

## II PUC MODEL QUESTION PAPER 2023-24

### STATISTICS (31)

**Duration: 3 Hrs 15 Min.**

**Max. Marks: 80**

- Instructions:**
1. Statistical table and graph sheets will be supplied on request.
  2. Scientific calculators are allowed.
  3. All working steps should be clearly shown.
  4. Only the first written answers will be considered for Section-A.

#### SECTION – A

##### **I. Choose the correct answer from the choices given:**

**$5 \times 1 = 5$**

1. The expected number of years that a new born baby would live is called
  - a) Cohort
  - b) Radix
  - c) Longevity
  - d) Survival ratio
2. The prices of items increased by 10% in 2012 as compared to 2010. Then the index number for the year 2010 is
  - a) 110
  - b) 10
  - c) 100
  - d) 0
3. Following is the probability distribution of a binomial variate:

|      |        |      |       |      |        |
|------|--------|------|-------|------|--------|
| X    | 0      | 1    | 2     | 3    | 4      |
| P(X) | 0.0625 | 0.25 | 0.375 | 0.25 | 0.0625 |

The mode of the distribution is

- a) 4
- b) 2
- c) 3
- d) 1

4. There are four possible decisions under the testing of null hypothesis ( $H_0$ ):
  - i) Accept  $H_0$  when it is true
  - ii) Reject  $H_0$  when it is not true
  - iii) Accept  $H_0$  when it is not true
  - iv) Reject  $H_0$  when it is true

The correct decisions are

- a) i and ii
- b) iii and iv
- c) i and iii
- d) ii and iv

5. The cost associated with the maintenance of an inventory until they are sold or used is called
  - a) Capital cost
  - b) Setup cost
  - c) Shortage cost
  - d) Holding cost.

##### **II. Fill in the blanks by choosing the appropriate word from those given in the brackets:**

**(Chance, Fisher's, Balanced, Parameter, Strategy, Bell)**

**$5 \times 1 = 5$**

6. Both time reversal test and factor reversal tests are satisfied by \_\_\_\_\_ index number.
7. The t-curve is \_\_\_\_\_ shaped.
8. A statistical constant of the population is called a \_\_\_\_\_.
9. A small amount of variation for which no specific cause can be attributed is termed as \_\_\_\_\_ cause of variation.
10. The \_\_\_\_\_ of a player is the pre-determined rule by which a player determines his course of action.

**III. Match the following:** **$5 \times 1 = 5$** **A**

11. N.R.R. per woman = 1.2
12. Index numbers
13. The range of Bernoulli distribution
14.  $H_1: \mu > 50$
15. Shortages are allowed

**B**

- (a) Inventory Model II
- (b)  $X = 0, 1$
- (c) Population increases
- (d) Economic barometers
- (e)  $H_0: \mu = 50$
- (f) Histogram

**IV. Answer the following questions:  $5 \times 1 = 5$** 

16. Define fertility.
17. Which variation of time series is predictable?
18. Write the relation between mean and variance of a Bernoulli distribution.
19. Define null hypothesis.
20. When is a transportation problem balanced?

**SECTION – B****V. Answer any FIVE of the following questions:** **$5 \times 2 = 10$** 

21. Diagrammatically represent ‘Business Cycle’ with stages.
22. Write two assumptions of interpolation and extrapolation.
23. Find the mean of a Hyper geometric distribution whose parameters are  $a = 4$ ,  $b = 6$  &  $n = 5$ .
24. Find the standard deviation of a chi-square distribution with 8 d.f.
25. A random sample of size 36 is drawn from a population whose standard deviation is 4. Compute standard error of the sample mean.
26. Define ‘point estimation’ and ‘interval estimation’.
27. If  $P' = 0.02$  and  $n = 25$ , calculate upper control limit for np–chart.
28. Test whether solution for the following T.P. is non-degenerate?

|   |    |    |    |
|---|----|----|----|
|   | 10 | 12 |    |
| 2 |    | 3  |    |
|   | 15 |    | 20 |
|   | 4  | 6  |    |
|   |    | 14 |    |
|   |    |    | 7  |

**SECTION – C****VI. Answer any FOUR of the following questions:** **$4 \times 5 = 20$** 

29. Calculate the cost of living index number for the following data. Comment on the result.

| Items    | Prices (Rs.) |      | Weights |
|----------|--------------|------|---------|
|          | 2012         | 2018 |         |
| Food     | 4000         | 6000 | 15      |
| Clothing | 2500         | 3500 | 08      |
| Housing  | 6000         | 9000 | 12      |
| Fuel     | 1000         | 1500 | 10      |
| Others   | 1600         | 2000 | 15      |

