Total No. of Questions: 25 **Enrollment No :** ____________________

MEDICAPS UNIVERSITY

Faculty of Engineering

End Semester Examination May 2025

EN3BS15 Engineering Mathematics -III

Programme	:	B.Tech.	**Branch/Specialisation**	:	All
Duration	:	3 hours	**Maximum Marks**	:	60

Note: *All questions are compulsory. Internal choices, if any, are indicated. Assume suitable data if necessary. Notations and symbols have their usual meaning.*

Section 1 (Answer all question(s))

Marks CO BL

Q1. $(1+\Delta)(1-\nabla)$ = ______. **1 1 2**

○ E^2 ○ $(1^2 - \Delta^2)$

◉ 1 ○ None of these

Q2. Let h be the finite difference, then shifting operator is defined by- **1 1 1**

◉ $Ef(x) = f(x+h)$ ○ $Ef(x) = f(x)$

○ $Ef(x) = f(x) - f(x-h)$ ○ None of these

Q3. If the function $y = f(x)$ is defined in the interval [-3,3] which is divided into 7 equidistant ordinates then the value of h is- **1 1 2**

○ 0 ◉ 1

○ 4/5 ○ None of these

Q4. In geometrical meaning of Euler's modified method, the curve is approximated as a- **1 1 2**

◉ Straight line ○ Circle

○ Parabola ○ None of these

Q5. In the normal distribution the curve is symmetrical about the_______. **1 1 2**

○ Variance ◉ Mean

○ Standard deviation ○ None of these

Q6. In exponential distribution variance is- **1 1 3**

○ $\frac{2}{\lambda^2}$ ◉ $\frac{1}{\lambda^2}$

○ $\frac{1}{\lambda}$ ○ None of these

Q7. The coefficient of correlation is the _______ of the coefficient of regression. **1 1 1**

◉ Geometric mean ○ Arithmetic mean

○ Both (A) and (B) ○ None of these

Q8. The rank Correlation coefficient lies between _______. **1 1 1**

○ $-1/4 \le r \le 1/4$ ○ $-1/2 \le r \le 1/2$

◉ $-1 \le r \le 1$ ○ None of these

Q9. In chi-square test expected frequencies should not be- **1 1 1**

◉ Less than 5 ○ Greater than 5

○ Equal to 5 ○ None of these

Q10. In any statistic if calculated value is not less than the tabulated value then which of the following hypothesis is accepted?		**1**	**1**	**1**

- ○ Null hypothesis
- ◉ Alternative hypothesis
- ○ Both (A) and (B)
- ○ None of these

Section 2 (Answer any 2 question(s))

Marks CO BL

Q11. Using Newton's forward interpolation formula, find the value of $f(1.6)$, if **5 2 3**

x	1	1.4	1.8	2.2
y	3.49	4.82	5.96	6.5

Rubric	Marks
write the formula, calculation and final answer	5

Q12. If the values of the function $f(x)$ are $f(1) = 4, f(2) = 5, f(7) = 5, f(8) = 4$ then find the value of $f(6)$ using Newton's divided difference formula. **5 2 3**

Rubric	Marks
Write the formula, calculations and final answer	5

Q13. Apply Bessel's formula to evaluate y_{25} given **5 4 4**

x	20	24	28	32
$y = f(x)$	2854	3162	3544	3992

Rubric	Marks
Write the formula, Calculations, value of y_{25}	5

Section 3 (Answer any 2 question(s))

Marks CO BL

Q14. Calculate by Simpson's one third rule an approximate value of $\int_0^1 \frac{x^2}{1+x^3}dx$ by taking five equidistant ordinates. **5 2 3**

Rubric	Marks
write the formula, find five equidistance ordinates, calculations	5

Q15. Use Picard's method to compute approximate the value of y when $x = 0.1$ given that $y = 1$ when $x = 0$ and $\frac{dy}{dx} = 3x + y^2$. **5 2 3**

Rubric	Marks
Write the formula, find Third iteration and final answer	5

Q16. Solve the equation $\frac{dy}{dx} = x + y$, with initial condition $y(0) = 1$ by Runge-Kutta method, from $x = 0$ to $x = 0.1$ with $h = 0.1$. **5 2 3**

Rubric	Marks
Write the complete formula, find the values and put the formula and final answer	5

