FULL TEST 4 -2019 ***REG.NO.***

XII- MATHEMATICS

TIME: 2.30 hrs ***MARKS:90***

NOTE: use blue or black ink to write and underline and pencil to draw the diagram.

SECTION-I

Answer all the questions. ***20x1=20***

>>CHOOSE THE BEST ANSWER<<

1) If A is a square matrix of order 7 then $|adjA|$ is

a) $|A|^4$ B) $|A|^{n-1}$ C) $|A|^6$ D) $|A|^7$

2) If $[\vec{a}\times\vec{b}\ \ \vec{b}\times\vec{c}\ \ \vec{c}\times\vec{a}]$ = 8 then $[\vec{a}\ \ \vec{b}\ \ \vec{c}]$ is

a) 4 b) 16 c) 32 d) - 4

3) $\vec{r} = s\vec{\imath} + t\vec{\jmath}$ is the equation of

a) a straight line joining the points $\vec{\imath}\ and\ \vec{\jmath}$ b) xoy plane

c) yoz plane d) zox plane

4) Cube roots of unity

a) the roots are in G.P with common ratio ω

b) the roots are in A.P with common difference ω

c) the roots are in G.P with common ratio ω^2

d) the roots are in A.P with common difference ω^2

5) For any rational number n , cos nθ - isin nθ is the value or one of the value of

a) sin $\theta - icos\theta$ b) $(sin\theta + icos\theta)^n$

c) $(cos\theta - isin\theta)^n$ d) $(sin\theta - icos\theta)^{n-1}$

>> FILL IN THE BLANKS<<

6) The rank of the matrix $\begin{bmatrix}7 & -1\\ 2 & 1\end{bmatrix}$ is.....

7) The directrix of the parabola y^2 = x+4 is.....

8) If u $= x^y$ then $\frac{\partial u}{\partial y}$ is ... ...

9) $\lim_{x\to\infty}\frac{2^x-3^x}{4^x-5^x}$ is .....

>> MATCH THE FOLLOWING<<

10) A) $|adj\ A|$ - i) $K^n|A|$

B) $|KA|$ - ii) min{m,n}

C) $\rho(A)$ - iii) inconsistent

D) $\rho(A) \neq \rho(A,B)$ - iv) $|A|^{n-1}$

	A	B	C	D
a)	ii	iv	i	iii
b)	iv	i	ii	iii
c)	iv	ii	i	iii
d)	ii	iii	iv	i

11) A) 3+i > 3-I - i) $(-\pi, \pi]$

B) Cube root of unity - ii) not possible in C

C) Arg(Z) - iii) ω^3 = 1

D) $|cis\theta|$ - iv) 1+i0

	A	B	C	D
a)	ii	iii	i	iv
b)	iii	ii	iv	i
c)	ii	iii	i	iv
d)	iv	ii	I	iii

12) Nature of roots — complementary function

A) Real and unequal - i) e^{cx} (A+Bx)

B) Complex roots - ii) $Ae^{c_1x} + Be^{c_2x}$

C) General solution - iii) $e^{ax}(Acosbx + Bsinbx)$

D) Real and equal -- iv) C.F+P.I

	A	B	C	D
a)	ii	i	iv	iii
b)	ii	iii	iv	i
c)	iii	iv	i	ii
d)	iv	iii	ii	i

>>CHOOSE THE WRONG STATEMENT<<

13) a) 2 tangent and 4 normals can be drawn in a parabola

b) 2 tangent and 4 normals can be drawn in a ellipse

c) 2 tangent and 4 normals can be drawn in a hyperbola

d) 2 tangent and 4 normals can be drawn in a R.H

14) symmetrical test

a) the curve is symmetrical about x axis if its equation is unaltered when y replaced by –y

b) the curve is symmetrical about y axis if its equation is unaltered when x replaced by –x

c) the curve is symmetrical about origin if its equation is unaltered when y replaced by –x and x replaced by -y

d) the curve is symmetrical about the line y=x if its equation is unaltered when x and y replaced by y and x.