30. Following is data regarding annual life insurance premium. Using binomial expansion method estimate the premium at the age 30 and 45 years.

|                  |      |      |    |      |      |    |
|------------------|------|------|----|------|------|----|
| Age (in Years)   | 20   | 25   | 30 | 35   | 40   | 45 |
| Premium (in Rs.) | 1426 | 1581 | -  | 1996 | 2256 | -  |

31. The probability that a team winning the game is  $3/5$ . If this team participates in 6 games, then find the probability that it wins i) all the games ii) more than one game.  
 32. Fit a Poisson distribution for the following data.

|                             |    |    |    |   |            |
|-----------------------------|----|----|----|---|------------|
| Number of mistakes per page | 0  | 1  | 2  | 3 | 4 and more |
| Number of pages             | 20 | 45 | 30 | 5 | 0          |

33. Test whether there is any significant difference in the population proportions at 5% level of significance, from the following data.

|           | Size | Proportion |
|-----------|------|------------|
| Sample I  | 100  | 0.02       |
| Sample II | 200  | 0.01       |

34. From the following  $2 \times 2$  contingency table test whether result depends on family condition of the students are independent. (Use 1% L.O.S.)

|        |      | Family condition |     |
|--------|------|------------------|-----|
|        |      | Good             | Bad |
| Result | Pass | 10               | 15  |
|        | Fail | 15               | 10  |

35. Solve the following game using the principle of dominance. Is the game fair?

|                |  | Player – B     |                |                |
|----------------|--|----------------|----------------|----------------|
|                |  | B <sub>1</sub> | B <sub>2</sub> | B <sub>3</sub> |
| Player – A     |  | A <sub>1</sub> | 4              | -1             |
|                |  | A <sub>2</sub> | 0              | 3              |
| A <sub>3</sub> |  | 6              | -5             | 1              |

36. The purchase price of a machine A is Rs. 5000. Its resale value and maintenance costs are as follows:

|                        |      |      |      |      |      |
|------------------------|------|------|------|------|------|
| Year                   | 1    | 2    | 3    | 4    | 5    |
| Maintenance cost (Rs.) | 100  | 200  | 330  | 510  | 860  |
| Resale value (Rs.)     | 3000 | 2500 | 2000 | 1500 | 1000 |

What would be the optimum replacement period?

## VII. Answer any TWO of the following questions:

**2×5 = 10**

37. Height of a group of candidates who attended the Agniveer army selection camp follows normal distribution with mean and S.D of height of candidates is 160cm and 3.9cm respectively. The minimum required height for Agniveer army selection is 165cm. Show that only 10% of the above group is eligible.  
 38. A machine is designed so as to fill the bottles with mean 1 litre of cold pressed ground nut oil. A sample of 26 bottles when measured had a mean content of 998 ml. with S.D. of 5 ml. Test at 5% level of significance whether the machine is functioning properly.  
 39. Following table gives mean ( $\bar{x}$ ) and Range (R) of samples of size 5 each.

|                    |    |    |    |    |    |    |
|--------------------|----|----|----|----|----|----|
| Sub group number   | 1  | 2  | 3  | 4  | 5  | 6  |
| Mean ( $\bar{x}$ ) | 52 | 49 | 53 | 48 | 51 | 47 |
| Range (R)          | 9  | 11 | 10 | 12 | 8  | 10 |

Find the control limits for drawing  $\bar{x}$ - chart.

40. F1 and F2 are two types of foods are used to get minimum supplements of vitamins B and C. Using graphical method for the following Linear Programming Problem model, find how much quantities of foods are needed to optimize the cost:

$$\text{Minimize } Z = 10x + 5y$$

$$\text{Subject to } 2x + 3y \geq 12$$

$$2x + y \geq 8$$

$$\text{and } x \geq 0, y \geq 0$$

**OR**

**(For Visually challenged students only)**

There are two types of foods F1 and F2 each containing different proportions of vitamins B and C. Food F1 contains 2 units of vitamin B and 2 units of vitamin C. Food F2 contains 3 units of vitamin B and 1 unit of vitamin C. The minimum daily requirement of vitamins B and C for a person is 12 and 8 units respectively. One unit of food F1 costs Rs.10 and one unit of food F2 costs Rs. 5. Formulate the L.P.P. to optimize the expenditure.