Section 4 (Answer any 2 question(s))

Marks CO BL

Q17. Six dice are thrown 729 times. How many times do you expect at least three dice to show five or six? **5 1 1**

Rubric	Marks
find probability of success and failure, at least three dice to show five or six, multiply by 729 then final answer	5

Q18. Derive mean and variance of Poisson distribution. **5 2 3**

Rubric	Marks
write the formula of Poisson distribution and derive first and second moment	5

Q19. Define exponential distribution and prove that the total area of exponential distribution is unity. **5 2 3**

Rubric	Marks
definition, write the formula and derive it	5

Section 5 (Answer any 2 question(s))

Marks CO BL

Q20. Fit a straight line to the following data regarding x as the independent variable: **5 4 4**

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

Rubric	Marks
write the equation of straight line and its normal equation, find the values	5

Q21. Calculate the Karl Pearson's coefficient of correlation between X and Y series: **5 2 3**

X	17	18	19	19	20	20	21	21	22	23
Y	12	16	14	11	15	19	22	16	15	20

Rubric	Marks
write the formula, put the values in formula from the table, then final answer	5

Q22. Prove that the arithmetic mean of the coefficient of regression is greater than the coefficient of correlation. Show that the product of regression coefficient is less than or equal to 1. **5 2 3**

Rubric	Marks
proof of first and second part	5

Section 6 (Answer any 2 question(s))

Marks CO BL

Q23. Define type I error, type II error, level of significance, critical region, and critical value. **5 1 2**

Rubric	Marks
assign 1 mark for each definition	5

Q24. A shampoo manufacturing company was distributed a particular brand of shampoo through a large number of retail shops. Before a heavy advertisement. Campaign, the mean sales per shampoo was 140 dozens. After the campaign a sample of 26 shampoo was taken and the mean sales figure was found to be 147 dozens with standard deviation 16. Can you consider the advertisement effective? (Given $t_{0.05,25} = 1.708$). **5** **2** **3**

Rubric	Marks
consider null hypothesis, write the formula of t-test, calculate and compare with tabulated value for decision	5

Q25. In a test given two groups of students drawn from two normal populations, the marks obtained were as follows: **5** **2** **3**

Group A	18	20	36	50	49	36	34	49	41
Group B	29	28	26	35	30	44	46		

Examine at 5% level, whether the two populations have the same variance. (Given that $F_{0.05,(8,6)} = 4.15$).

Rubric	Marks
consider null hypothesis, write formula, compare calculated and tabulated value and decision,	5

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Faculty of Engineering
End Semester Examination May 2025.
EN3BS15, Engineering Mathematics-III
Programme: B.Tech. Branch/Specialisation: AI

Section 1.

Q1	(c) 1	1
Q2	(a) $Ef(x) = f(x+h)$	1
Q3	(b) 1	1
Q4	(a) straight line	1
Q5	(b) Mean	1
Q6	(b) $1/\lambda^2$	1
Q7	(a) Geometric Mean	1
Q8	(c) $-1 \le r \le 1$	1
Q9	(a) less than 5	1
Q10	(b) Alternative hypothesis.	1

Section 2.

Q11. The table of forward differences is:-

x	$y=f(x)$	$\Delta f(x)$	$\Delta^2 f(x)$	$\Delta^3 f(x)$
1	3.49	1.33		
1.4	4.82	1.14	−0.19	−0.41
1.8	5.96		−0.60	
2.2	6.5	0.54		

+2

$f(1.6) = ?$ so $x = 1.6$, Also $a = 1, h = 0.4$

$$u = \frac{x-a}{h} = \frac{1.6-1}{0.4} = 1.5$$

formula

$$f(a+uh) = f(a) + u\Delta f(a) + \frac{u(u-1)}{2!}\Delta^2 f(a) + \ldots\ldots$$ +1

Q 13. Taking the Origin at $x_0 = 24$, $h = 4$

$$\therefore u = \frac{x - x_0}{h} = \frac{25-24}{4} = \frac{1}{4} \Rightarrow 0.25 \text{ which is lies b/w } \tfrac{1}{4} \text{ \& } \tfrac{3}{4}.$$

