



## BRAINWARE UNIVERSITY

**Term End Examination 2021 - 22**  
**Programme – Diploma in Electrical Engineering**  
**Course Name – Mathematics II**  
**Course Code - DEE204**  
**( Semester II )**

**Time allotted : 1 Hrs.15 Min.**

**Full Marks : 60**

[The figure in the margin indicates full marks.]

**Group-A**

(Multiple Choice Type Question)

1 x 60=60

*Choose the correct alternative from the following :*

(1)  $\int \frac{dx}{x \log x} =$

- |                 |                       |
|-----------------|-----------------------|
| a) $\log x + c$ | b) $\log(\log x) + c$ |
| c) $e^x + c$    | d) None of these      |

(2)  $\int \frac{3^x}{3^x + 1} dx =$

- |                          |                             |
|--------------------------|-----------------------------|
| a) $\log 3^x + 1  + c$   | b) $3^x + 1 + c$            |
| c) $\log_3 3^x + 1  + c$ | d) $\log_{10} 3^x + 1  + c$ |

(3)  $\int \frac{\cos 2x dx}{(\sin x + \cos x)^2} =$

- |                             |                            |
|-----------------------------|----------------------------|
| a) $\log \sin x + \cos x $  | b) $\log \sin x - \cos x $ |
| c) $-\log \sin x + \cos x $ | d) None of these           |

(4)  $\int \frac{dx}{\cos^2 x - \sin^2 x} =$

- |  |  |
|--|--|
| a) $\log \sec 2x + \tan 2x  + c$             | b) $\log \sec 2x - \tan 2x  + c$             |
| c) $\frac{1}{2} \log \sec 2x + \tan 2x  + c$ | d) $\frac{1}{2} \log \sec 2x - \tan 2x  + c$ |

$$\frac{1}{2} \log |\sec 2x - \tan 2x| + c$$

(5)  $\int \frac{\sin^2 x}{\cos^4 x} dx = A \tan^3 x$  then A is

a) 3

b)  $\frac{1}{3}$

c) -3

(6)  $\int 2^{3x} dx =$

a)  $\frac{2^{3x}}{3 \log 2} + c$

b)  $\frac{2^{3x+1}}{3x+1} + c$

c)  $32^{3x} \log 2 + c$

d) None of these

(7)  $\int \cot^2 x dx =$

a)  $-(\cot x + x) + c$

b)  $-(\cot x - x) + c$

c)  $-\cot x + x + c$

d) None of these

(8)  $\int 0 dx =$

a) 0

b) x

c) dx

d) constant

(9)  $\int \frac{1}{x} \left( x + \frac{1}{x} \right) dx$

a)  $\left( x - \frac{1}{x} \right) + c$

b)  $\left( x^2 - \frac{1}{x^2} \right) + c$

c)  $\left( 1 - \frac{1}{x^2} \right) + c$

d)  $\left( x + \frac{1}{x} \right) + c$

(10)  $\int e^{3 \log x} dx =$

a)  $x^3 + c$

b)  $\log x + c$

c)  $\frac{x^4}{4} + c$

d)  $x^4 + c$

(11) The formula  $\int a^x dx = \frac{a^x}{\log a} + c$  is invalid for a =

a) 1

b) 2

c) 3

d) None of these

(12) If  $\int \frac{dx}{x^2 + 25} = k \tan^{-1} \frac{x}{5}$  then k is

a) 1

b) 5

c)  $\frac{1}{5}$

d) -5

(13) If  $\int \frac{x \cos x + \sin x}{x \sin x} dx = f(x) + \log \sin x + c$  then  $f(x)$  is

