Q.29 Find the centre and radius of the circle $x^2+y^2-6x+8y-2=0$

Q.30 Evaluate the following limit: $\lim_{x\to 5}\frac{x^4-625}{x-5}$

Q.31 Find $\frac{d^2y}{dx^2}$, if $y=(x+1)^2 \sin x$.

Q.32 Evaluate $\int x^3 \log x\, dx$.

Q.33 Find the area of the quadrilateral formed by the lines $y=2x+3$, $y=0$, $x=4$ and $x=6$ through integral.

Q.34 Solve the differential equation $\frac{d^2y}{dx^2}+4\frac{dy}{dx}+5y=-2\cos x$

Q.35 Solve the following differential equation by variable separable method: $e^{-2x}\frac{dy}{dx}=y+1$

Section-D

Note: Long answer type questions. Attempt any one question out of three questions. (1x10=10)

Q.36 Find the coordinates of the foci, the vertices, the lengths of major and minor axes and the eccentricity of the ellipse $9x^2+4y^2=36$.

Q.37 Find all the points of local maxima & local minima and their corresponding local maximum & local minimum values of the function $f(x)=x^3-12x+5$.

Q.38 Apply Simpson's rule to find the approximate value of

$$\int_0^{12}(3x^2+1)\,dx$$

by taking 6 equal subintervals of $0 \le x \le 12$.

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Roll No. .....

1st Year / Advance Diploma in Tool and Die Making

Subject : Applied Maths

Time : 3 Hrs. M.M. : 100

Section-A

Note: Multiple Choice questions. All questions are compulsory. (10x1=10)

Q.1 10th term of the A.P. u, $u+v$, $u+2v$,..... is

(a) $u+8v$ (b) $u+9v$

(c) $u+10v$ (d) $u+11v$

Q.2 cosec 60° = _____

(a) 2 (b) 1

(c) 0 (d) none of the above

Q.3 Fill in the blank:

180 *degree* = _____ *grades*

(a) 100 (b) 200

(c) 300 (d) 400

Q.4 cos 2x = _____

(a) $1+\sin^2 x$ (b) $1+\cos^2 x$

(c) $1-2\sin^2 x$ (d) $1+2\sin^2 x$

Q.5 In which quadrant the point $(8, -3\sqrt{2})$ lies?

(a) 4th (b) 1st

(c) 2nd (d) 3rd

Q.6 Fill in the blank $\lim_{x\to 0}(1+x)^{1/x}$ = _____

(a) n (b) 0

(c) e (d) none of these

Q.7 Fill in the blank $\frac{d}{dx}(x\ logx) =$ _____

(a) $1+log\ x$ (b) $log\ x$

(c) 0 (d) none of these

Q.8 $\int sec\ 2x\ tan\ 2x\ dx =$ _____

(a) $\frac{\cos\ 2x}{2}+c$ (b) $\frac{\tan\ 2x}{2}+c$

(c) $\frac{\sec\ 2x}{2}+c$ (d) None of these

Q.9 If $f(t)$ is defined on the interval $a \le t \le b$, then the root mean square value of the function is given by

(a) $\sqrt{\frac{1}{b-a}\int_a^b [f(t)]^2\,dt}$ (b) $\sqrt{\frac{1}{b-a}\int_a^b [f(t)]\,dt}$

(c) b - a (d) None of these

Q.10 Which of the following is a homogeneous differential equation?

(a) $x^5\frac{dy}{dx}=y^2$ (b) $(x^2+y^2)dy-xydx=0$

(c) $y+\frac{d\ y}{d\ x}=x^3$ (d) $(x^2+y^2)dy-xy^2dx=0$

Section-B

Note: Objective type questions. All questions are compulsory. (10x2=20)

Q.11 Evaluate $^{10}P_4$.

Q.12 How many middle terms are there in the Binomial expansion of $(x+y)^{13}$?

Q.13 State the Napier's Analogy.

Q.14 Write the formula to find the centroid of triangle with given vertices.

Q.15 Write the intercept form of the straight line.

Q.16 Write the general equation of the circle.

Q.17 $\frac{d}{dx}(u.v) =$ _____

Q.18 What is the value of $\int tan\ x\ dx$?

Q.19 Evaluate $\int_0^2 4x^3\ dx$

Q.20 $x^2\frac{d\ y}{d\ x}-y^{-5}=x$ is a _____ ordinary differential equation. (linear / non-linear)

Section-C

Note: Short answer type questions. Attempt any ten questions out of fifteen questions. (10x6=60)

Q.21 Find the 4th term from the end of the G.P. 3, 6, 12, 24, ……, 3072

Q.22 Find the 8th term in the binomial expansion of $\left(\frac{x}{a}-\frac{3a}{x^2}\right)^{12}$.

Q.23 Resolve the following into partial fractions: $\frac{5x+7}{(3x-6)(x+8)}$

Q.24 Prove that $tan\ 56^o=\frac{cos11^o+sin11^o}{cos11^o-sin11^o}$

Q.25 Prove that $\cos A + cos\ (120°\text{-}A) + cos\ (120°+A)=0$

Q.26 Prove that $sec\ 2A+tan\ 2A=\frac{cos\ A+sin\ A}{cos\ A-sin\ A}$

Q.27 If in the ΔABC, b=5cm, c=6cm and $\angle A=60°$, then show that area of the triangle is $\frac{15\sqrt{3}}{2}$ sq.units.

Q.28 Find the equation of the straight line passing through (4,-5) and parallel to the line joining the points A(3,7) and B (-2 ,4).