



KLE Society's

## S. Nijalingappa / Independent PU College

II Block, Rajajinagar, Bangalore-10

Phone: 080-23526055, 080-23325020

Website: www.klesncpu.edu.in

Fax: 080-23320902

E-mail:klesncpuc@gmail.com

### MODEL QUESTION PAPER -2

Class : II PUC	Subject : Basic Mathematics	Subject Code : 75
Year :2020 – 21	Duration : 3 hour 15 minutes	Maximum Marks : 100

- INSTRUCTIONS:** i) The question paper has five parts A, B, C, D and E. Answer all the Parts.  
ii) PART A carries 10 marks, PART B carries 20marks, PART C carries 30 marks, PART D carries 30 marks and PART E carries 10 marks.  
iii) Write the question numbers properly as indicated in the question paper.

#### PART - A

I. Answer all the **TEN** questions :

10 x 1 =10

- 1) Find the adjoint of the matrix  $\begin{bmatrix} -4 & -3 \\ -2 & -1 \end{bmatrix}$
- 2) If  ${}^5P_r = 60$  find the value of  $r$ .
- 3) Define Mutually exclusive events.
- 4) Negate 'It is cold or it is raining'.
- 5) Find the mean proportion of 0.8 and 1.8 .
- 6) Find the present value of Rs750 due 4 months hence at 15% p.a.
- 7) What is the yield obtained when Rs 5000 , 3% stock is purchased at Rs 125?
- 8) Find the index of learning for 80% learning effect.
- 9) Find the value of  $\tan 75^\circ$
- 10) If the radius of the circle  $x^2 + y^2 + 4x - 2y - k = 0$  is 4 units then find  $k$ .

#### PART -B

II. Answer **ANY TEN** questions :

10 x 2 =20

- 11) If  $A = \begin{bmatrix} 2 \\ -1 \\ 3 \end{bmatrix}$  ,  $B = [1 \ 4 \ 2]$  , find  $AB$ .

12) Without expansion show that  $\begin{vmatrix} x & 3 & y+z \\ y & 3 & z+x \\ z & 3 & x+y \end{vmatrix} = 0$

13) How many four digit numbers can be formed using the digits 0,2,3,5,7,8.

How many of them are even.

14) Find the number of diagonals of a polygon of 20 sides .

15) If  $P(A) = \frac{2}{5}$  ,  $P(B) = \frac{1}{5}$  , find  $P(A \cup B)$  if A and B are independent events.

16) If the truth value of the propositions p, q and r are T, T, and F respectively, then find the truth value of  $p \rightarrow (q \wedge r)$ .

17) If  $a : b = 4 : 5$  , find  $\frac{3a+2b}{3a-2b}$ .

18) TD on a bill was Rs100 and BG was Rs10. What is the face value of the bill?

19) How much does Maya realize by selling Rs 30,000 stock at 20 discount.

20) A shopkeeper purchases an article for 7,000 and sells it to a customer for 8,200. If the VAT rate is 6%. Find the VAT paid by the shopkeeper?

21) A kite flying at a height of h is tied to a thread which is 50m long. Assuming that there is no kink in the thread and it makes an angle of  $30^\circ$  with the ground . Find the height of the kite.

22) Prove that  $\frac{\cos 2A}{1+\sin 2A} = \frac{\cos A - \sin A}{\cos A + \sin A}$  .

23) Show that  $\sin 65^\circ + \cos 65^\circ = \sqrt{2} \cos 20^\circ$  .

24) Find the length of the chord of the circle  $x^2 + y^2 + 3x - 2 = 0$  intercepted by y-axis

### PART - C

III. Answer ANY TEN questions :

10 x 3 = 30

25) Find A and B if  $2A - 3B = \begin{bmatrix} 2 & -4 \\ -12 & 1 \end{bmatrix}$  ,  $A + 5B = \begin{bmatrix} 1 & 24 \\ 33 & 7 \end{bmatrix}$  .

26) Prove that " If in a determinant the elements of any row (or column ) are multiplied by the same scalar say k , then the value of the new determinant is k times the given determinant " .

27) A candidate is required to answer 6 out of 12 questions which are divided into two groups containing 6 questions in each group. Find the number of choices he has if he cannot attempt more than five questions from the group.

28) In a class 45% students read English , 30% read French , and 20% read both English and French . One student is selected at random . Find the probability that  
(1) He reads English , if it is known that he reads French .