### SECTION – D

#### VIII. Answer any TWO of the following questions:

**$2 \times 10 = 20$**

41. Calculate the standardized death rates for both Localities A and B from the following data. State which locality is healthier?

| Age-group<br>(in years) | Locality - A |        | Locality - B |        | Standard<br>Population |
|-------------------------|--------------|--------|--------------|--------|------------------------|
|                         | Population   | Deaths | Population   | Deaths |                        |
| 0 – 10                  | 6,000        | 60     | 7,000        | 84     | 4,000                  |
| 10 – 20                 | 10,000       | 80     | 15,000       | 90     | 16,000                 |
| 20 – 60                 | 20,000       | 240    | 25,000       | 250    | 18,000                 |
| 60 & above              | 4,000        | 120    | 3,000        | 120    | 2,000                  |

42. Calculate the Laspeyre's, Paasche's and Dorbish- Bowley's price index numbers from the following data.

| Items | Base Year     |          | Current Year  |          |
|-------|---------------|----------|---------------|----------|
|       | Price (in Rs) | Quantity | Price (in Rs) | Quantity |
| Rice  | 50            | 10       | 60            | 08       |
| Wheat | 40            | 08       | 45            | 12       |
| Dhal  | 100           | 03       | 160           | 02       |
| Oil   | 80            | 02       | 120           | 03       |

43. a) Following data shows the sales figures of a company. Mention the trend by calculating three yearly moving averages.

|                         |      |      |      |      |      |      |      |
|-------------------------|------|------|------|------|------|------|------|
| Year                    | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
| Sales (in thousand Rs.) | 120  | 104  | 130  | 126  | 145  | 131  | 132  |

- b) Following are the figures of production (in thousand quintals) of a sugar factory. Fit a straight line trend of the type  $Y = a + b x$  to this data.

|            |      |      |      |      |      |      |      |
|------------|------|------|------|------|------|------|------|
| Year       | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
| Production | 80   | 90   | 92   | 83   | 94   | 99   | 92   |

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- ಮೂಲಕನೇ:
- ಸಾಂಪ್ರದೀಯ ಕೋಣೆಕ್ಸೆ ಮತ್ತು ಆಲೇವಿ ಕಾಗದಗಳನ್ನು ಕೇಳಿದಾಗ ನೀಡಲಾಗುವುದು.
  - ಪ್ರೈಜಾನ್‌ನಿಕ ಕ್ಯಾಲ್ಯೂಲೇಟರ್‌ಗಳನ್ನು ಬಳಸಬಹುದು.
  - ಕಾರ್ಯದ ಎಲ್ಲಾ ಹಂತಗಳನ್ನು ಸ್ವಷ್ಟವಾಗಿ ತೋರಿಸಬೇಕು.
  - A - ವಿಭಾಗದಲ್ಲಿನ ಪ್ರಶ್ನೆಗಳಿಗೆ ಪ್ರಫರ್ಮವಾಗಿ ಬರೆದ ಉತ್ತರಗಳನ್ನು ಮಾತ್ರ ಪರಿಗಣಿಸಲಾಗುವುದು.

ವಿಭಾಗ - A

I. ಸರಿಯಾದ ಉತ್ತರವನ್ನು ಆಯ್ದುಮಾಡಿ ಬರೆಯಿರಿ:

$5 \times 1 = 5$

- $E = \frac{1}{2}mv^2$   $\Rightarrow E = \frac{1}{2} \times 10 \times 10^2 = 500 \text{ J}$
- 2010 ರಿಂದ 2012 ರ ಮಧ್ಯ ವರ್ಷಗಳಲ್ಲಿ ಪ್ರಾರಂಭಿಕ ವಾಗಿ ಪ್ರಾರಂಭಿಕ ವಾಗಿ ಪ್ರಾರಂಭಿಕ ವಾಗಿ
- MAZL CMAX ZAPLZA  $\rightarrow P = \frac{v}{l} = \frac{100}{10} = 10$

| X    | 0      | 1    | 2     | 3    | 4      |
|------|--------|------|-------|------|--------|
| P(X) | 0.0625 | 0.25 | 0.375 | 0.25 | 0.0625 |

