Code No. 26

FACULTY OF ENGINEERING

B.E 2/4 I-Semester (Backlog) Examination, May/June 2018

Subject : Mathematics – III (Common to All Except ECE/I.T)

Time: 3 Hours **Max. Marks : 75**

Note: Answer all questions from Part-A and any five questions from Part-B.

Part – A (25 Marks)

1 Eliminate the arbitrary functions F and G to obtain a partial differential equation from $z = x y + F(x^2 - y^2)$ (3)

2 Solve $p^2 + q^2 = 6z$ (2)

3 Find the half range sine series of the function

$$f(x) = \begin{cases} \pi - x, & 0 < x < \pi \\ 0, & \pi \le x < 2\pi \end{cases}$$ (3)

4 Solve $\frac{\partial u}{\partial x} - 2\frac{\partial u}{\partial y} = u$ Where $u(x,0) = 6e^{-3x}$

5 Two dice are thrown, at is the probability that the sum is neither 7 nor 11 (3)

6 Let X be a ranmdom variable with the following probability distribution (2)

x	-3	6	9
P(X=x)	1/6	1/2	1/3

Then find E (X), $E(X + 1)^2$

7 Six coins are tossed 2560 times. Find the probability of getting 6 heads 200 times using poission distribution (3)

8 Find the moment generating function of gamma distribution (2)

9 If the regression lines of Y on X and X on Y are $8X - 10Y + 66 = 0$, $40X - 18Y - 214 = 0$, then Find the correlation coefficient between X and Y (3)

10 Fit a straight line $y = a + bx$ to the following data (2)

x	0	2	4	5
y	3	11	19	23

Part – B (50 Marks)

11. a) Find a complete integral of the equation $p^2 x + q^2 y = z$ by using charpit's method (5)

b) Solve $(y^3 x - 2x^4)p + (2y^4 - x^3 y)q = qz(x^3 - y^3)$ (5)

12. Find the Fourier series expansion of the function $f(x) = 2x - x^2$ in (0,3) and hence deduce that $\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} ...... = \frac{\pi^2}{12}$ (10)

Contd… 2…

13. Find the solution of the wave equation $\frac{\partial^2 u}{\partial t^2} = c^2 \frac{\partial^2 u}{\partial x^2}$, $0 < x < l, t > 0, u(o,t) = o = 4(l,t)$

$$u(x,o) = u_0 \sin^3 \frac{\text{®}x}{l}., \left(\frac{\partial u}{\partial t}\right)_{t=0} = 0$$

14. a. State Baye's theorem (10)

A bag A contains 3 red and 7 white balls A second bag B contains 5 red and 4 white balls. One ball is drawn at random from the first bag and transferred to the second bag. Now a ball is drawn from the second bag. It is found that the drawn ball is white. Find the probability that a red ball was transferred to bag B. (3+7)

15. Let X be a variable which follows a normal distribution with mean 30 and standard deviation 5. Then find the probabilities that

(i) $26 \leq x \leq 40$ (ii) $X \geq 45$ (iii) $|X - 30| > 5$

(Given P ($0 \leq z \leq 2$) = 0.4772; P ($0 \leq z \leq 0.8$) = 0.2881

P ($0 \leq z \leq 1$) = 0.3413; P ($0 \leq z \leq 3$) = 0.4986) (10)

16. A dice is thrown 276 times and the result of these throws are as follows (10)

Face	1	2	3	4	5	6
Face frequency	40	32	29	59	57	59

Test whether the dice is biased or not (x_5^2 (0.05) = 11.07)

17. a). Fit a curve $y = a + bx + cx^2$ to the following data (5)

x	0	1	2	3	4
y	1	1.8	1.3	2.5	6.3

b) The ranks of ten students in two subjects A and B are as follows (5)

A	3	5	8	4	7	10	2	1	6	9
B	6	4	9	8	1	2	3	10	5	7

Then find the rank correlation coefficient

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Code No. 56

FACULTY OF INFORMATICS

B.E. 2/4 (IT) I-Semester (Back Log) Examination, May / June 2018

Subject: Discrete Mathematics

Time: 3 Hours **Max. Marks: 75**

Note: Answer all questions from Part A and any five questions from Part B.

PART-A (25 Marks)

1. State the converse, contrapositive and inverse of the implication: “If it snows today, Iwill ski tomorrow”. 3
2. Define functionally complete set of connectives. 2
3. What is the negation of the statement “All Americans eat cheese burgers”? 2
4. Let f: A→B, g: B→C; for the sets A={a,b,c}, B={x,y,z}, C={1,2,3,4}find gof and its image. 2
5. How many bit strings of length 8 either start with a 1 bit or end with the two bits 00. 2
6. If n is a positive integer then show that $_{=0}(-1)^{r}\, nC_{r}$ =0. 3
7. How many different strings can be made by reordering the letters of the word SUCCESS? 3
8. From a group of 30 people, find the probability that atleast two people have the same birthday? 3
9. Define Euler Graph. 2
10. Explain Preorder, Inorder and Postorder tree traversals with an example. 3

PART-B (50 MARKS)