The Central difference table is:

x	$y = f(x)$	Δy	$\Delta^2 y$	$\Delta^3 y$
$x_{-1} = 20$	2854			
		308		
$x_0 = 24$	3162		74	-8
		382		
$x_1 = 28$	3544		66	
		448		
$x_2 = 32$	3992			

+2

The Bessel's formula is,

$$f(x) = y_0 + u\Delta y_0 + \frac{u(u-1)}{2!}\left[\frac{\Delta^2 y_{-1} + \Delta^2 y_0}{2}\right] + \frac{(u-\frac{1}{2})u(u-1)}{3!}\Delta^3 y_{-1} + \ldots$$ +1

Putting all values from the table, we get.

$$f(25) = 3162 + (0.25)\times(382) + \frac{(0.25)(-0.75)}{2}\left[\frac{74+66}{2}\right] + \frac{(-0.25)(0.25)(-0.75)}{6}\times(-8)$$ +1

$$\text{or } y_{25} = 3162 + 95.5 - 6.5625 - 0.0625$$
$$= 3250.875.$$ +1

Section 3.

Q14. Here the Range of integration (0,1) is subdivided into five equal parts. so $h = \frac{1-0}{5} = 0.2$. Now the values of the give function $y = x^2/(1+x^3)$ computed for each point of subdivision are as follows:

x_K	$y_K = \frac{x_K^2}{1+x_K^3}$	Calculations for Simpson's $\frac{1}{3}$ rule.
$x_0 = 0$	$y_0 = 0$	$y_0 = 0$
$x_1 = 0.2$	$y_1 = 0.0397$	$4y_1 = 0.1588$
$x_2 = 0.4$	$y_2 = 0.15037$	$2y_2 = 0.30074$
$x_3 = 0.6$	$y_3 = 0.2960$	$4y_3 = 1.184$
$x_4 = 0.8$	$y_4 = 0.4233$	$2y_4 = 0.8466$
$x_5 = 1$	$y_5 = 0.5$	$y_5 = 0.5$
	Total	2.99014

+2

formula, $I = \frac{h}{3}\left[(y_0+y_n)+4(y_1+y_3+\dots+)+2(y_2+y_4+y_6+\dots)\right]$ +1

$\therefore$ By Simpson's $\frac{1}{3}$ rule.

$$\int_0^1 \frac{x^2}{1+x^3} = \frac{0.2}{3}\left[2.99014\right] = 0.1993$$ +2

Q15. $\frac{dy}{dx} = 3x+y^2 \Rightarrow f(x,y) = 3x+y^2, y_0 = 1, x_0 = 0$

~~Now, first~~

picard's formula $y^{(n)} = y_0 + \int_{x_0}^{x} f(x, y^{(n-1)})dx$ +1

Now, first approximation,

$$y^{(1)} = y_0 + \int_{x_0}^{x} f(x,y_0)dx = 1 + \int_0^x (3x+1)\,dx$$

$$= 1+x+\frac{3x^2}{2} = 1.11500 \text{ (at } x=0.1)$$ +1

Second approximation,

$$y^{(2)} = y_0 + \int_{x_0}^{x} f(x, y^{(1)})dx = 1 + \int_0^x [3x + \{y^{(1)}\}^2]\,dx$$

$$= 1 + \int_0^x \left[3x + \left(1+x+\frac{3x^2}{2}\right)^2\right] dx$$

$$= 1 + \int_0^x \left(\frac{9}{4}x^4 + 3x^3 + 4x^2 + 5x + 1\right) dx$$

$$= \frac{9}{20}x^5 + \frac{3}{4}x^4 + \frac{4}{3}x^3 + \frac{5}{2}x^2 + x + 1$$

$$= 1.1264, \text{ at } x = 0.1$$ +1

Third Approximation,

$$y^{(3)} = y_0 + \int_0^2 f(x, y^{(2)})dx = 1 + \int_0^x [3x + \{y^{(2)}\}^2]\,dx$$

$$= 1 + \int_0^x \left(\frac{81}{400}x^{10} + \frac{27}{40}x^9 + \frac{141}{80}x^8 + \frac{17}{4}x^7 + \frac{1157}{180}x^6 + \frac{136}{15}x^5 + \frac{125}{12}x^4 + \frac{23}{3}x^3 + 6x^2 + 5x + 1\right) dx$$

$$= \frac{81}{4400}x^{11} + \frac{27}{400}x^{10} + \frac{47}{240}x^9 + \frac{17}{32}x^8 + \frac{1157}{1260}x^7 + \frac{62}{45}x^6 + \frac{26}{12}x^5 + \frac{23}{12}x^4 + 2x^3 + \frac{5}{2}x^2 + x + 1$$ +1

$$= 1.12721, \text{ at } x = 0.1$$

$\therefore$ at $x = 0.1$, $y = 1.127$. +1

Q16. The given differential eqn is $\frac{dy}{dx} = x+y \Rightarrow f(x,y) = x+y$
and the given values are