- $H_0$  ಪ್ರತಿ ವರ್ಷ ಮಧ್ಯಾವಾಗಿ ಪ್ರಾರಂಭಿಕ ವಾಗಿ ಪ್ರಾರಂಭಿಕ ವಾಗಿ ಪ್ರಾರಂಭಿಕ ವಾಗಿ

  - $H_0$  ಪ್ರತಿ ವರ್ಷ ಮಧ್ಯಾವಾಗಿ ಪ್ರಾರಂಭಿಕ ವಾಗಿ ಪ್ರಾರಂಭಿಕ ವಾಗಿ.
  - $H_0$  ಪ್ರತಿ ವರ್ಷ ಮಧ್ಯಾವಾಗಿ ಪ್ರಾರಂಭಿಕ ವಾಗಿ ಪ್ರಾರಂಭಿಕ ವಾಗಿ.
  - $H_0$  ಪ್ರತಿ ವರ್ಷ ಮಧ್ಯಾವಾಗಿ ಪ್ರಾರಂಭಿಕ ವಾಗಿ ಪ್ರಾರಂಭಿಕ ವಾಗಿ.
  - $H_0$  ಪ್ರತಿ ವರ್ಷ ಮಧ್ಯಾವಾಗಿ ಪ್ರಾರಂಭಿಕ ವಾಗಿ ಪ್ರಾರಂಭಿಕ ವಾಗಿ.

- $C = \frac{P}{V}$   $\rightarrow C = \frac{100}{10} = 10$

II. ಅವರಣಿದಲ್ಲಿರುವ ಸರಿಯಾದ ಉತ್ತರವನ್ನು ಆಯ್ದಿ, ಬಿಡ್ಡಿ ಸ್ಥಳ ತಂಬಿರಿ:

$5 \times 1 = 5$

(ಅಕ್ಷಿಕ, ಫಿಶರನ, ಸಮಶೋಲನ, ಪ್ರಾಚಲ/ನಿಯತಾಂಕ, ತಂತ್ರ, ಗಂಟಿ)

- $P = \frac{N}{V}$   $\rightarrow P = \frac{100}{10} = 10$
- $t = \frac{P}{C}$   $\rightarrow t = \frac{100}{10} = 10$
- $P = \frac{V}{C}$   $\rightarrow V = C \times P = 10 \times 10 = 100$
- $P = \frac{V}{C}$   $\rightarrow V = C \times P = 10 \times 10 = 100$
- $N = P \times V$   $\rightarrow N = 10 \times 10 = 100$
- $C = \frac{P}{V}$   $\rightarrow C = \frac{100}{10} = 10$
- $V = C \times P$   $\rightarrow V = 10 \times 10 = 100$
- $P = \frac{V}{C}$   $\rightarrow V = C \times P = 10 \times 10 = 100$
- $N = P \times V$   $\rightarrow N = 10 \times 10 = 100$
- $C = \frac{P}{V}$   $\rightarrow C = \frac{100}{10} = 10$

III. ಹೊಂದಿಸಿ ಬರೆಯಿರಿ:

$5 \times 1 = 5$

A

11.  $M_{SI} = \frac{V}{A} = 1.2$

B

a)  $g = \frac{V}{A} = 1.2$

12.  $\text{H}_0: \mu = 50$   
 13.  $\text{H}_1: \mu > 50$   
 14.  $\text{P}(\text{Type I Error}) = 0.05$   
 15.  $\text{P}(\text{Type II Error}) = 0.10$

- b)  $X = 0, 1$   
 c)  $\text{d.f.} = 10 - 2 = 8$   
 d)  $\text{Dy}(\bar{x}) = \frac{1}{n} \sum_{i=1}^n (\bar{x}_i - \bar{x})^2$   
 e)  $\text{H}_0: \mu = 50$   
 f)  $\text{H}_1: \mu < 50$

#### IV. මෙයින් සුදුසු පූර්ණ ලාභයි:

16.  $\text{P}(\text{Type I Error}) = 0.05$ .  
 17.  $\text{P}(\text{Type II Error}) = 0.10$ .  
 18.  $\text{P}(\text{Type I Error}) = 0.05$ .  
 19.  $\text{P}(\text{Type II Error}) = 0.10$ .  
 20.  $\text{P}(\text{Type I Error}) = 0.05$ .

$$5 \times 1 = 5$$

#### විභාග - B

#### V. මෙයින් යාපුදාදරා ප්‍රතීත්ති පූර්ණ ලාභයි:

$$5 \times 2 = 10$$

21.  $\text{P}(\text{Type I Error}) = 0.05$ .  
 22.  $\text{P}(\text{Type II Error}) = 0.10$ .  
 23.  $\text{P}(\text{Type I Error}) = 0.05$ .  
 24.  $\text{P}(\text{Type II Error}) = 0.10$ .  
 25.  $\text{P}(\text{Type I Error}) = 0.05$ .  
 26.  $\text{P}(\text{Type I Error}) = 0.05$ .  
 27.  $\text{P}(\text{Type II Error}) = 0.10$ .  
 28.  $\text{P}(\text{Type I Error}) = 0.05$ .

