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నమస్తే తెలంగాణ నిపుణ III పోటీపరీక్షల ప్రత్యేకం
Guide to Excellence
మంగళవారం 7 మార్చి 2023

నేటి భారత కరెన్సీకి రూపమైన రూపాయ అనే వెండి నాణేన్ని అమలులోకి తెచ్చిన వారు?
షేర్షా

లోడి వంశస్తుల్లో గొప్పవాడు, ఆగ్రా నగర నిర్మాత ఎవరు?
సికిందర్‌లోడి

మొగలుల్లో టంకా(వెండినాణెం) స్థానంలో రాగి, కాంస్య నాణేలు ప్రవేశ పెట్టిన వారు?
మహమ్మద్ బిన్ తుగ్లక్

బాబర్‌కు 1527లో రాణ సంగ్రమ సింహతో జరిగిన యుద్ధం?
కణ్వ యుద్ధం

INTER MATHS MODEL PAPERS

Time: 3Hrs MATHS – IB MODEL PAPER-II
Marks:75

SECTION-A

(i) Very Short Answer Questions
ii Each Question carries Two marks
10x2=20

1. Find the value of k, if the straight lines $6x-10y+3=0$ and $kx-5y+8=0$ are parallel
2. Find the value of 'P' if the lines $3x+4y=5, 2x+3y=4, Px+4y=6$ are concurrent.
3. Find fourth vertex of the parallelogram whose consecutive vertices are $(2,4,-1)(3,6,-1)(4,5,1)$
4. Find the equation of the plane is the foot of the perpendicular from origin to the plane is $(2,3,-5)$.
5. Find $\lim_{x\to 0}\frac{3^x-1}{\sqrt{1+x}-1}$
6. Evaluate $\lim_{x\to -\infty}\left(\frac{2x+3}{\sqrt{x^2-1}}\right)$
7. Find the derivative of $y=\tan^{-1}\left|\frac{\sqrt{1+x^2}-1}{x}\right|$
8. If $x=a\cos^3 t$, $y=a\sin^3 t$ find $\frac{dy}{dx}$.
9. Find Δy and dy if $y=x^2+x$ when $x=10$ $\Delta x=0.1$
10. Let $f(x)=(x-1)(x-2)(x-3)$ prove that there is more than one "c" in $(1,3)$ such that $f^1(c)=0$.

Section-B

(II) Short Answer Questions:

5× 4 = 20 Marks

(i) Answer any Five Questions.

(ii) Each Question carries Four marks.

11. $A(5,3), B(3,-2)$ are two fixed points. Find the locus equation of P, so that the area of triangle PAB is 9 sq. units
12. When axes are rotated through an angle $\frac{\pi}{6}$, find the transformed equation of $x^2+2\sqrt{3}xy-y^2=2a^2$.
13. A straight line through $Q(\sqrt{3},2)$ makes an angle $\frac{\pi}{6}$ with the positive direction of the X-axis. If the straight line intersects the line $\sqrt{3}x-4y+8=0$ at P, find the distance PQ.
14. Find real constants a, b so that the function f given by
$$f(x)=\begin{cases}\sin x & \text{if } x\le 0\\ x^2+a & \text{if } 0<x<1\\ bx+3 & \text{if } 1\le x\le 2\\ -3 & \text{if } x>3\end{cases}$$
is continuous on R.
15. Find the derivative of 'sin2x' using first principle.
16. A particle is moving along a line according to $S=f(t)=4t^3-3t^2+5t-1$, where S is measure in meters and t is measure in seconds. Find the velocity and acceleration at time t. At what time the acceleration is zero?
17. Find the lengths of normal and subnormal at a point on the curve $y=\frac{a}{2}\left(e^{\frac{x}{a}}+e^{\frac{-x}{a}}\right)$.

Section-C

(III) Long Answer Questions:

5×7= 35

Marks

(i) Answer any Five Questions

(ii) Each Question carries seven marks.

18. Find the circumcentre of the triangle whose vertices are $(-2,3)(2,-1)(4,0)$.
19. If the equation $S=ax^2+2hxy+by^2+2gx+2fy+c=0$ represents a pair of parallel straight lines, then show that
i) $h^2=ab$ ii) $af^2=bg^2$ and
iii) the distance between the parallel lines $2\sqrt{\frac{g^2-ac}{a(a+b)}}$
20. Find the angle between the lines joining the origin to the points of intersection of the curve $x^2+2xy+y^2+2x+2y-5=0$ and the line $3x-y+1=0$.
21. If a ray makes angles $\alpha,\beta,\gamma,\delta$ with the four diagonals of a cube then find $\cos^2\alpha+\cos^2\beta+\cos^2\gamma+\cos^2\delta$.
22. If $y=\tan^{-1}\left[\frac{\sqrt{1+x^2}+\sqrt{1-x^2}}{\sqrt{1+x^2}-\sqrt{1-x^2}}\right]$ then find $\frac{dy}{dx}$.
23. If the tangent at any point p on the curve $x^m y^n=a^{m+n}$ meets the coordinate axes in A and B then show that $AP:BP$ is a constant
24. A window in the shape of a rectangle surmounted by a semicircle. If the perimeter of the window be 20ft. Find the maximum Area.

