

TE Petroleum

NMG–(2012/2015 course)

Question Bank

- 1) If the curve passing through (1, 1), (2, 4), (3, 7) is given by  $y = y_0 + u\Delta y_0$ , then the value of  $y$  at  $x = 1.5$  is \_\_\_\_\_
- a. 2.5
  - b. 1.5
  - c. 1
  - d. 2
- 2) By using Newton's Backward difference formula the value of  $y$  when  $x = 2.5$  is

X	0	1	2	3
Y	0	1	4	9

- A. 3.5
- B. 12.5
- C. 6.25
- D. 2.33

- 3) A curve passes through the set of points

x	1	1.5	2	2.5	3	3.5	4
y	2	2.4	2.7	2.8	3	2.6	2.1

Using Simpson's  $1/3$ rd rule the value of  $\int_1^4 y dx$  is

- A. 7
- B. 6.8
- C. 7.8
- D. 8

- 4) At the end of second iteration , the real root of  $(17)^{1/3}$  by using Newton-Raphson method is

( Given that initial approximation is 2 and root value at the end of first iteration is 2.75)

- A. 2.7500
- B. 2.582645
- C. 2.571332
- D. 2

- 5) The next iterative value of the root of  $3x + \sin x - e^x = 0$  using Newton- Raphson method , if the initial guess is 0

- A. 0.1  
 B. 0.3333  
 C. 0.3602  
 D. 0.4589
- 6) The first approximate real root of the equation  $x^3 - 5x - 7 = 0$  which lies in between 2 and 3, using method of false position is
- A. 2.8  
 B. 2.114  
 C. 2.6429  
 D. 2.987

7) Given

X	0	1	2
y	2	3	4

The value of  $\int_0^2 y dx$ , using trapezoidal rule for the given data is \_\_\_\_\_

- 8) If  $f(x) = x^2$ ,  $h = 1$ , the value of  $\Delta(f(x))$  is equal to \_\_\_\_\_
- 9) How many real roots are there of the equation  $x^2 - 10 = 0$ ?
- 10)  $3 \frac{dy}{dx} + 5y^2 = \sin x$ ,  $y(0.3) = 5$  and using a step size of  $h=0.3$ , the value of  $y_1(0.6)$  using Euler's method is most nearly
- a) -7.4704      b) -7.5704      c) -7.6704      b) -7.3704

11) While solving by Gauss-Seidel method, which of the following is the first Iterative solution for the system;  $x-2y=1$ ,  $x+4y=4$ ?

- a) (1, 0.75)  
 b) (0.1, 0.75)  
 c) (1, 0)  
 d) (0, 1.75)

12) The two regression lines are  $x=19.13 - 0.87y$  &  $y= 11.64-0.50x$  then  $\bar{x}$  is

a) 3.673    b) 0.6595    c) 15.935    d) none of these

13) Using Euler's modified method, obtained  $y_1^{(1)}$  of the equation  $\frac{dy}{dx} = x + y$  with initial conditions  $y = 1$  at  $x = 0$  ( $h = 0.2$ ).

- a) 1.24  
 b) 1.21

c) 1.13

d) 1.41

14) To solve the ordinary differential equation

$$3 \frac{dy}{dx} + 3xy^2 = \sin x, \quad y(0) = 5,$$

by Runge – Kutta method 4<sup>th</sup> order method, you need to rewrite the equation as

a)  $\frac{dy}{dx} = 3(\sin x - xy^2), y(0) = 5$

b)  $\frac{dy}{dx} = \frac{1}{3}(\sin x - 3xy^2), y(0) = 5$

c)  $\frac{dy}{dx} = \frac{1}{3}\left(-\cos x - \frac{xy^3}{3}\right), y(0) = 5$

d)  $\frac{dy}{dx} = \frac{x}{y}(\sin x + xy^2), y(0) = 5$

15) Normal equations for fitting of straight line  $y=mx+c$ , using least square solution for the following data are----

x	0	1	2
y	1	2	3

16) The null hypothesis  $H_0$  is accepted when

a) Calculated value < Tabular value

b) Calculated value > Tabular value

c)  $H_1$  is accepted      d) none of these

17) If  $\text{Cov}(X, Y) = 5$ ,  $b_{yx} = 3.14$  then  $\sigma_x$  is-----

18) For leptokurtic curves,

a)  $\beta_2 < 3$       b)  $\beta_2 = 3$       c)  $\beta_2 > 3$       d)  $\beta_2 = 1$

20) Maximize  $z = 2x + 3y$

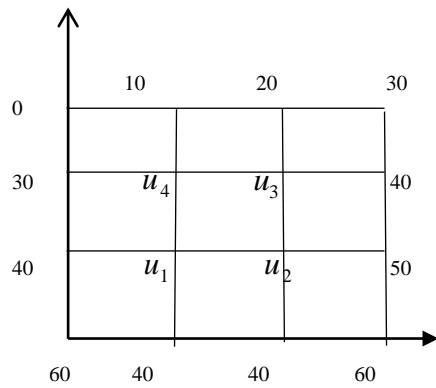
Subject to  $x + 2y \leq 3$

$$y \leq 1$$

$x, y \geq 0$

The number of basic variables involved to solve it by using simplex method are-----

20) For the equation  $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$  using Finite difference approximation method, the equation of  $u_2$  with reference to following grid. [  $h = k = 1$  ] is



21) Eigen values of the matrix

$$A = \begin{bmatrix} 4 & 6 & 6 \\ 1 & 3 & 2 \\ -1 & -4 & -3 \end{bmatrix} \text{ are:}$$

22) The solution of system of linear equation  $x+y=a$ ,  $2x+3y=b$  is-----

23) If Eigen values of the matrix A are 4, 3, -2 then  $|A|$  is equal to -----