$\therefore h = 0.1,\ x_0 = 0,\ y_0 = 1.$

$S_1 = hf(x_0, y_0) = (0.1)(0+1) = 0.1$ +1

$S_2 = hf\left(x_0 + \frac{h}{2}, y_0 + \frac{S_1}{2}\right) = (0.1) f(0+0.5, 1+0.5)$ +1

$= (0.1) f(0.05 + 1.05)$

$= (0.1)(0.05 + 1.05) = 0.11$

$S_3 = hf\left(x_0 + \frac{h}{2}, y_0 + \frac{1}{2}S_2\right) = (0.1) f(0.05, 1+0.055) = (0.1)(0.05 + 1.055)$ +1

$= 0.1105$

$S_4 = hf(x_0 + h, y_0 + S_3) = (0.1) f(0.1, 1+0.1105) = (0.1)(0.1 + 1.1105)$ +1

$= 0.12105$

Here $x_1 = x_0 + h = 0 + 0.1 = 0.1$

$y_1 = y(0.1) = y_0 + \frac{1}{6}(S_1 + 2S_2 + 2S_3 + S_4) = 1 + \frac{1}{6}[0.1 + 2(0.11) + 2(0.1105) + 0.12105]$

$= 1 + \frac{1}{6}[0.1 + 0.22 + 0.2210 + 0.12105]$

$= 1 + \frac{1}{6}[0.66205] = 1 + 0.11034$

$y_1 = 1.11034$

Hence at $x = 0.1,\ y = 1.11034$ +1

Remark:- for second order.

$S_1 = hf(x_0, y_0)$

$S_2 = hf(x_0 + h, y_0 + S_1)$

& $y_1 = y_0 + \frac{1}{2}(S_1 + S_2)$.

Q17. Let Success = showing 5 or 6
probability of success $p = 2/6 = 1/3$, failure $= \frac{2}{3}$ +1

Let $X \sim$ Binomial $(n=6, p=1/3)$

we need
$P(X \geq 3) = P(3) + P(4) + P(5) + P(6)$ +1

$P(3) = {}^6C_3 (1/3)^3 (2/3)^3 = 20 \cdot \frac{1}{27} \cdot \frac{8}{27} = \frac{160}{729}$

$P(4) = {}^6C_4 (1/3)^4 (2/3)^2 = 15 \cdot \frac{1}{81} \cdot \frac{4}{9} = \frac{60}{729}$

$P(5) = {}^6C_5 (1/3)^5 (2/3) = 6 \cdot \frac{1}{243} \cdot \frac{2}{3} = \frac{12}{729}$

$P(6) = {}^6C_6 (1/3)^6 = \frac{1}{729}$

$P(X \geq 3) = \frac{160+60+12+1}{729} = \frac{233}{729}$ +2

Expected no. of times
$E = \frac{729 \times 233}{729} = 233$ +1

Q18. In poisson distribution
$P(X=r) = \frac{e^{-m} \cdot m^r}{r!}, r = 0, 1, 2, 3, \ldots$ +1

$$\mu_1' = \sum_{r=0}^{\infty} e^{-m} \cdot \frac{m^r r}{r!}$$

$$= e^{-m} \sum_{r=0}^{\infty} \frac{m^r}{(r-1)!} = e^{-m}\left(m + \frac{m^2}{1!} + \frac{m^3}{2!} + \cdots\right)$$

