



SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR
Siddharth Nagar, Narayanavanam Road – 517583

QUESTION BANK (DESCRIPTIVE)

Subject with Code : MATHEMATICS-III(15A54301)

Course & Branch: B.Tech(ECE)

Year & Sem: II-B.Tech & I-Sem

Regulation: R15

UNIT –IV

1. Derive normal equations to fit the straight line $y = a+bx$. [10 M]
2. Derive normal equations to fit the straight line $y = a+bx+cx^2$. [10 M]
3. a) Fit a straight line $y=a+bx$ from the following data [5 M]

X	0	1	2	3	4
Y	1	1.8	3.3	4.5	6.3

- b) Fit a straight line $y=ax+b$ from the following data [5 M]

X	6	7	7	8	8	8	9	9	10
Y	5	5	4	5	4	3	4	3	3

4. Fit a second degree polynomial to the following data by the method of **least squares** [10 M]

X	0	1	2	3	4
Y	1	1.8	1.3	2.5	6.3

5. a) Fit the curve of the form $y = ae^{bx}$ [5 M]

X	77	100	185	239	285
Y	2.4	3.4	7.0	11.1	19.6

- b) Fit the curve of the form $y = ab^x$ for [5 M]

X	2	3	4	5	6
Y	8.3	15.4	33.1	65.2	127.4

6. a) From the following table values of x and y, find $\frac{dy}{dx}, \frac{d^2y}{dx^2}$ for x=1.5 [5 M]

X	1.5	2.0	2.5	3.0	3.5	4.0
Y	3.375	7.0	13.625	24.0	38.875	59

b) From the following table values of x and y, find $\frac{dy}{dx}$, when x=3 and x=6 [5 M]

X	0	1	2	3	4	5	6
Y	6.9897	7.4036	7.7815	8.1291	8.4510	8.7506	9.0309

7. Compute $f^{-1}(4)$ from the following table [10 M]

X	1	2	4	8	10
Y	0	1	5	21	27

8. Evaluate $\int_0^1 \frac{1}{1+x} dx$ [10 M]

i) By trapezoidal rule and Simpson's $\frac{1}{3}$ rule.

ii) Using Simpson's $\frac{3}{8}$ rule and compare the result with actual value.

9. a) Compute $\int_0^4 e^x dx$ by Simpson's $\frac{1}{3}$ rule with 10 subdivisions. [5 M]

b) Find $\int_3^7 x^2 \log x dx$, using trapezoidal rule and Simpson's rule by 10 sub divisions. [5 M]

10. a) Define error for least Square. b) What is Curve –fitting ? [5x2=10 M]

c) Write the trapezoidal rule formula. d) Write the normal equations for the straight line

$$y = a+bx+cx^2.$$

e) Write the Simpson's $\frac{1}{3}$ rule formula.



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UNIT – II

1. The principle of least squares states that []
- a) sum of residuals is minimum b) sum of residuals is maximum
- c) sum of squares of the residuals is minimum d) none
2. The process of calculating derivatives of a function near the beginning of the table makes use of []
- a) Newton's forward interpolation formula b) Newton's backward formula
- c) Gauss's formula d) Lagrange's interpolation formula
3. In the general quadrature formula $n=2$ gives []
- a) Trapezoidal rule b) Simpson's $\frac{1}{3}$ rule
- c) Simpson's $\frac{3}{8}$ rule d) Weddle's rule
4. In the general quadrature formula $n=3$ gives []
- a) Trapezoidal rule b) Simpson's $\frac{1}{3}$ rule
- c) Simpson's $\frac{3}{8}$ rule d) Weddle's rule
5. In application of Simpson's $\frac{1}{3}$ rule, the interval h for closer app should be []
- a) even and small b) odd and small
- c) equal to zero d) none

6. By trapezoidal rule, $\int_a^b f(x)dx =$ []

a) $\frac{h}{2}[(y_0 + y_n) + 2(y_1 + y_2 + \dots + y_{n-1})]$

b) $\frac{h}{3}[(y_0 + y_n) + 2(y_1 + y_2 + \dots + y_{n-1})]$

c) $\frac{h}{3}[(y_0 + y_n) + 2(y_2 + y_4 + \dots) + 3(y_1 + y_3 + \dots)]$ d) none

7. In Simpson's $\frac{1}{3}$ rule the number of sub intervals should be []

a) even b) odd c) multiple of 3 d) none

8. In Simpson's $\frac{1}{3}$ rule the number of ordinates should be []

a) even b) odd c) multiple of 3 d) none

9. In Simpson's $\frac{3}{8}$ rule the number of sub intervals should be []

a) even b) odd c) multiple of 3 d) none

10. Among Regula-falsi method and Newton-raphson method, the
Rate of convergence is faster for []

a) Newton-raphson method b) Regula-falsi method c) cant say d) none

11. Normal equations of the straight line $y = a_0 + a_1x$ are []

a) $\sum y = ma_0 + a_1 \sum x$ b) $\sum xy = a_0 \sum x + a_1 \sum x^2$

c) a&b d) none

12. If $y = a + bx + cx^2$ then the first normal equation by least square []

Method is $\sum y_i =$

a) $ma_0 + a_1 \sum x_i + a_2 \sum x_i^2$ b) $a_0 \sum x_i + a_1 \sum x_i^2 + a_2 \sum x_i^3$

c) $a_0 \sum x_i^2 + a_1 \sum x_i^3 + a_2 \sum x_i^4$ d) none

13. If $y = a + bx + cx^2$ then the second normal equation by least square []

Method is $\sum x_i y_i =$

a) $ma_0 + a_1 \sum x_i + a_2 \sum x_i^2$ b) $a_0 \sum x_i + a_1 \sum x_i^2 + a_2 \sum x_i^3$

