

II PUC Mid term examination

Sub : Basic mathematics

Time : 3 hours 15 min

Maximum marks ; 100

INSTRUCTIONS : 1. The question paper has 5 parts A,B,C,D and E. Answer all the parts.

2. Part – A carries 10 marks , part – B carries 20 marks, part – C carries 30 marks, part – D carries 30 marks and part – E carries 10 marks.

3. Write the question number properly as indicated in the question paper.

PART – A

I Answer all the 10 questions :

10 × 1 = 10

1. If $|4x + 16| = 0$, Find the values of 'x'.
2. Evaluate $|4001\ 4002\ 4003\ 4004|$
3. If $n_{C_5} = n_{C_7}$, find $n_{C_{11}}$
4. Negate the proposition $P \rightarrow \sim q$
5. If 'p' and 'q' are propositions with truth values 'F' and 'T' , then, find the truth value of $(\sim q \wedge p)$
6. A bill drawn for 6 months was legally due on 10 – 10 – 2013. Find the date of drawing the bill.
7. Define yield?
8. If $5:20 = 3:x$, find the value of 'x'
9. Find the fourth proportional to 2,6,5.
10. Evaluate $\frac{x^2-4x}{x-2}$
11. Evaluate $\frac{\sin ax}{bx}$, $a, b \neq 0$

Part – B

II Answer any ten of the following

10 × 2 = 20

12. If $A = \begin{bmatrix} -4 & -3 & -2 & -1 \end{bmatrix}$, find A^{-1} .
13. If $\begin{bmatrix} 2 & -1 & 3 & 1 \end{bmatrix} x y = 10$ 2
14. There are 14 points in a plane , out of which three are collinear. Find the number of straight lines you can make.
15. One ticket is drawn at random from a bag of 20 ticket. Find the probability that it is a multiple of 2 or 5.
16. Write the converse and the contrapositive of "If $x < 1$, then, it is a prime number."

17. Find the Banker's discount on a bill of Rs. 10,000 due in 9 months at 5% per annum.
18. B.D and B.G on a certain bill due after sometime are Rs.1,250 and Rs.50 respectively.
Find the face value of the bill.
19. What rate of interest is obtained by investing in 9% stock at 180.
20. Monthly income of A and B are in the ratio 2:3 and their monthly expenditure are in the ratio 3:5. If each saves Rs. 100 per month, find the monthly income of A and B.
21. Find the duplicate and triplicate ratio of 2:3
22. Find 'K' for which $f(x) = \begin{cases} k + x, & \text{if } x = 1 \\ 4x + 3, & \text{if } x \neq 1 \end{cases}$, is continuous at $x = 1$
23. Evaluate $\frac{x^3-27}{x+3}$

PART -C

III Answer any TEN questions

10 × 3 = 30

24. If $A = [1 \ 2 \ 2 \ 2 \ 1 \ 2 \ 2 \ 2 \ 1]$ then, prove that, $A^2 - 4A + 5I = 0$
25. If $A = [1 \ 2 \ 1 \ 4]$ $B = [4 \ -3 \ 2 \ 1]$ $C = [1 \ 0 \ -2 \ 4]$, then, show that $A(B+C) = AB + AC$.
26. Find the number of permutations of the letters of the word 'UNIQUE',
 - a. How many of them end with QUE
 - b. How many begin with 'U' and end with 'E'
 - c. How many begin with a consonant
27. Three fair coins are tossed simultaneously. Find the probability of getting
 - a. One head
 - b. At most one head
 - c. Atleast two heads
28. A problem in maths is given to two students A and B whose chances of answering are $\frac{1}{2}$ and $\frac{1}{3}$ respectively. What is the probability that the problem is solved.
29. B.G on a bill due 6 months at 4% per annum is Rs.20. Find the true discount, banker's discount and bill amount
30. The Banker's gain on a bill is $\frac{1}{5}$ th of the banker's discount and the rate of interest is 20% per annum. Find the unexpired period of the bill.
31. A man invests equal sums of money in 4%, 5% and 6% stock, each stock being at par. If the total income of the man is Rs. 3,600. Find his total investment.
32. Three carpenters can earn Rs. 360 in 6 days working 9 hours a day. How much will 8 carpenters earn in 12 days working 6 hours a day
33. Evaluate $\frac{x^2-9}{\sqrt{3x+7}-\sqrt{5x+1}}$
34. In a fort, there was ration for 560 soldiers that would last the soldiers left the fort. For how many days the remaining ratio can support the remaining soldiers.

PART - D

IV Answer any six questions

6×5 = 30

35. Solve 'x' if $3x - 8 \ 3 \ 3 \ 3x - 8 \ 3 \ 3 \ 3x - 8 = 0$

36. Evaluate $(\sqrt{3} + 1)^5 - (\sqrt{3} - 1)^5$ using Binomial theorem
37. Resolve $\frac{3x+2}{(x+3)^2(x-2)}$ into partial fractions
38. Examine whether the propositions $[(p \wedge \sim q) \vee q]$ and $(p \vee q)$ are logically equivalent or not
39. Distribute Rs.632 amongst A,B and C in such a way that 'B' will get 20% more than 'A' and 'C' gets 20% less than 'B'.
40. 4 men or 12 boys can do a job in 5 days by working 8 hrs/day. In how many days 2 men and 4 boys can do the same job working 12 hrs a day
41. Verify if the proposition $[\sim p \wedge (p \vee q)] \rightarrow q$ is a Tautology, contradiction or neither
42. Resolve $\frac{x^2}{(x+1)(x+2)(x+3)}$ into Partial fractions.

PART _ D

V Answer any one question

1×10 = 10

43. a . A school wants to award its students for the values of punctuality, good behaviour and hard work together with the award money for punctuality is Rs. 11,000. The award money for punctuality and hard work together is double the one given for good behaviour .Represent the above situation algebraically and also find the award money for each value , using matrix method.

(6)

- b. Find the value of $(1.01)^5$ using Binomial Theorem, upto 4 decimal places. **(4)**

44. a. If 'n' is a Rational number and 'a' is a non- zero real number, then, prove that $\frac{x^n - a^n}{x - a} = n.a^{n-1}$ **(6)**

- b. Expand $(0.99)^4$ using Binomial theorem upto four decimal places. **(4)**