|   |    |    |    |
|---|----|----|----|
|   | 10 | 12 |    |
| 2 |    | 3  |    |
|   |    | 15 | 20 |
|   | 4  |    | 6  |
|   |    |    | 14 |
|   |    |    | 7  |

#### විභාග - C

#### VI. මෙයින් යාපුදාදරා නොලු පූර්ණ පූර්ණ ලාභයි:

$$4 \times 5 = 20$$

29.  $\text{P}(\text{Type I Error}) = 0.05$ .  $\text{P}(\text{Type II Error}) = 0.10$ .

| අගුනා                          | E (g/k) |      | අගුනා |
|--------------------------------|---------|------|-------|
|                                | 2012    | 2018 |       |
| D <sup>o</sup> Ag <sup>A</sup> | 4000    | 6000 | 15    |
| S <sup>m</sup>                 | 2500    | 3500 | 08    |
| A <sup>w</sup>                 | 6000    | 9000 | 12    |
| E <sup>az</sup>                | 1000    | 1500 | 10    |
| E <sup>v</sup>                 | 1600    | 2000 | 15    |

30.  $\text{P}(\text{Type I Error}) = 0.05$ .  $\text{P}(\text{Type II Error}) = 0.10$ .

| අගුනා (g/k)  | 20   | 25   | 30 | 35   | 40   | 45 |
|--------------|------|------|----|------|------|----|
| «අගුනා (g/k) | 1426 | 1581 | -  | 1996 | 2256 | -  |

- |   |    |    |    |   |               |
|---|----|----|----|---|---------------|
| ¥ <sub>1</sub> € <sub>1</sub> ZP AIA VMA, ASI | 0  | 1  | 2  | 3 | 4 a. V. o. Z. |
| ¥ <sub>1</sub> UMA, ASI                       | 20 | 45 | 30 | 5 | 0             |

|                             |    |    |    |   |               |
|-----------------------------|----|----|----|---|---------------|
| ¥be ¥AI ZP AIA VYAUVA , ASI | 0  | 1  | 2  | 3 | 4 a VVUO EZAN |
| ¥AI UVA , ASI               | 20 | 45 | 30 | 5 | 0             |

33. F ZNÁIA±ICAZA , PÄP CÉÄYÁVÜKAP È UPÄEAO Ð a MAi, kZAIÄÄ JAŠÄZIEB ±ÄRqÁ 5 gÀ ®PÁP Ð a ÄI ÄZP È ¥J ÄQÐ .

|             | UAvæ | CENYAVÄ |
|-------------|------|---------|
| ¤ ZLÖPPI I  | 100  | 0.02    |
| ¤ ZLÖPPI II | 200  | 0.01    |

34. F PÍLAVÉA 2 × 2 , ÁWÍHVA ÁGÍTÁIÍMÉ « ZÁYÓUMÁ ¥P VÁA±Á CÁIGA PÁI ÁAS ¥GÍWAIÁ a ÁA-TÉ CÁPA©VÍP ÁVZÁIÁ JAŠAZÉAB ¥J ÁQÉ. (±ÁRqÁ 1% ®PÁP ÐvÉ G¥AÍÆAV<sup>1</sup>)

|                                    |                   | PAT | AAS | YgrA | W  |
|------------------------------------|-------------------|-----|-----|------|----|
|                                    |                   | GvP | A   | P    | I  |
| Y <sub>1</sub> P VAA <sub>±1</sub> | GwA <sub>0</sub>  |     | 10  |      | 15 |
|                                    | CEwA <sub>0</sub> |     | 15  |      | 10 |

35. F PIVNEA QEGAIAMS YAVI «ZAEKAZH» r<sup>1</sup>. EZÄ QUPIYAVIZADI aÄ?

DI UÁgA – B

$$\begin{array}{ccccc} & & B_1 & B_2 & B_3 \\ & A_1 & 4 & -1 & 2 \\ & A_2 & 0 & 3 & \\ \text{DI } U\tilde{A}g\tilde{A} - A & A_3 & 1 & & \end{array}$$



| $\text{Ag}$                  | 1    | 2    | 3    | 4    | 5    |
|------------------------------|------|------|------|------|------|
| $\text{Ag}/\text{AgI}$ (g/L) | 100  | 200  | 330  | 510  | 860  |
| $\text{Ag}/\text{AgI}$ (g/L) | 3000 | 2500 | 2000 | 1500 | 1000 |

a A Ää Åæ Æäß Sz Á-Ä, Äa Á, Æá Áavá C a) Cu Aii Áa Áz Á?