- (2) He reads French if it is known that he reads English .
- 29) Seven persons are to be seated in a row . Find the probability that 2 particular persons sit next to each other.
- 30) Find the 8<sup>th</sup> term of  $\left(2x^2 - \frac{3}{x}\right)^{12}$  .
- 31) Resolve  $\frac{x+1}{(x-2)(x-3)}$  into partial fractions.
- 32) Write the converse, inverse and contrapositive of the implications of the statement, 'If two Straight lines are parallel then they do not intersect'.
- 33) The ages of a father and his son are in the ratio 6 : 1 . After 14 years their age will be in the ratio 8 : 3 . What are their present ages.
- 34) X, Y and Z play cricket. The runs scored by X and Y are in the ratio 3 : 2. Y's runs to Z's runs are in the ratio 3: 2. Together they all score 342 runs. How many runs did each score ?
- 35) Veena buys 100 shares of Karnatak bank at Rs 101 per share. She pays Rs 10130.3 to her broker. What is the total brokerage she paid and calculate the percentage rate of brokerage.
- 36) A shopkeeper purchases an audio system for Rs 3000 and sells it off at a gain of 15% . He also charges a sales tax of 10% on the selling price . Calculate the amount the buyer will pay to the shopkeeper.
- 37) Prove that  $\tan 2A \cdot \tan 3A \cdot \tan 5A = \tan 5A - \tan 3A - \tan 2A$ .
- 38) Show that the line  $3x + 4y + 7 = 0$  touches the circle  $x^2 + y^2 - 4x - 6y - 12 = 0$  .

### PART - D

IV. Answer **ANY SIX** questions

**6 x 5 = 30**

- 39) Find the number of permutations of the letters of the word ASSASSINATION.

In how many of these

- the vowels are in even places.
  - vowels are in odd places.
  - the word NATION is always present together.
  - begins with 'AS' and ends with 'AS'.
- 40) Find the term independent of x in the expansion of  $\left(x^3 - \frac{3}{x^2}\right)^{15}$  .

- 41) Resolve into partial fractions  $\frac{2x^2 - 7x + 1}{x^2 - 3x - 4}$  .
- 42) Show that  $[(p \rightarrow q) \wedge (q \rightarrow r)] \rightarrow (p \rightarrow r)$  is a tautology.
- 43) The monthly incomes of A and B are in the ratio 9 : 7 and those of B and C are in the ratio 3 : 2. If 10 % of A's income and 15% of C's income differ by Rs 18, find the incomes of A , B and C .
- 44) A bill of Rs 2725.25 was drawn on 03-6-2010 and made payable 3 months after due date. It was discounted on 15-6-2010 at 16% p.a. What is the discounted value of the bill and how much did the banker gain?
- 45) An engineering company has 80% learning effect and spends 500 hours for the prototype . Estimate the labour cost of producing 7 engines of new order if the Labour cost is Rs 40 per hour.
- 46) Solve the LPP graphically , Maximise :  $Z = 6x + 8y$   
 Subject to :  $4x + 2y \leq 20$  ,  $2x + 5y \leq 24$  ,  $x \geq 0$  ,  $y \geq 0$
- 47) Two towers of height 14m and 25m stand on level ground. The angles of elevation of their tops from a point on the line joining their feet are  $45^\circ$  and  $60^\circ$  respectively. Find the distance between the towers.
- 48) Prove that  $\cos 20^\circ \cdot \cos 40^\circ \cdot \cos 60^\circ \cdot \cos 80^\circ = \frac{1}{16}$

**PART - E**

**V. Answer ANY ONE question : 1 x 10 = 10**

- 49) a) Solve by matrix method  $x + y - z = 5$  ,  $3x + y - 2z = 3$  and  $x - y - z = -1$ . (6)
- b) Find the value of  $(0.99)^4$  using Binomial theorem upto 4 decimal places. (4)
- 50) a) Show that the points  $(2, -4)$ ,  $(3, -1)$ ,  $(3, -3)$ ,  $(0,0)$  are Concyclic.
- b) Nikhil pesticide company must produce 200kg mixture consisting of chemicals A and B daily. A costs Rs 3 per kg and B costs Rs 8 per kg. Maximum 80 kg of chemical A and atleast 60 kg of chemical B should be used. Formulate LPP model to minimise the cost. (4)



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