15) a) $\int_a^b f(x)dx = -\int_b^a f(x)dx$

b) $\int_0^a f(x)dx = \int_0^a f(a+0)dx$

c) $\int_{-a}^a f(x)dx = 0$ where f(x) even

d) $\int_a^b f(x)dx$ = F(b)−F(a)

>> CHOOSE THE CORRECT STATEMENT <<

16) a) Z is a group under addition

b) Q is a group under multiplication

c) C is a group under multiplication

d) N is not closed under division

17) In normal distribution

a) Mean=mode=median=μ

b) It has unimodal

c) Normal curve is bell shaped

d) The skewness is 1.

>> CHOOSE THE ODD MAN OUT<<

18) a) $\rho(A) = \rho(A,B)$ then the system is consistent

b) $\rho(A) < \rho(A,B)$ then the system has no solution

c) $\rho(A) = \rho(A,B) <$ no.of unknowns the system has many solution.

d) $\Delta \neq 0$ then only cramers rule is possible.

19) $a)(\vec{a}x\vec{b}).\vec{c} = [\vec{a}\vec{b}\vec{c}]$

b) $(\vec{a}x\vec{b})x\vec{c} = (\vec{a}.\vec{c})\vec{b} - (\vec{b}.\vec{c})\vec{a}$

c)$(\vec{a}x\vec{b}).(\vec{c}x\vec{d}) = \begin{vmatrix} \vec{a}.\vec{c} & \vec{a}.\vec{d} \\ \vec{b}.\vec{c} & \vec{b}.\vec{d} \end{vmatrix}$

d) $[\vec{a}-\vec{b} \quad \vec{b}-\vec{c} \quad \vec{c}-\vec{a}] = 0$

>>ASSERTION AND REASON<<

20) Assertion (A): e in the R.H is $\sqrt{2}$

Reason (R): in R.H a=b

a) Both A and R true and R is the correct explanation of A

b) Both A and R true and R is the not a correct explanation of A

c) A is true but R is false

section II ***7x2=14***

NOTE: i) answer any 7 questions. ii) Q.No.30 is compulsory

21) Find the coordinates of the centre and the radius of the sphere whoe vector equation is given by $\vec{r}^2 - \vec{r}.(8\vec{\imath} - 6\vec{\jmath} + 10\vec{k}) - 50$

22) If $A = \begin{bmatrix} -1 & 3 \\ 2 & -4 \end{bmatrix}$ then find the value of $|adjA|$

23) If u = $e^{x/y}$ $\sin\frac{x}{y} + e^{y/x}\cos\frac{y}{x}$ then show that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y}$=0

24) Find the inverse of the each element of the group (G,.) where G= {1,-1,I,-i}

25) Find the all values of $(i)^{\frac{1}{4}}$

26) Prove that $e^x > 1 + x$ for all x> 0

27) Evaluate: $\int_0^{\frac{\pi}{2}} cos^8 x\, dx$

28) Solve : $(D^2 + 7D + 12)y = e^{2x}$

29) Find the equation of hyperbola whose foci if (±,3,5) and e=3

30) For the following probability distribution of X

X	0	1	2	3
P(X)	1/6	1/2	3/10	1/30

Find the value of p($0 \leq x < 2$)

Section iii ***7x3=21***

Answer any 7 questions. Q.no 40 is compulsory

31) Prove that $\left[\left[1 + i\sqrt{3}\right]\right]^n + \left[\left[1 - i\sqrt{3}\right]\right]^n = 2^{n+1}\cos\frac{n\pi}{3}$

32) Show that $p \leftrightarrow q \equiv [(\sim p)\vee q]\wedge[(\sim q)\vee p]$