**VII.** ఈ కెళగిన యావుదాదరూ ఎరడు ప్రశ్నగలిగే ఉత్తరిసి:

$$2 \times 5 = 10$$

37. CV<sub>2</sub>Ág<sub>1</sub> ÁEAI<sub>1</sub> DAI<sub>1</sub> 2©giP<sub>1</sub> ° ÁdgÁz<sub>1</sub> C<sub>1</sub>lyðUM<sub>1</sub> U<sub>1</sub>A | E<sub>1</sub> Jv<sub>1</sub>g<sub>1</sub> Ág<sub>1</sub>, j 160 , Á. « Á. a Áv<sub>1</sub>o oAi<sub>1</sub>V<sub>1</sub> « ZP<sub>1</sub>E<sub>1</sub>  
 3.9 , Á. « Á. Eg<sub>1</sub>a<sub>1</sub> Y<sub>1</sub>g<sub>1</sub>A<sub>1</sub>AE<sub>1</sub> « v<sub>1</sub>g<sub>1</sub>U<sub>1</sub>A<sub>1</sub>E<sub>1</sub> ° E<sub>1</sub>A<sub>1</sub>C<sub>1</sub>zé CV<sub>2</sub>Ág<sub>1</sub> ÁEUE Ág<sub>1</sub>P<sub>1</sub>A C<sub>1</sub>l<sub>1</sub>k<sub>1</sub>g<sub>1</sub>A<sub>1</sub> P<sub>1</sub>p<sub>1</sub>J<sub>1</sub>v<sub>1</sub>g<sub>1</sub> 165  
 , Á. « Á. Dzg<sub>1</sub> a Á<sub>1</sub>o E<sub>1</sub> U<sub>1</sub>A | E<sub>1</sub>P<sub>1</sub> è ± Á. 10 g<sub>1</sub>l<sub>1</sub>C<sub>1</sub>lyðUM<sub>1</sub> a ÁV<sub>1</sub>o C<sub>1</sub>l<sub>1</sub>g<sub>1</sub> Ág<sub>1</sub> JAZ<sub>1</sub> v<sub>1</sub>Áj<sub>1</sub> 1.  
 38. UÁt<sub>1</sub>Az<sub>1</sub> v<sub>1</sub>l<sub>1</sub>g<sub>1</sub>A<sub>1</sub> ±AU<sub>1</sub> Ju<sub>1</sub>AI<sub>1</sub>E<sub>1</sub> Y<sub>1</sub>h<sub>1</sub> ÁI<sub>1</sub> - iU<sub>1</sub>E<sub>1</sub> 1 ° ÁI<sub>1</sub> g<sub>1</sub> v<sub>1</sub>AS<sub>1</sub>A<sub>1</sub>V<sub>1</sub>E<sub>1</sub> MAZ<sub>1</sub> A<sub>1</sub>AV<sub>1</sub>E<sub>1</sub> CT<sub>1</sub>U<sub>1</sub>E<sub>1</sub>A<sub>1</sub> ÁV<sub>1</sub>E<sub>1</sub>  
 F A<sub>1</sub>AV<sub>1</sub>E<sub>1</sub>A<sub>1</sub>Z<sub>1</sub>A<sub>1</sub> v<sub>1</sub>AS<sub>1</sub> 1 0 26 ° ÁI<sub>1</sub> - iU<sub>1</sub>E<sub>1</sub> DAI<sub>1</sub>Y<sub>1</sub> ÁQ<sub>1</sub>z<sub>1</sub>A<sub>1</sub> C<sub>1</sub>l<sub>1</sub>U<sub>1</sub>R<sub>1</sub>A<sub>1</sub> ±AU<sub>1</sub> Ju<sub>1</sub>AI<sub>1</sub> , g<sub>1</sub>, j Y<sub>1</sub>h<sub>1</sub>A<sub>1</sub>t<sub>1</sub>  
 998 « Á. ° Á. a Áv<sub>1</sub>o o. < . 5 « Á. ° Á. JAZ<sub>1</sub> P<sub>1</sub>q<sub>1</sub>S<sub>1</sub>A<sub>1</sub>zé ° ÁUÁzg<sub>1</sub> A<sub>1</sub>AV<sub>1</sub>E<sub>1</sub> j A<sub>1</sub>AV<sub>1</sub> P<sub>1</sub>®, Á. a Áq<sub>1</sub>W<sub>1</sub>z<sub>1</sub>A<sub>1</sub>A<sub>1</sub>  
 JA<sub>1</sub>S<sub>1</sub>A<sub>1</sub>E<sub>1</sub> ± ÁRg<sub>1</sub> 5g<sub>1</sub> ®P<sub>1</sub>P<sub>1</sub>D<sub>1</sub>V<sub>1</sub>A<sub>1</sub> ° è Y<sub>1</sub> ÁQ<sub>1</sub>.