Time: 3Hrs MATHS – IB MODEL PAPER-III
Marks:75

(i) Very Short Answer Questions
ii Each Question carries Two marks
10x2=20

1. Find the value of x, if the slope of the line passing through (2,5) and (x,3) is 2.
2. Find the equation of the straight line passing through the point (2,3) and making intercepts, whose sum is zero.
3. Find the coordinates of the vertex 'C' of ΔABC if its centroid is the

3. Find the coordinates of the vertex 'C' of ΔABC if its centroid is the origin & the vertices A, B are (1, 1, 1) and (-2, 4, 1) respectively.
4. Find a traid of d.c's of the normal to the plane $x+2y+2z-4=0$.
5. $\lim_{x\to a}\left(\frac{x\sin a-a\sin x}{x-a}\right)$.
6. Compute $\lim_{x\to 0}x^2\sin\left(\frac{1}{x}\right)$.
7. Find the derivative of log($\sin^{-1}e^x$).
8. Find $\frac{dy}{dx}$ if $2x^2-3xy+y^2+x+2y-8=0$.
9. If the increase in the side of a square is 4% then find the approximate percentage of increase in the area of the square.
10. Find c so that $f'(c)=\frac{f(b)-f(a)}{b-a}$ where $f(x)=e^x, a=0, b=1$

SECTION-B

(II) Short Answer Questions
i Answer any five question
ii Each Question carrier four marks
5x4=20

11. Find the equation of locus of a point the difference of whose distances from (-5, 0) and (5,0) is 8 units.
12. When the axes are rotated through an angle 45^0, the transformed equation of a curve is $17x^2-16xy+17y^2=225$. Find the original equation of the curve.
13. Transform the equation $\frac{x}{a}+\frac{y}{b}=1$ into normal form where a > 0, b > 0. If the perpendicular distance of the straight line from the origin is p then deduce that $\frac{1}{p^2}=\frac{1}{a^2}+\frac{1}{b^2}$.
14. If f is given by $f(x)=\begin{cases}k^2x-k & if\ x\ge 1\\ 2 & if\ x<1\end{cases}$ is a continuous function on R, then find k.
15. If $x=a\left[\cos t+\log\tan\left(\frac{t}{2}\right)\right], y=a\sin t$, find $\frac{dy}{dx}$.

15. If $x=a\left[\cos t+\log\tan\left(\frac{t}{2}\right)\right], y=a\sin t$, find $\frac{dy}{dx}$.

16. A container in the shape of an inverted cone has height 12cm and radius 6cm at the top. If it is filled with water at the rate of $12cm^3$/sec., what is the rate of change in the height of water level when the tank is filled 8cm?
17. At any point t on the curve x = a(t + sint), y = a(1 – cost), find the lengths of tangent, normal, subtangent and subnormal.

Section-C

(III) Long Answer Questions:

5 × 7= 35 Marks

(i) Answer any Five Questions

(ii) Each Question carries Seven marks.

18. Find the orthocenter of the triangle with the following vertices (i) (-2, -1), (6, -1) and (2, 5)
19. Show that the area of the triangle formed by the lines $ax^2+2hxy+by^2=0$ and $lx+my+n=0$ is $\left|\frac{n^2\sqrt{h^2-ab}}{am^2-2hlm+bl^2}\right|$.
20. Find the condition for the chord $lx+my=1$ of the circle $x^2+y^2=a^2$ (whose centre is the origin) to subtend a right angle at the origin.
21. Find the angle between the lines whose d.c's are related by $l+m+n=0\ \&\ l^2+m^2-n^2=0$.
22. Find the derivative of $x^{\tan x}+(\sin x)^{\cos x}$ w.r.to x.
23. S.T. the curves $y^2=4(x+1)$, $y^2=36(9-x)$ intersect orthogonally.
24. A wire of length l is cut into two parts which are bent respectively in the form of a square and a circle. What are the lengths of pieces of wire so that the sum of areas is least?

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