RAMAIAH
Pre-University College

I PUC MID-TERM EXAMINATION- SEPTEMBER 2019

TIME : 3Hrs 15 Mins SUBJECT: BASIC MATHEMATICS MAX 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 30 marks ,Part C carries 30 marks and Part D carries 10 marks.

(iii)Write the question numbers as indicated in the question paper.

PART-A

I Answer any TEN of the following questions **10×1=10M**

1. Given the Canonical representation of 385.
2. Define an equivalence relation.
3. If f is a function defined by f(x)=3x+5 find f(3) .
4. Simplify $a^{2x+y}.a^{2x-y}$.
5. Express $3^{-2}=\frac{1}{9}$ in logarithmic form.
6. Simplify$(\frac{8}{27})^{1/3}$.
7. Form the quadratic equation whose roots are 1,2.
8. Find the 8^{th} term of an AP -2,-4,-6,…..
9. Solve for x : 2(7+x)-10=16-2(x-24).
10. Express 144° in radian measure.
11. Find the value of sinA.secA.

PART-B

II Answer any TEN of the following **10×2=20M**

12. Find the imaginary part of (1+i)(4-3i).
13. Find the HCF of 18 and 24.
14. If A={1,3,5};B={5};C{7}, find A×(B-C).
15. If the first term of an AP is 3 and the common difference is -2.Find the 11^{th} term .
16. Simplify:$\frac{2^{7a-2b}.8^{2a-b}}{16^{a+b}}$.
17. Prove that $\log\sqrt{\frac{a}{b}}.\log\sqrt{\frac{b}{c}}.\log\sqrt{\frac{c}{a}}=0$.
18. Solve by method of elimination x+2y=4;3x+y=7.
19. Find the sum to infinity of GP 3,-1,$\frac{1}{3}$,-$\frac{1}{9}$,…… if it exists.
20. Solve the inequalities 5x-3<3x+1;x∈R and represent on the number line.
21. Solve:$(1+\tan^2\theta)(1-\sin^2\theta)=1$.
22. Find the value of $\cos60°-\sin30°-\cot^3 45°$.

PART-C

III Answer any TEN of the following **10×3=30M**

23. Three bells toll at intervals of 30 seconds,40 seconds and 50 seconds respectively they start together .After how many minutes will next bell toll together?
24. Show that the relation " Congruent to" on the set of all triangles is an equivalence relation

25. If $f(x)=x^2$;$g(x)=x+1$;find the value of fog(1),gof(1),fof(2).
26. If $p^x=q^y=r^z=s^w$ and pq=rs then prove that $\frac{1}{x}+\frac{1}{y}=\frac{1}{z}+\frac{1}{w}$.
27. If $x^2+y^2=12xy$;show that 2log(x-y)=log2+log5+logx+logy.
28. Insert 4 Arithmetic means between 14 and 34.
29. If the second term of the GP is 6 and 5^{th} term is 162.Then fnd the GP
30. If α and β are the roots of the equation $2x^2-5x+7=0$ then evaluate $\frac{\alpha^2}{\beta}+\frac{\beta^2}{\alpha}$.
31. The angles of a triangle are in the ratio 2:3:5.Find them in degrees and radians.
32. Prove that $\sqrt{\frac{sec\theta+1}{sec\theta-1}}=\frac{1+cos\theta}{sin\theta}$.
33. Find the value of $3tan^2 30°+4cos^2 30°-\frac{1}{2}cot^2 45°-\frac{2}{3}sin^2 60°+\frac{1}{8}sec^4 60°$.

PART-D

III Answer any SIX of the following **6×5=30M**

34. Prove that $\sqrt{5}$ is an irrational number also find the real and imaginary part of $\frac{(1+2i)}{(3-4i)}$.
35. In a class of 50 students 15 do not participate in any games,25 play cricket and 20 play football.Find the number of students who play both.Represent the result using venn diagram.
36. Evaluate using log tables $\frac{25.36\times0.4569}{847.5}$.
37. Find the sum of all integers between 200 and 500 which are divisible by 7.
38. Obtain a root of the equation $x^3-2x^2-2x+3=0$ by inspection and then solve using synthetic division method.
39. If $tan\theta=\frac{a}{b}$ show that $\frac{asin\theta-bcos\theta}{asin\theta+bcos\theta}=\frac{a^2-b^2}{a^2+b^2}$.
40. Find x if $\frac{x.sin^2 300°.sec240°}{cos^2 225°.cosec240°}$=cot 135°.x.tan 315°.

PART-E

III Answer the following question **1×10=10M**

41. (a)If U={1,2,3,4,5,6,7,8,9};A={1,2,3,4,5};B={3,4,5,6,7} Show that $(A\cap B)^1=A^1\cap B^1$.(4m)

(b)Insert Geometric Mean between $\frac{1}{4}$ and $\frac{1}{64}$. (4m)

(c)If $a^x=b;b^y=c;c^z=a$ show that xyz=1. (2m)

42. (a)Solve the linear inequalities graphically:$3x+3y\leq6;x+4y\leq4;x\geq0;y\geq0$. (4m)

(b)Find the sum to n terms of the series 9+99+999+……. (4m)

(c)The HCF of two numbers is 16 and their LCM is 160. If one of the numbers is 64, then find the other number. (2m)