$$= m e^{-m}\left(1 + \frac{m}{1!} + \frac{m^2}{2!} + \cdots\right)$$

$$= m e^{-m} \cdot e^{m}$$

$$\Rightarrow \boxed{\mu' = m}$$

$$\boxed{\text{Mean} = m}$$

+2

$$\mu_2' = \sum_{r=0}^{\infty} e^{-m} \frac{m^r r^2}{r!}$$

$$= \sum_{r=0}^{\infty} e^{-m} \frac{m^r}{r!} \{r(r-1) + r\}$$

$$= \sum_{r=0}^{\infty} \frac{e^{-m} m^r}{(r-2)!} + \sum_{r=0}^{\infty} \frac{e^{-m} \cdot m^r}{(r-1)!}$$

$$= m^2 \sum_{r=0}^{\infty} \frac{e^{-m} \cdot m^{r-2}}{(r-2)!} + m \sum_{r=0}^{\infty} \frac{e^{-m} \cdot m^{r-1}}{(r-1)!}$$

$$\boxed{\mu_2' = m^2 + m}$$

+2

$$\mu_2 = \mu_2' - \mu_1'^2$$

$$= m^2 + m - m^2$$

$$\Rightarrow \boxed{\mu_2 = m = \text{variance}}$$

+2

Q19 Exponential Distribution :— The exponential distribution is a continuous probability distribution used to model the time between independent events that occur at a constant average rate. +2

The Probability density function of an exponential distribution is given By:

$$f(x) = \begin{cases} \lambda e^{-\lambda x}, & x \geq 0 \\ 0, & x < 0 \end{cases}$$ +1

To prove the total area under the exponential distribution curve is unity. i.e,

$$\int_{-\infty}^{\infty} f(x)dx = 1$$

$\because f(x) = 0$ for $x < 0$, the integral becomes

$$\int_{-\infty}^{\infty} f(x)\, dx = \int_{0}^{\infty} \lambda e^{-\lambda x} dx$$

$$= \lambda \int_{0}^{\infty} e^{-\lambda x} dx$$, let $u = \lambda x \Rightarrow du = \lambda dx \Rightarrow dx = \frac{du}{\lambda}$

Substituting

$$= \lambda \int_{u=0}^{\infty} e^{-u} \frac{du}{\lambda} = \int_{0}^{\infty} e^{-u} du$$

$$= \left[-e^{-u}\right]_{0}^{\infty} = 0 + 1 \quad +1.$$ +2

Q20. Let the Required line be $y = mx + c$

we use the Least Square method with the following normal equations:

$$\sum y = m\sum x + nc \quad \text{---} (1)$$

$$\sum xy = m\sum x^2 + c\sum x \quad \text{---} (2)$$

+2

x	y	x^2	xy
0	1.0	0	0.0
1	1.8	1	1.8
2	3.3	4	6.6
3	4.5	9	13.5
4	6.3	16	25.2

+2

$\sum x = 10$ $\sum y = 16.9$ $\sum x^2 = 30$ $\sum xy = 47.1$

Here $n = 5$.

$\therefore$ eq^n (1) & (2) becomes

$$16.9 = m(10) + 5c \Rightarrow 10m + 5c = 16.9 \quad \text{---} (3)$$

$$47.1 = m(30) + c(10) \Rightarrow 30m + 10c = 47.1 \quad \text{---} (4)$$

solving eq^n (3) & (4) we get

$$m = 1.33, \quad c = 0.72$$

$\therefore$ the required line is

$$\boxed{y = 1.33x + 0.72}$$

+1

Q21.

$$r = \frac{n\sum xy - \sum x \sum y}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}}$$

+1

X	Y	X^2	Y^2	XY
17	12	289	144	204
18	16	324	256	288
19	14	361	196	266
19	11	361	121	209
20	15	400	225	300
20	19	400	361	380
21	22	441	484	462
21	16	441	256	336
22	15	484	225	330
23	20	529	400	460
$\Sigma X=200$	$\Sigma Y=160$	$\Sigma X^2=4030$	$\Sigma Y^2=2668$	$\Sigma XY=3235$

+2

$$\Rightarrow r = \frac{350}{568.32} \simeq 0.616$$ +2

Q22. The arithmetic mean of the Coefficient of regression is greater than the coefficient of correlation:-

we know that $b_{yx} = r \frac{\sigma_y}{\sigma_x}$, $b_{xy} = r.\frac{\sigma_x}{\sigma_y}$