11. a) Without using the truth table, show that $\neg(p \vee (\neg p \wedge q))$ and $\neg p \wedge \neg q$ are logically equivalent. 5

    b) Translate the statement $C(x) \cup \exists y(C(y) \cap F(x,y))$ into english, where C(x) is “x has a computer” and F(x,y) is “x and y are friends” and the universe of discourse for both x and y consists of all students in your school. 5

12. a) What is the Cartesian product AXBXC, where A={0,1}, B={1,2}, and C={0,1,2}? 4

    b) Use Mathematical Induction to prove that n^3-n is divisible by 3, whenever n is a positive integer. 6

13. a) Find all solutions of the recurrence relation $a_n=3a_{n-1}+2n$. What is the solution with $a_1=3$? 6

Contd… 2…

b) Are the events E, that a family with three children has children of both sexes, and F that a family with three children has at most one boy, independent? Assume that the eight ways a family can have three children are equally likely? 4

14. a) What is the variance of the random variable $X(i,j)=2i$, where i is the number appearing on the first dice and j is the number appearing on the second dice, when two dice are rolled? 6

b) What is the coefficient of $x^{12} y^{13}$ in the expansion of $(x+y)^{25}$. 4

15. a) Suppose that R is the relation on the set of strings of english letters such that (a R b) if and only if l(a)=l(b), where l(x) is the length of the string x. Is R an equivalence relation? 4

b) Solve the recurrence relation $a_n=8a_{n-1}+10^{n-1}$ and the initial condition $a_1=9$. Use Generating function to find an explicit formula for a_n. 6

16. a) Define Eulers formula. Suppose that a connected planar simple graph with 20 vertices, each of degree 3. Into how many regions does a representation of this planar graph split the plane. 5

b) What is the prefix form for $((x + y) \uparrow 2) + ((x - 4)/3)$? 5

17. a) Explain Kruskal's algorithm to find a minimum spanning tree with an example. 5

b) How many integers between 1 & 1000 which are not divisible by 2,3 or 5. 5

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Code No: 40

FACULTY OF ENGINEERING

B.E. II/IV(ECE) I Semester (Backlog) Examination, May/June 2018

Subject: Applied Mathematics

Time: 3 Hours **Max. Marks: 75**

Note: Answer all questions from Part A & Any Five questions from Part B

PART – A (25 Marks)

1. Solve 2p+3q=1
2. Reduce $4xyz=pq+2pqx^2y+2qxy^2$ to clainaut's form using the transformation x^2 = X and y^2 =Y
3. Determine whether the function f(z)= $f(z)=\begin{cases}\dfrac{z.\mathrm{Re}(z)}{|z|} & z\neq 0\\ 0 & 0\end{cases}$

   Is continuous at z=0
4. Integrate $(\bar{z})^2$ from 0 to 2+i along the line x=2y
5. Locate and classify the singular points of $f(z)=\dfrac{1-e^{2z}}{z^4}$
6. Find the bilinear transformation that maps the points z=∞, i,0 into the points w=0,i, ∞
7. Perform two iterations of bisection method to find the cube root of 100
8. If $y_0=1$, $y_1=11$, $y_2=28$ and $y_3=28$ and $y_4=29$, find $\Delta^4 y_o$
9. Define coefficient of correlation and state its limits.
10. Show that the arithmetic mean of regression coefficients in greater than the correlation coefficient.

PART – B (50 Marks)

.11. (a) Form a partial differential equation by eliminating arbitrary constants a,b,c from

$$+\frac{y^2}{b^2}+\frac{z^2}{c^2}=1$$

(b)Solve $z^2(p^2+q^2)=x^2+y^2$

12. a) If $f(z)=u+iv$ is an analytic function and $u+v=(x+y)(2-4xy+x^2+y^2)$, find u, v and the analytic function f(z).

(b) State and prove Cauchy's integral formula.

Cont..2

13. (a)Find the Taylor's series expansion of f(z)= $\frac{z}{e^z}$ about z=0

(b) Evaluate $\left(1+z+z^2\right)^{1/z} + e^{1/(z-1)} + e^{1/(z-2)}\Big)$ dz, where C is lzl = , using residue theorem

14. (a) If f(1)=168, f(7)=192 and f(15)=336,find f(10) using Lagrange's interpolation formula.

(b) Use the following data to find x for which y is minimum and find this value of y.

x	0.60	0.65	0.70	0.75
y	0.622	0.615	0.613	0.617

15. (a) Find the least square parabola to the following data:

x	-3	-1	1	3
y	15	5	1	5

(b) Calculate the correlation coefficient from the following data:

X	1	2	3	4	5	6	7	8	9
Y	9	8	10	12	11	13	14	16	15

16. (a) Solve pq = z by charpit's method.

(b) If f(z) = u+iv is analytic functions, show that $\nabla^2 u^2 = 2\left|f'(z)\right|^2$,where

$\nabla^2 = + \frac{\partial^2}{\partial y^2}$

17. (a) Evaluate $\int_0^{®} \frac{dv}{\cdot cos\theta)^2}$

(b) If = x - y^2, then find y (0 2) using Ruge-Kuffa method of order 4.

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