NEW HORIZON PRE UNIVERSITY COLLEGE

New Horizon PU College 'A' Grade College, Accredited by Karnataka PU Board

MODEL QUESTION PAPER - 2

SUBJECT: BASIC MATHS

PART-A

Answer all the questions: **(1*10=10)**

1.Evaluate $\begin{vmatrix} 3200 & 3201 \\ 3202 & 3203 \end{vmatrix}$

2. In how many ways can 10 people be seated around a table?

3.If P(A)= 3/5 find P(A')

4. Symbolise "2+5=6 or all integers are rationals"

5. Find the third proportional of 4 and 6.

6. Define yield.

7. What rate of interest is obtained by investing in 9% stock at 180?

8. Define index of learning.

9. Find the value of 3sin10˚- 4 $sin^3 10^\circ$

10. Find the equation of the point circle with centre (4,-5)

PART-B

Answer any ten questions : **(2*10=20)**

11. Solve using cramer's rule:

3x+4y=7

7x-y=6

12. If A=$\begin{bmatrix} 1 & 3 \\ 1 & 0 \end{bmatrix}$ then prove that A^2-A-3I=0

13. In a party each person shakes hands with everyone. If there are 25 members in the

party calculate the number of handshakes.

14. Find the number of straight lines and triangles that can be formed out of 20 points in Which 8 are collinear.

15. If P(A)=1/2 , P(B)=1/3 and P(AUB)=7/12 , find P(B/A)

16. Write the converse and contrapositive of "If the questions are easy then students score better marks"

17. Two numbers are in the ratio 3:5, 5 is added to each of them then the new ratio will be 2:3.Find the numbers.

18. Banker's gain on a bill due after 6 months at 4% p.a is 24.Find the true discount and banker's discount.

19. What is the market value of 9.5% stock when an investment of rupees 12400 produces an income of ₹1472.5?

20. Raj paid ₹60 as sales tax on a watch worth ₹1200.Find the rate of sales tax.

21. The angle of elevation of the top of a tree at a distance 100m from its foot is 30°.Find its height.

22. If tanA=5/6 , tan(A+B)=1 then show that tanB=1/11

23. $Prove\ that\ \frac{Sin\ 3A}{1+2Cos2A} = \sin A$

24. Find the equation of the circle whose centre is at (4,-2) and passing through the origin(0,0)

PART-C

Answer any 10 questions : **(3*10=30)**

25. If A=$\begin{bmatrix} 2 & -1 \\ 1 & 4 \end{bmatrix}$ B=$\begin{bmatrix} -3 & 2 \\ -1 & 4 \end{bmatrix}$ then show that A(B+C)= AB+AC

26. Show that $\begin{vmatrix} a+b+2c & a & b \\ c & b+c+2a & b \\ c & a & c+a+2b \end{vmatrix} = 2(a+b+c)^2$

27. 24. Find the number of permutations of the letters of the word UNIQUE:

a. How many of them end with 'QUE'

b. How many of them begin with 'U' and end with 'E'?

c. How many of them begin with a consonant?

29. If A and B are events with P (A)= $\frac{5}{8}$ P(B) = $\frac{3}{8}$ and P(AUB)=$\frac{3}{4}$,find

a. P (B/A)

b. P (A/B)

30. Find the middle term in the expansion of $\left(3x - \frac{x^3}{6}\right)^7$

31. Resolve into partial fractions $\frac{x+8}{(x-1)(2x+1)}$

32. Write the converse,inverse and contrapositive of :If x divides y then z is the remainder"

33. If the monthly incomes of A and B are in the ratio 3:4 and their expenditure are in the ratio 1:2.If each saves ₹2000.Find their monthly income.

34. If rupees 120 maintain a family of 4 people for 30 days .How long rupees 300 maintain a family of 6 people?

35. The price of a washing machine inclusive of sales tax is ₹13530.If the sales tax is 10%.Find the basic price.

36. A man invests equal sums of money in 4%,5%,6% stock, each stock being at par. If the total income of the man is ₹3600.Find the total investment.

37. Prove that: $\frac{sin3\Theta}{1+2\cos 2\Theta}$ = sinΘ

38. Find the equation of the circle having x+y=4 and x-y=4 as the equations of its diameters and passing through the point (2,-1).

PART-D

Answer any 6 questions. **(5*6=30)**

39. Find the number of permutations of the letters of the word COMMITTEE. How many of these a)Have all vowels together?

    b)Begin with T and end with T?

40. Find term independent if x in $\left(x^3 - \frac{3}{x^2}\right)^{15}$

41. Resolve into partial fractions $\frac{3x+4}{(x+1)^2(x-1)}$

42. Prove that (pvq) ^ (~p ^ ~q) is a contradiction.

43. Two taps can separately fill a tank in 12 minutes and 15minutes respectively. The tank when full, can be emptied by a drain pipe in 20 minutes. When the tank was empty all the three were opened simultaneously. In what time will the tank be filled up?

44. A motor company limited , has observed that 90% learning effect applies to all labour related cost .Whenever a new product is taken up for production, the anticipated production to 320 units for the coming year.The production is done in lots of 10units each.Each lot requires 1000 hours at Rs. 15/hour. Calculate the total labour hours and labour cost to manufacture 320 units.

45. Banker's gain on a bill due after 6 months at 4% p.a is rupees 24.

    Find TD,BD,Bill amount and discounted value of the bill.

46. Maximize z=3x+5y

    Subject to constraints: $x+3y \geq 3$

    $x+y \geq 2$

    $x,y \geq 0$

47. A person standing on the bank of the river observes that the angle subtended by a tree on the opposite bank is 60˚.When he returns 80 metres from the bank he finds the angle to be 30˚.Find the height of the tree and the width of the river.

48. Prove that: $\frac{cos7x+cos3x-cox5x-cosx}{sin7x-sin3x-sin5x+sinx} = \cot 2x$

PART-E

Answer any one question: **(1*10=10)**

49.a. Solve the following equations using matrix method:

3x+y+2z =3

2x-3y-z = -3

x+2y+z =4

b. Find the value of $(1.2)^5$ upto 4 decimal places using binomial theorem.

50.a. Show that (1,0) (2,-7) (8,1)and (9,-6) are concyclic.

b. Rahul has 50 and 85 units of labour capital respectively which he can use to produce two types of goods A and B.To produce one unit of A,1 unit of labour and 2units of capital are required.Similarly 3 units of labour and 2 units of capital is required to produce 1 unit of B.If A and B are priced at ₹100 and ₹150 per unit respectively,how should the producer use his resources to maximize the total revenue.Formulate the LPP to maximize his total revenue?

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