F zñÁÁ±P Á YñAÍE AñZ Á xzñD P Á U Á V ñS E gñA Á gñA Á (x) Á V ñU a Á Á ñU (R) U ñZ U E Á S A C ñ Z E

| <sup>a</sup> Ájá GYUMAYA ASI | 1  | 2  | 3  | 4  | 5  | 6  |
|------------------------------|----|----|----|----|----|----|
| <sup>a</sup> Igáj (x)        | 52 | 49 | 53 | 48 | 51 | 47 |
| <sup>a</sup> Ájá Ó(R)        | 9  | 11 | 10 | 12 | 8  | 10 |

$\bar{x} = \text{F}\ddot{\text{P}}\ddot{\text{E}} \cup \frac{1}{4} \text{A} \ddot{\text{I}} \ddot{\text{M}} \ddot{\text{R}} \ddot{\text{A}} \times \text{A} \ddot{\text{I}} \ddot{\text{M}} \text{A} \text{V} \text{H} \text{E} \ll \ddot{\text{A}} \ddot{\text{W}} \ddot{\text{U}} \ddot{\text{M}} \ddot{\text{E}} \ddot{\text{A}} \ddot{\text{B}} \ddot{\text{P}} \ddot{\text{A}} \ddot{\text{G}} \ddot{\text{A}} \gg \text{r} \rightarrow \ddot{\text{A}} \text{J}$ .

39. F1  $\overset{a}{\text{Á}}$  $\overset{v}{\text{V}}$  $\overset{v}{\text{A}}$  F2 JAS Jglq $\ddot{\text{A}}$  D $\circ$  Ág $\ddot{\text{A}}$  Y $\overset{v}{\text{l}}$  $\overset{v}{\text{z}}$  $\overset{v}{\text{A}}$  $\overset{v}{\text{x}}$  $\overset{v}{\text{D}}$  $\overset{v}{\text{U}}$  $\overset{v}{\text{M}}$ AZ $\ddot{\text{A}}$  C $\overset{a}{\text{E}}$  $\overset{v}{\text{k}}$ g $\ddot{\text{A}}$  A B  $\overset{a}{\text{Á}}$  $\overset{v}{\text{V}}$  $\ddot{\text{A}}$  C f $\ddot{\text{A}}$  A $\overset{v}{\text{M}}$  $\overset{v}{\text{U}}$  $\overset{v}{\text{M}}$ E $\ddot{\text{A}}$  B Y $\overset{v}{\text{q}}$  $\ddot{\text{A}}$  i $\ddot{\text{A}}$  R $\ddot{\text{A}}$  G $\overset{v}{\text{Y}}$  $\overset{v}{\text{A}}$  $\overset{v}{\text{i}}$  $\overset{v}{\text{E}}$  $\overset{v}{\text{A}}$ V $\ddot{\text{A}}$  Z $\ddot{\text{A}}$  F g $\overset{v}{\text{A}}$ S $\overset{v}{\text{S}}$  $\overset{v}{\text{A}}$ V $\ddot{\text{A}}$  P $\overset{v}{\text{A}}$  $\overset{v}{\text{E}}$  $\overset{v}{\text{C}}$  $\ddot{\text{A}}$ , P $\ddot{\text{A}}$ , A $\ddot{\text{A}}$ , A $\overset{v}{\text{I}}$  $\overset{v}{\text{A}}$  $\ddot{\text{A}}$  D $\overset{v}{\text{T}}$  $\overset{v}{\text{A}}$ R «Z $\overset{v}{\text{A}}$  $\overset{v}{\text{E}}$  $\overset{v}{\text{K}}$ AZ $\ddot{\text{A}}$  C $\ddot{\text{r}}$  $\ddot{\text{A}}$ .  $\overset{v}{\text{E}}$  $\overset{v}{\text{E}}$ , P $\overset{v}{\text{A}}$  $\overset{v}{\text{M}}$  $\overset{v}{\text{U}}$  $\overset{v}{\text{V}}$  $\overset{v}{\text{E}}$  $\overset{v}{\text{Z}}$ , P $\overset{v}{\text{A}}$  $\overset{v}{\text{P}}$  C $\overset{a}{\text{E}}$  $\overset{v}{\text{k}}$ g $\ddot{\text{A}}$  A D $\circ$  Ág $\ddot{\text{A}}$  Y $\overset{v}{\text{l}}$  $\overset{v}{\text{z}}$  $\overset{v}{\text{A}}$  $\overset{v}{\text{x}}$  $\overset{v}{\text{D}}$  $\overset{v}{\text{U}}$  $\overset{v}{\text{M}}$ A $\overset{v}{\text{A}}$  Y $\overset{v}{\text{B}}$  $\overset{v}{\text{A}}$  $\overset{v}{\text{T}}$  $\ddot{\text{A}}$  E $\ddot{\text{A}}$  P $\overset{v}{\text{A}}$ q $\ddot{\text{A}}$  r $\overset{v}{\text{A}}$ j $\ddot{\text{A}}$ .