c) $a_0 \sum x_i^2 + a_1 \sum x_i^3 + a_2 \sum x_i^4$ d) none

14. If $y = a + bx + cx^2$ then the third normal equation by least square []

Method is $\sum x_i^2 y_i =$

a) $ma_0 + a_1 \sum x_i + a_2 \sum x_i^2$ b) $a_0 \sum x_i + a_1 \sum x_i^2 + a_2 \sum x_i^3$

c) $a_0 \sum x_i^2 + a_1 \sum x_i^3 + a_2 \sum x_i^4$ d) none

15. If $\sum x_i = 15, \sum y_i = 30, \sum x_i y_i = 110, \sum x_i^2 = 55$ and $y = a_0 + a_1 x$ []

Then $a_0 =$

a) 2.2 b) 1.52 c) 1.2 d) 0

16. The n^{th} order difference of polynomial of n^{th} degree is []

a) constant b) zero c) polynomial d) Symmetric

17. The normal equation of straight line is $\epsilon y =$ []

a) $na + b\epsilon x$ b) $na + \epsilon y$ c) $na - b\epsilon y$ d) $a + \epsilon y$

18. The normal equation of parabola line is $\epsilon y =$ []

a) $na + b\epsilon y + c$ b) $na + b\epsilon x + c\epsilon x^2$ c) $na - b\epsilon x + \epsilon x^2$ d) $a + \epsilon x + \epsilon x^3$

19. In exponential curve $y = ae^{bx}$, $Y =$ []

a) $\ln y$ b) $\log y$ c) y d) none

20. The value of $\int_1^2 1/x \, dx$ by Trapezoidal rule (take $n=4$) is []

a) 0.697 b) 0.589 c) 0.456 d) 56

21. The value of $\int_0^1 1/(1+x) dx$ by simpson's 1/3 rule (take n=4) is []

- a) 0.693 b) 0.589 c) 0.456 d) 56

22. In simpson's $\frac{1}{3}$ rule state that $\int_a^b f(x) dx =$ []

- a) $\frac{h}{2} [(y_0 + y_n) + 2(y_1 + y_2 + \dots + y_{n-1})]$ b) $\frac{h}{3} [(y_0 + y_n) + 2(y_1 + y_2 + \dots + y_{n-1})]$

- c) $\frac{h}{3} [(y_0 + y_n) + 2(y_2 + y_4 + \dots) + 4(y_1 + y_3 + \dots)]$ d) none

23. In simpson's $\frac{3}{8}$ rule state that $\int_a^b f(x) dx =$ []

- a) $\frac{3h}{8} [(y_0 + y_n) + 3(y_1 + y_2 + y_4 + \dots + y_{n-1}) + 2(y_3 + y_6 + y_9 + \dots + y_n)]$

- b) $\frac{h}{3} [(y_0 + y_n) + 2(y_1 + y_2 + \dots + y_{n-1})]$

- c) $\frac{h}{3} [(y_0 + y_n) + 2(y_2 + y_4 + \dots) + 4(y_1 + y_3 + \dots)]$ d) none

24. If []

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

Then $\sum xy = \dots\dots\dots$

- a) 15 b) 204 c) 55 d) 748

25. The power curve is []

- a) $y = ax^b$ b) $y = ab^x$ c) $y = ae^b$ d) none

26. The exponential curve is []

- a) $y = ax^b$ b) $y = ab^x$ c) $y = ae^{bx}$ d) none

27. $y = a e^{bx}$ is _____ curve []

- a) exponential b) power c) parabola d) none

28. In Simpson's 1/3 rule the number of subintervals should be _____ []

- a) even b) odd c) multiples of 3 d) none

29. Putting $n=2$ in Newton- cotes Quadrature formula we obtain _____ rule []

- a) Trapezoidal b) Simpson's 1/3 c) Simpson's 3/8 d) none

30. If $y=8.3, Y= \log y$ then $Y=.....$ []

- a) 0.9191 b) 9.191 c) 0.0919 d) none

31. If $y=4.077, Y= \ln(y)$ then $Y=.....$ []

- a) 1.040 b) 1.405 c) 0.4059 d) none

32. If []

x	0	2	5	7
y	-1	5	12	20

Then $\sum x^2 =$

- a) 79 b) 78 c) 77 d) none

33. If []

x	0	1	2	3	4
y	1	1.8	3.3	4.5	6.3

Then $\sum x =$

- a) 10 b) 11 c) 12 d) none

34. If []

x	0	5	10	15	20	25
y	12	15	17	22	24	30

Then $\sum y =$

- a) 12 b) 139 c) 120 d) none

35. If []

x	0	1.0	2.0
y	1.0	6.0	17.0

Then $n =$

- a) 2 b) 4 c) 3 d) none

36. If $y = a + bx + cx^2$ the second normal equation by least square []

Method is.....

- a) $y = a + cx^2$ b) $y = a + bx + cx^2$ c) $y = bx + cx^2$ d) none

37. The Normal equations of the straight line is..... []

- a) $y = a_1x$ b) $y = a_0 + x$ c) $y = a_0 + a_1x$ d) none

38. If $y = ax^2$ is equation []

- a) ellips b) parabola c) hyperbola d) none

39. If $y = 2x + 5$ is the best fit for 6 pairs of values (x, y) by the method of least squares, []

find $\sum x_i$ if $\sum y_i = 120$.

- a) 40 b) 35 c) 45 d) 30

40. If $y = a + bx + cx^2$ and []

x	0	1	2	3	4
y	1	1.8	3.3	2.5	6.3

Then the second normal equation is

- a) $37.1 = 8a + 28b + 100c$ b) $37.1 = 10a + 30b + 100c$
 c) $35.1 = 10a + 28b + 100c$ d) $10a + 30b + 96c = 37.1$