Now, the arithmetic mean of the two regression Coefficients is:

$$A.M. = \frac{b_{yx}+b_{xy}}{2} = \frac{r.\frac{\sigma_y}{\sigma_x} + r.\frac{\sigma_x}{\sigma_y}}{2} = r.\frac{1}{2}\left(\frac{\sigma_y}{\sigma_x}+\frac{\sigma_x}{\sigma_y}\right)$$

Let $K = \frac{\sigma_y}{\sigma_x} \Rightarrow \frac{\sigma_x}{\sigma_y} = 1/K$ so,

$$A.M = r.\frac{1}{2}\left(K + 1/K\right)$$

we use the inequality: $k + \frac{1}{k} \geq 2$ (for all $k \geq 0$)

$\therefore \quad AM \geq r \cdot \frac{1}{2} \cdot 2 = r$

$\Rightarrow \boxed{A \cdot M \geq r}$ +2.5

Product of Regression Coefficient is less than or equal to 1:-

we know that $b_{yx} = r \cdot \frac{\sigma_y}{\sigma_x}$, $b_{xy} = r \cdot \frac{\sigma_x}{\sigma_y}$

Multiply both:

$$b_{yx} \cdot b_{xy} = \left(r \cdot \frac{\sigma_y}{\sigma_x}\right) \cdot \left(r \cdot \frac{\sigma_x}{\sigma_y}\right)$$

$$= r^2$$

$\because \quad -1 \leq r \leq 1 \Rightarrow 0 \leq r^2 \leq 1$

$\therefore \quad b_{yx} \cdot b_{xy} = r^2 \leq 1.$ +2.5

Section 6.

Q23. Type I error:- Type I error occurs when the null hypothesis H_0 is true But we reject it. +1

Type II error: Type II error occurs when the null hypothesis H_0 is false But we fail to reject it. +1

Level of Significance: it is the Probability of making a Type I error. +1

Critical region: it is the set of all values of the test statistic that Leads to rejection of the null Hypothesis H_0. +1

Critical Value: The Critical value is the Boundary Value that separates the critical region from the non-critical region +1

Q24. Given $n = 26$ (small samples)
mean $= \bar{x} = 147$; S.D., $\sigma = 16$ (Variance are known)

& degree of freedom, $v = n-1 = 25$

Null Hypothesis, Ho: There is no difference in between the sample mean and population mean. i.e, the advertisement is not effective. i.e, $H_0: \mu = 140$. +1

we have, $t = \frac{(\bar{x}-\mu)\sqrt{n-1}}{\sigma} = \frac{(147-140)\sqrt{25}}{16}$ +1

$= 2.19$. +1

The tabulated value of t at 5% level of significance and for $v = 25$ dof is 1.708.

clearly, calculated value of $|t| = 2.19 \nless$ tabulated value of $t = 1.708$ +1

$\Rightarrow$ Null Hypothesis H_0 is Rejected.
$\Rightarrow$ the advertisement is effective +1

Q25: Given that: $n_1 = 9$ and $n_2 = 7$
$\bar{x} = \frac{\Sigma x}{n_1} = \frac{333}{9} = 37$, $\bar{y} = \frac{\Sigma y}{n_2} = \frac{238}{7} = 34$.

Null Hypothesis Ho: $\sigma_1^2 = \sigma_2^2$ .i.e, two populations have the same variance. +1

Group A			Group B		
x	$x-\bar{x}$	$(x-\bar{x})^2$	y	$y-\bar{y}$	$(y-\bar{y})^2$
18	−19	361	29	−5	25
36	−1	1	26	−8	64
50	13	169	35	1	1
49	12	144	30	−4	16
36	−1	1	44	10	100
34	−3	9	46	12	144
49	12	144			
41	4	16			
$\Sigma x = 333$		1134	$\Sigma y = 238$		386

we have $S_1^2 = \frac{\Sigma(x-\bar{x})^2}{n_1 - 1} = \frac{1134}{8} = 141.75$ +1

$S_2^2 = \frac{\Sigma(y-\bar{y})^2}{n_2 - 1} = \frac{238}{6} = 64.33$ +1

clearly $S_1^2 > S_2^2$, then $F = \frac{S_1^2}{S_2^2} = \frac{141.75}{64.33} = 2.203$ +1

$\because$ Calculated value < tabulated value

$\Rightarrow$ the null hypothesis H_0 is accepted. +1

$\Rightarrow$ the two population have the same variance.