33) Find p,q such that Y=X^{-1} , for X=$\begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 5 \\ 3 & 5 & 6 \end{bmatrix}$, Y =$\begin{bmatrix} 1 & -3 & 2 \\ -3 & 3 & -1 \\ 2 & p & q \end{bmatrix}$

34) Evaluate: $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{dx}{1+\sqrt{tanx}}$

35) Find $\frac{dx}{dt}$, if w = x+2y+ z^2, y= sint, z=t

36) If $\vec{a}, \vec{b}, \vec{c}$ are the position vectors of the vertices A,B,C of a triangle ABC, then prove that the area of triangle ABC is $\frac{1}{2}|\vec{a}\times\vec{b} + \vec{b}\times\vec{c} + \vec{c}\times\vec{a}|$ deduce the condition for points $\vec{a}, \vec{b}, \vec{c}$to be collinear.

37) The tangent at any point on R.H xy = c^2 makes intercept a, b and the normal at the points makes intercepts p,q on the axes. Prove that ap+bq=0

38) The time of swing T of a pendulum is given by T = $k\sqrt{l}$ where k is aconatant. Determine the percentage error in the time of swing if the length of the pendulum $l$changes from 32.1 cm to 32.0 cm.

39) In a hurdle race a player has to cross 1o hurdles . the probability that he will clear each hurdle is 5/6. What is the probability that he will knock down less than 2 hurdles.

40) Find the intervals in which f(x)= $2x^3 + x^2 - 20x$ is increasing and decreasing.

SECTION IV ***7x5=35***

NOTE: Answer all the questions.

41) Find the condition for the curves $ax^2 + by^2 = 1$, $ax^2 + b_1y^2 = 1$, to intersect orthogonally. (OR)

A bag contains 3 types of coins namely Rs.1, Rs.2 and Rs.5. these are 30 coins amounting to Rs.100 in total. Find the number of coins in each category.

42) Show that the lines $\frac{x-1}{1} = \frac{y+1}{-1} = \frac{z}{3} and \frac{x-2}{1} = \frac{y-1}{2} = \frac{-z-1}{1}$ intersecting and find their point of intersection. (OR)

If α and $\beta$are the roots of the equation $x^2 - 2px + (p^2 + q^2) = 0$, $tan\theta = \frac{q}{y+p}$

Show that $\frac{(y+\alpha)^n-(y+\beta)^n}{\alpha-\beta} = q^{n-1}\frac{sinn\theta}{sin^n\theta}$

43) The girder of railway bridge is a parabola with its vertex at the highest point, which is 15 mts above the span of length 150mts. Find its height 30 mts from the mid point.

(OR)

Solve : $(D^2 - 6D + 9)y = 2x + e^{-x}$

44) Show that $(Z_9 - \{[0]\}, .9)$ forms a group. (OR)

If the number of incoming buses per minute at a bus terminus is a random variable having a poisson distribution with $\lambda = 0.9$. fond the probability that there will be

(i) Exactly 9 incoming buses during a period of 5 minutes.

(ii) Fewer than 10 incoming buses during a period of 8 minutes.

(iii) Atleast 14 incoming buses during a period of 11 minutes.

45) Find the vector and cartesian equations of the plane passing through the points (-1,1,1) and (1,-1,1) and perpendicular to the plane x+2y+2z=5. (OR)

For a postmortem report , a doctor requires to know approximately the tome of death of the deceased. He records the first temperature at 10.00 am to 93.4^0F . After 2 hours hr finds the temperature to be 91.4^0F

46) Prove that the equation of tangent at the point $(acos\theta, bsin\theta)$ on the ellipse is $\frac{x}{a}cos\theta + \frac{y}{b}sin\theta = 1$ (OR)

Find the area between the curves $y = x^2 - x - 2$, x axis and the lines x=-2 and x=4

47) Find the length of the curve $4y^2 = x^3$ between x=0 and x=1 (OR)

Trace the curve $y = x^2 - 1$

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