a)  $x$

b)  $e^x$

c)  $\log x$

d) None of these

(14)  $\int e^{1-\log x} dx =$

a)  $ex+c$

b)  $e \log x + c$

c)  $x \log e + c$

d) None of these

(15)  $\int \sec 3x \tan 3x dx =$

a)  $3 \sec 3x + c$

b)  $\sec 3x + c$

c)  $\frac{1}{3} \sec x + c$

d)  $\frac{1}{3} \sec 3x + c$

(16)  $\int x \sin x dx =$

a)  $x \cos x - \sin x + c$

b)  $-x \cos x + \sin x + c$

c)  $x \sin x + \sec x + c$

d) none of these

(17)  $\int_0^{\frac{\pi}{2}} \cos 2x dx =$

a) 0

b) 1

c) 2

d) none of these

(18)  $\int_1^e \frac{\log x}{x} dx =$

a)  $\frac{1}{2}$

b) 2

c)  $\frac{1}{e}$

d) e

(19)  $\int_0^{\frac{\pi}{4}} (\sec x + \tan x) \sec x dx =$

a)  $\sqrt{3}$

b) 2

c) 1

d)  $\sqrt{2}$

(20)  $\int_0^{\frac{\pi}{4}} \tan^2 x dx =$

a)  $1 - \frac{\pi}{4}$

b)  $1 + \frac{\pi}{4}$

c)  $-\frac{\pi}{4}$

d)  $\frac{\pi}{4}$

(21)  $\int_0^1 \frac{dx}{1+x^2} =$

a)  $\frac{\pi}{4}$

b)  $\frac{\pi}{2}$

c)  $\frac{2\pi}{3}$

d) none of these

(22)  $\int_0^{\frac{\pi}{2}} \sin^2 x dx =$

a) 0

b) 1

c) 2

d)  $\frac{\pi}{4}$

(23) The order and degree of the differential equation  $\left(\frac{dy}{dx}\right)^2 - 2\frac{dy}{dx} = 3x$  are

a) 2,1

b) 2,2

c) 1,1

d) 1,2

(24) The order and degree of the differential equation  $\left(\frac{d^2y}{dx^2}\right) = \left(1 + \frac{dy}{dx}\right)^{\frac{2}{3}}$  are

a) 2,3

b) 3,2

c) 1,3

d) None of these

(25) The differential equation whose general solutions are  $y = A\sin x + B\cos x$  is

a)  $\frac{d^2y}{dx^2} = y$

b)  $\frac{d^2y}{dx^2} = -y$

c)  $\frac{d^2y}{dx^2} = 0$

d) none of these

(26) The differential equation whose general equation is  $y = kx + 6$  is

a)  $y = x \frac{dy}{dx}$

b)  $y = \frac{dy}{dx} + 6$

c)  $y = x \frac{dy}{dx} + 6$

d) none of these .

(27) The differential equation whose general solutions are  $y = A\sin mx + B\cos mx$  is

a)  $\frac{d^2y}{dx^2} + m^2y = 0$

b)  $\frac{d^2y}{dx^2} + y = 0$

c)  $\frac{d^2y}{dx^2} + m^2 = 0$

d) none of these

(28) The general solution of  $xdy - ydx = 0$  is

a)  $y^2 + x^2 = c^2$

b)  $y^2 = Ax^2$

c)  $y^2 = Ax$

d)  $y^2 = -x$

(29) The general solution of  $xdx + ydy = 0$  is

a)  $x^2 - y^2 = c^2$

b)  $x^2 + y^2 = c^2$

c)  $x^2y^2 = c^2$

d) none of these

(30) If  $\frac{dy}{dx} = 2x$  and  $y=0$  at  $x=0$  then  $y=$

a)  $x$

b)  $2x$

c)  $3x^2$

d)  $x^2$

(31) If  $\frac{dy}{dx} = -y$  and  $y=1$  at  $x=2$  then  $x=$

a)  $\log y$

b)  $\log y+1$

c)  $\log y+2$

d)  $2-\log y$

(32) The general solution of the differential equation  $\frac{dy}{dx} = \frac{1+y^2}{1+x^2}$  is

a)  $y = \tan^{-1} x + c$

b)  $x = \tan^{-1} y + c$

c)  $\tan(xy) = c$

d)  $y-x=c(1+xy)$

(33) Integrating factor of  $(x^2 + y^2 + x) dx + xy dy = 0$  is

a)  $x$

b)  $y$

c)  $x^2$

d)  $y^2$

(34) Solution of  $\frac{y dx - x dy}{y^2} + \sin x dx + dy = 0$

a)  $\frac{x}{y} - \cos x + y = C$

b)  $\frac{x}{y} + \cos x + y = C$

c)  $\frac{x}{y} - \cos x - y = C$

d) none of these

(35) The integrating factor of the equation  $\frac{dx}{dy} + \frac{x}{1+y^2} = \frac{e^{-\tan^{-1}y}}{1+y^2}$  is

a)  $\tan^{-1} y$

b)  $e^{\tan y}$

c)  $e^{\sin^{-1} y}$

d)  $e^{\tan^{-1} y}$

(36) The integrating factor of the equation  $\frac{dy}{dx} + 2xy = x^3$  is

a)  $e^x$

b)  $x^2$

c)  $e^{x^2}$

d)  $e^{-x^2}$

(37)  $\frac{1}{D} \left( x^{\frac{5}{2}} \right) =$

a)  $\frac{7}{2} x^{\frac{7}{2}}$

b)  $\frac{2}{7} x^{\frac{7}{2}}$

c)  $\frac{7}{x^{\frac{7}{2}}}$

d)  $\frac{7}{x^{\frac{7}{2}}}$

(38)

