MATHEMATICS

(311)

Day and Date of Examination………………………………………………………

Signature of Invigilators 1. ………………………………………………….

2.…………………………………………………

General Instructions :

1. Candidate must write his / her Roll Number on the first page of the question Paper.

2. please check the question paper to verify that the total pages and total number of questions contained in the booklet are the same as those printed on the top of the first page. Also check to see that the questions are in sequential order.

3. making my identification mark in the answer book or writing roll number anywhere other than the specified places will lead to disqualification of the candidate.

4. Write your Question Booklet Code No. XXXII/OSS/A/1 on the answer-book.

5. (a) the question paper is in English/Hindi medium only. However, if you wish, you can answer in any one of the language listed below.

English, Hindi Urdu, Punjabi, Bengali, Tamil, Malayalam, Kannada, Telugu, Marathi, Oriya, Gujarati, Konkani, Manipuri, Assamese, Nepali, Kashmiri, Sankrit and Sindhi. You are required to indicate the language you have chosen to answer in the box provided in the answer-book.

(a) if you choose to write the answer in the language other than Hindi and English, the responsibility for any errors/mistakes in understanding the question will be yours only.

MATHEMATICS

(311)

Time : 3 Hours]   [Maximum Marks : 100

Note (i) This Question Paper consists of two Sections, viz., 'A' and 'B'

(ii) All questions from Section 'A' are to be attempted.

(iii) Section 'B' has got more than one option. Candidates are required to attempt questions from one option only.

1. Evaluate :

2. Prove that

3. Using the properties of determinants, Prove the following :

4. Prove that

5. If r cos

6. Prove that

7. How many numbers greater than 4000 can be formed with the digits 2,3,4,5 and 6 when no digit is repeated ?

8. Determine whether the function $f(x)= x^3$

9. Find the equation of the line which makes equal intercepts on both axes and passes through the point (4,3).

10. Show that among rectangles of given area, the square has the least perimeter.

11. Evaluate :

12. If

13. If I, w and w^2 are cube roots of unity, unity prove the following :

14. If A=

15. Find the Sum of the following series :

16. 2+22+222+…………….. to n terms

17. Find the equation of the circle which touches the axis of x and passes through the points (-1,2) and (-3,4).

18. Find the intervals in which the function $f(x)= 2x^3-3x^2 -12+6($ a) increasing, (b) dcreasing.

19. Find the equation of tangent to the circle $x^2 + y^2 = 2$ at the point (1,1)   4

20. Show that y $=cx+a/b$ is the solution of the differential equation y=xdy/dx+adx/dy.

21. Solve the equation sin2 +cos= for general solution.

22. If $C_0, C_1, C_2,……, C_n$ are binomial coefficients in the expansion of $(1+X)^n$, prove that.

23. Find the area of the region bounded by the two parabolas $y^2 = x$ and $x^2=y$.

24. Find the sum of the following infinite series. : $1+1/3(1/2)^{2+}+1/5(1/2)^{4}+\ldots\ldots$

25. Find

26. If

27. Find the square root of 3++2i.

28. Using matrices, solve the following system of equations. : 2x-y+z=2;2x+y+z=4;x+2y+2z=5   5

29. Computer the mean and standard for the following data:

Classes	0-10	10-20	20-30	30-40	40-50	Total
Frequency	2	3	5	7	3	20

30. For events A and B, if P(A)=1/4,P(B)=1/2 P(B)=1/2, P

31. The mean and variance of binomial distribution are 3 and 4/9 respectively. Find the distribution and P(X>1).

OPTION –II

(Linear Programming)

28. Find the dual of the following problem :

Z= 16x1+9x2+21x3

X1+x2+3x3>16

2x1+x2+x3>0

29. Four persons A,B, C and D are to be assigned four jobs I, II, III and IV. The cost matrix is given below . Find the proper assignment :

	A	B	C	D
I	8	10	17	9
II	3	8	5	6
III	10	12	11	9
IV	6	13	9	7

30. Solve the following linear programming problem graphically :

Maximize $Z = 8x+19y$

Subject to

$X+5y<200$

$2x+3y<134$

$x>0, y>0$

OPTION –III

(**Vectors and** 3-D **Geometry**)

28. Find the Value of so that the vector and perpendicular to each other.

29. Find the equation of the line passing through the point (2,1,-4) and parallel to the line

x+3/4=y-2/1=z-5/3

30. Find the equation of sphare concentric with the sphere x^2 $+y^2$ $+z^2$-2x-2y-2z-6=0

This question paper consists of 36 questions [Section-A (27)+Section – B(3+3+3)] and 8 printed pages.