$$\text{Planes } Z = 10x + 5y$$

$$\text{Satz 12.1: } 2x + 3y \geq 12$$

$$2x + y \geq 8$$

$a \leq x, y \geq 0$

ಅಧ್ಯವಾ (ದೃಷ್ಟಿ ವಿಕಲಚೀತನ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಮಾತ್ರ)

F1 a Ávú F2 JAS Jglq Ágá ¥lzÁxðum «z Átzt p B a Ávú C fá Ávú Múmæb M14ñear a F1  
JAS D Ágá ¥lzÁxða 2 a Áfélz Bfá Ávú 2 a Áfélz C fá Ávú o fæacze F2 JAS D Ágá  
¥lzÁxða 3 a Áfélz Bfá Ávú 1 a Áfélz C fá Ávú o fæacze Msá a dñue fepé C a Ávú gá B a Ávú C  
fá Ávú Múmá yðiat 12 a Ávú 8 DVzé 1 a Áfélz F1 D Ágá ¥lzÁxðz z E gá. 10 a Ávú 1 a Áfélz F2 D Ágá  
¥lzÁxðz z E gá. 5 DVzé RZðeab, p Áavúfz, p Ágásávpa p Áci, p Á, i gla.

విభాగ - D

VIII. ಈ ಕೆಳಗಿನ ಯಾವುದಾದರೂ ಎರಡು ಪ್ರಶ್ನೆಗಳಿಗೆ ಉತ್ತರಿಸಿ:

$$2 \times 10 = 20$$

40. F PÍVNEA ZNAIAPE JgqNE YIÁAUIA oAIWAPIVÀ aAgat zgnueas piaqà»rzä, AIIAaÀ YIÁAUI oEZAN  
DgkEUPgjP AVZÉ JAZÄ w½¹.

| අභ්‍යන්තර ප්‍රදේශ | යුත්තාල- A |       | යුත්තාල- B |       | DZAL<br>DEJAS |
|-------------------|------------|-------|------------|-------|---------------|
|                   | DEJAS      | ගැටුව | DEJAS      | ගැටුව |               |
| 0 – 10            | 6,000      | 60    | 7,000      | 84    | 4,000         |
| 10 – 20           | 10,000     | 80    | 15,000     | 90    | 16,000        |
| 20 – 60           | 20,000     | 240   | 25,000     | 250   | 18,000        |
| 60 අධ්‍යාපක       | 4,000      | 120   | 3,000      | 120   | 2,000         |

41. F zMÁIA±PE - Áá, ÁAíGÉA ¥Á±ÁiÁÉA a ÁvÄU gÁ©Ø±i- ° E° AíA ° E E , KEZÁAPUMÉÄB PíAg» r-Äj .

| 支店    | DZAGI   |      | ¥ZAVI   |      |
|-------|---------|------|---------|------|
|       | ET(gE.) | ¥JAT | ET(gE.) | ¥JAT |
| CAL   | 50      | 10   | 60      | 08   |
| URACU | 40      | 08   | 45      | 12   |
| AVAE  | 100     | 03   | 160     | 02   |
| JUL   | 80      | 02   | 120     | 03   |

| <sup>a</sup> MBD               | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|--------------------------------|------|------|------|------|------|------|------|
| <sup>a</sup> AgAI (, A«gl gE.) | 120  | 104  | 130  | 126  | 145  | 131  | 132  |

| Year              | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|-------------------|------|------|------|------|------|------|------|
| GVA/ $\text{m}^2$ | 80   | 90   | 92   | 83   | 94   | 99   | 92   |