If  $P(A+B) = \frac{2}{7}$  then the probability of  $P(\bar{A} \cdot \bar{B})$  is

a)  $\frac{1}{7}$

b)  $\frac{2}{7}$

c)  $\frac{5}{7}$

d) None of these

(39) The probability of any event  $A$  satisfies

a)  $P(A) \geq 1$

b)  $P(A) < 0$

c)  $0 \leq P(A) \leq 1$

d) None of these

(40) Two events  $A$  and  $B$  are mutually exclusive if

a)  $P(A \cap B) = P(A) \cdot P(B)$

b)  $P(A \cap B) = 1$

c)  $P(A \cap B) = 0$

d) none of these

(41) If  $P(A \cup B) = \frac{7}{8}$ ,  $P(A \cap B) = \frac{1}{4}$ ,  $P(A^c) = \frac{5}{8}$  then  $P(B) =$

a)  $\frac{3}{8}$

b)  $\frac{3}{4}$

c)  $\frac{1}{3}$

d)  $\frac{1}{4}$

(42) Probability of an impossible event is

a)  $-\infty$

b) 1

c) 0

d) none of these

(43) One card is drawn from a standard pack of 52. The probability which is either king or a queen is

a)  $\frac{1}{3}$

b)  $\frac{2}{13}$

c)  $\frac{3}{13}$

d) none of these

(44) Two unbiased coins are tossed. Then the probability of obtaining at least one tail is

a)  $\frac{4}{3}$

b)  $\frac{3}{4}$

c)  $\frac{1}{3}$

d) none of these

(45) Two unbiased coins are tossed one after another, the probability that one is head and other is tail is

a)  $\frac{1}{4}$

b)  $\frac{1}{2}$

c)  $\frac{3}{4}$

d) none of these

(46) An unbiased die is rolled, the probability that an odd point or a six will appear on the top of the die is

a)  $\frac{1}{2}$

b)  $\frac{1}{3}$

c)  $\frac{2}{3}$

d) none of these

(47) Let A and B be two events and  $P(\bar{A}) = 0.3, P(B) = 0.4, P(\bar{A} \cap \bar{B}) = 0.5$ ; then  $P(A \cup \bar{B}) =$

a) 0.5  
c) 1

b) 0.8  
d) none of these

(48) An urn contains 4 white and 6 black balls. Two balls are drawn one after another without replacement. Probability of one ball white and one black is

a)  $\frac{1}{24}$

b)  $\frac{4}{15}$

c)  $\frac{8}{15}$

d) none of these

(49) Median of the frequency distribution

$x_i$ :	3	2	5	1
$f_i$ :	2	1	1	3

a) 5

b)  $\frac{16}{7}$

c)  $\frac{1}{2}$

d)  $\frac{7}{16}$

(50) The A.M OF  $x-2, 10, x+3, 7$  is 9 . The value of x is

a) 10  
c) 0

b) 9  
d) 11

(51) The A.M of the datas 13,15,17,19,23,30 is

a) 19  
c) 20.5

b) 19.5  
d) none of these

(52) If  $y=3x-100$  and  $\bar{x}=50$  then the value of  $\bar{y}$

a) 60  
c) 100

b) 30  
d) 50

(53) Median from the data : 10,5,9,4,8,7,6 is...

a) 5  
c) 6

b) 7  
d) 8

(54) For a distribution having single mode , the mean is 42.58, median is 42.1 , mode is

a) 41.14  
c) 40

b) 38  
d) none of these

(55) The mode of the frequency distribution

$x_i$ :	0	1	2	3	4
$f_i$ :	23	24	21	25	20

a) 0  
c) 2

b) 1  
d) 3

(56)

$2x+y=3$  is the relation between two variables  $x$  and  $y$ . If  $\sigma_x = 3$  then  $\sigma_y =$

- a) 3
- b) 4
- c) 6
- d) none of these

(57) Two variables  $x$  and  $y$  are related by  $y=10-3x$ . If the SD of  $x$  is 4 then SD of  $y$  is

- a) 10
- b) 11
- c) 12
- d) 20

(58) Mean and Median of 3,6,24,18,0 are

- a) 10.2, 3
- b) 10.2, 6
- c) 20.25, 6
- d) none of these

(59) If  $\text{var}(x)=5$  and  $y=5x+6$  then  $\text{var}(y) =$

- a) 125
- b) 150
- c) 6
- d) none of these

(60) Which are the following digits are not significant of the number 0.025

- a) 0
- b) 2
- c) 5
- d) none of these