil, CSE, ECE & Mech.)

Time: 3 hours Max. Marks: 70

*Note: Answer **ALL** questions in **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

1. Find the coefficient of cos2x in the Fourier series expansion of $f(x)=\pi-x$, for $0<x<2\pi$
2. Is the function defined as $f(x)=\begin{cases}3x+4\cos x+x^2, 0<x<a\\ 3x-4\cos x-x^2, -a<x<0\end{cases}$ even or odd?
3. Find the PDE whose complete solution represent all spheres whose centre lie on z-axis.
4. Solve $\frac{\partial z}{\partial x}+\frac{\partial z}{\partial y}=1$
5. Write Lagrange's interpolation formula for unequal interval.
6. Write the Newton's forward and backward formulae for interpolation.
7. Define a random variable .what is continuous and discrete random variable.
8. Write short notes on Testing of Hypothesis.
9. Write the normal equation for straight line.
10. Explain coefficient of correlation.

Part-B (5 x 10 = 50 Marks)
(All bits carry equal marks)

11. a) Find the Fourier series of $f(x)=x^3, -\pi<x<\pi$.

    b) Find the Fourier series of $f(x)=\begin{cases}x+\pi, 0\le x\le\pi\\ -x-\pi, -\pi\le x\le 0\end{cases}$. $f(x+2\pi)=f(x)$

12. a) Solve the PDE $\frac{y-z}{yz}p+\frac{z-x}{xz}q=\frac{x-y}{yx}$ where $p=\frac{\partial z}{\partial x}, q=\frac{\partial z}{\partial y}$

    b) A rod of length L with insulated sides is initially at a uniform temperature 'u'. Its ends are suddenly cooled to zero degrees and are kept at that temperature. Find the temperature at any point and at any time t of the rod.

13. a) Find y(0.06) by taking the step size 0.02 from $\frac{dy}{dx}=x^2+y, y(0)=1$ using Euler's Modified method

    b) Construct a fourth order interpolating polynomial for the following data:

x	0	0.1	0.3	0.6	1.0
F(x)	-6	-5.894	-5.650	-5.578	-4.282

Contd...2

14. a) The two regression lines are given by 5x+2y-32=0 and 3 x+5y-23=0. Find(i) which one t represent the regression line of y on x(ii) correlation coefficient.(iii) find the ratio of variance of x to variance of y.

b) Fit a linear curve of y on x from the following.

x	1	2	3	4	5
y	14	27	40	55	68

15. a) A survey of 320 families with 5 children is given below. Using Chi-square test, test the hypothesis that the male and female births are equally possible.

No of boys	5	4	5	2	1	0	Total
No of Girls	0	1	2	3	4	5	
No families	14	56	110	88	40	12	320

b) Find the moment generating function of Poisson distribution. Find the first four moments of it.

16. a) Find the Fourier cosine series of the periodic function defined by $f(t) = \text{Sin}\left(\frac{\pi t}{2}\right), 0 < t < 2$

b) Using Charpit's method, solve $\left(p^2 + q^2\right) y = qz$, *where* $p = \frac{\partial z}{\partial x}, q = \frac{\partial z}{\partial y}$

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

a) Use R-K method to find u at t=0.2 from the IVP $\frac{du}{dt} = -2tu^2, u(0) = 1$ .Take step size h=0.2

b) The life of army shoes is normally distributed with mean 8 months and standard deviation of 2 months. If 5000 pairs are issued how many pairs would be expected to need replacement after 12 months.

c) Find the correlation coefficient from the following data:

x	25	30	32	35	37	40	42	45
y	8	10	15	17	20	23	24	25

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