Note: Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink in the answer-book. Cutting or filling two or more circles will result in zero mark in that question.

1-1- The solution set of the inequality $ax + by < c$ is the:

(a) Parabola   (b) Half plane ✓

(c) Circle   (d) Hyperbola

2- If m_1 and m_2 are slopes of two parallel lines, then:

(a) $m_1 m_2 = -1$ (b) $m_1 = -m_2$

(c) $m_1 = m_2$ ✓   (d) $m_1 m_2 = 1$

3- $\underline{j} \times \underline{k} =$:

(a) $\underline{j}$ (b) $\underline{k}$

(c) $-\underline{i}$ (d) $\underline{i}$ ✓

4- A linear equation in two variables represents:

(a) Ellipse   (b) Arc

(c) Circle   (d) Straight line ✓

5- If the dot product of two vectors is zero, then the vectors will be:

(a) Perpendicular ✓   (b) Parallel

(c) Collinear   (d) None of these

6- Mid-point of the line segment joining the points (2, 0) and (0, 2) is:

(a) (0, 0)   (b) (2, 2)

(c) (1, 1) ✓   (d) (3, 3)

7- The foci of the hyperbola $\dfrac{x^2}{a^2} - \dfrac{y^2}{b^2} = 1$ are:

(a) $(0, \pm c)$ (b) (1, 1)

(c) $(\pm c, 0)$ ✓   (d) (0, 0)

8- Directrix of the parabola $x^2 = 4ay$ is:
   (a) $(a, 0)$
   (b) $(-a, 0)$
   (c) $(0, -a)$
   (d) $(0, a)$ ✓

9- The slope of the line through the points $(1, 5)$, $(5, 1)$ is:
   (a) -1 ✓
   (b) 1
   (c) 0
   (d) -9

10- The radius of the circle $(x - 5)^2 + (y - 3)^2 = 9$ is:
   (a) 3 ✓
   (b) 5
   (c) 9
   (d) 0

11- If $y = e^{2x}$, then $y_2 =$:
   (a) e^{2x}
   (b) $2e^{2x}$
   (c) $4e^{2x}$ ✓
   (d) $16e^{2x}$

12- $f(x) = ax + b$, $a \neq 0$ is:
   (a) Trigonometric function
   (b) Linear function ✓
   (c) Cubic function
   (d) Quadratic function

13- $\int a^x \, dx =$:
   (a) $\dfrac{\ln a}{a^x} + c$
   (b) $\dfrac{a^x}{\ln a} + c$ ✓
   (c) $\dfrac{1}{a^x \ln a}$
   (d) $a^x \ln a + c$

14- The value of $\dfrac{dy}{dx} = \dfrac{-2}{x^3}$ at $x = -1$ is:
   (a) 4
   (b) 5
   (c) -2
   (d) 2 ✓

15- Order of the differential equation $\dfrac{x d^2 y}{dx^2} + \dfrac{dy}{dx} - 2x = 0$ is:
   (a) 1
   (b) 2 ✓
   (c) 3
   (d) 4

16- If $f(x) = \cos x$, then $f'(\pi) = $:

(a) 1

(b) 0 ✓

(c) −1

(d) 2

17- $\int_0^{\pi/2} \cos x \, dx = $:

(a) $\dfrac{\pi}{2}$

(b) 0

(c) −1

(d) 1 ✓

18- $\lim\limits_{n \to +\infty} \left(1 + \dfrac{1}{n}\right)^{n/2} = $:

(a) e^{-1}

(b) e^2

(c) $e^{1/2}$ ✓

(d) e^3

19- Differential of y is denoted by:

(a) $\dfrac{dy}{dx}$

(b) dy ✓

(c) dx

(d) dy'

20- $\dfrac{d}{dx}[5 f(x)] = $:

(a) $5f'(x)$ ✓

(b) 5

(c) $f'(x)$

(d) $5 + f'(x)$