KARNATAKA SCHOOL EXAMINATION AND ASSESSMENT BOARD

II YEAR PUC ANNUAL EXIAMINATION MARCH 2023

BASIC MATHEMATICS SUBJECT CODE:75

SCHEME OF VALUATION

Instructions:

1) Answer by alternate method should be valued and suitably awarded
2) All answers (Including extra, Struck of and repeated) should be valued. Answers with maximum $marks\ must\ be\ considered$.
3) If the student had written wrong question number, write the correct question number and be valued.

Question No.	**PART-A**	**MARKS**
I		**(10X1=10)**
1	Answer (a) $2A=\begin{pmatrix}2 & -6\\ 4 & 8\end{pmatrix}$	1
2	Answer (c) $\begin{vmatrix}3200 & 3201\\ 2 & 2\end{vmatrix}$ =2(-1)=-2	1
3	Answer (c) Number of arrangements of the word 'MONDAY' =6!=720	1
4	(10-1)!=9!	1
5	Answer (a) pvq	1
6	Answer (c) 4:9	1
7)	Answer (a) Cos 2A=1-2sin^2 A=1-2$(\frac{1}{2})^2$ =1-2$(\frac{1}{4})$= $(\frac{1}{2})$	1
8	Answer (b) $(2, \frac{1}{2})$	1
9	Answer (a) $5e^x - \frac{1}{x} - \frac{3}{2\sqrt{x}}$	1
10	Answer (a) 5logx +C	
Question No.II		**MARKS (5X1=5)**
11	n=9	1
12	Fourth proportional =35	
13	Stock=4500	1
14	Rate of sales tax =5%	1
15	$\lim_{X\to\infty}\left(\frac{4X+3}{X-2}\right)=(\frac{19}{2})$	
Question		**MARKS**

No. III		**(5X1=5)**
16	Negation of $\sim p \rightarrow q \; is \; \sim p \wedge \sim q$	1
17	Legally due date of bill is 17-06-2013	1
18	Learning Index $=\frac{\log(learning\ effect)}{log2}$	1
19	K=2	1
20	MC=$\frac{d}{dx}(C)$ =2X+5	1
Question No. IV	**PART- B**	**MARKS (9X2=18)**
21	AB=$\begin{pmatrix} -5 & 0 \\ -7 & 18 \end{pmatrix}$ $(AB)^1=\begin{pmatrix} -5 & -7 \\ 0 & 18 \end{pmatrix}$	1 1
22	a)7! X6! or(3628800) b) 6! X7P_6 or (3628800)	1 1
23	a) P(getting two heads)=$\frac{m}{n}=\frac{1}{4}$ b) P(getting at least one head)=$\frac{m}{n}=\frac{3}{4}$	1 1
24	P is T and qvr is F P is T , q is F and r is F	1 1
25	7x-3x=24 X=6 , quantities are 18 and 42	1 1
26	Finding TD =900 F=$\frac{BDXTD}{BG}=\frac{927X900}{27}$=30900	1 1
27	Cos3A=4Cos^3 A- 3CosA=4$(\frac{4}{5})^3$ -3$(\frac{4}{5})$ Cos3A= $(\frac{-44}{125})$	1 1
28	Tan(A+B)=$\frac{TanA+TanB}{1-TanA\,TanB}=\frac{\frac{3}{4}+\frac{1}{7}}{1-\frac{3}{4}X\frac{1}{7}}$ Tan(A+B)=1 therefore (A+B)=$\frac{\pi}{4}$	1 1
29	a=3 y^2=4ax y^2=12x	1 1
30	$\lim_{X\to a}(f(X))=f(a)$	1

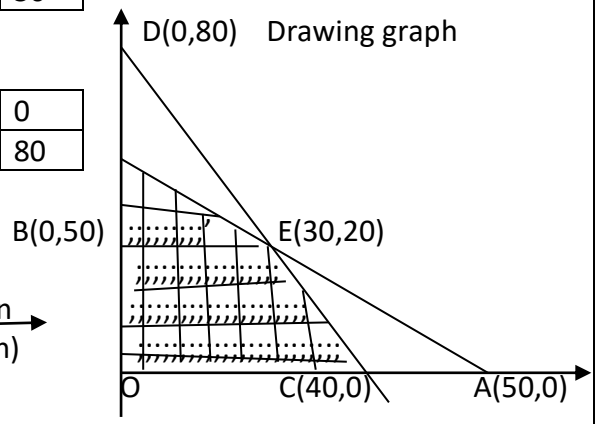
	$\lim_{X\to\infty}\left(\frac{x^4-256}{X-4}\right)$=256 therefore a=256.	1
31	Y=x^5 . $x^{\log x}$, $\frac{dy}{dx}$ = $x^5\frac{d}{dx}(x^{logx})$ + xlogx $\frac{d}{dx}(x^5)$ = x^5 $(x^{logx})(\frac{2logx}{x})$+ xlogx($5x^4$)	1 1
32	$\frac{ds}{dt}$=$6t^2$-10t+4 $(\frac{ds}{dt})_{t=2}$=$6(2)^2$-10(2)+4=8	1 1
33	X^2+5X+3=t $\Longrightarrow$(2X+5) dX=dt $\int\frac{2X+5}{X^2+5X+3}dX=\int\frac{1}{t}dt$ $\int\frac{2X+5}{X^2+5X+3}dX$=log($X^2$+5X+3)+c	1 1
34	$\int_1^2(2X^2+\frac{1}{X})dX=[\frac{2}{3}X^3+\log X]_1^2$ $\frac{16}{3}$ +log2- $\frac{2}{3}$ -0=$\frac{14}{3}$ +log2	1 1
Question No. V	**PART-C**	**MARKS (9X3=27)**
35	$\Delta=\begin{vmatrix}3 & 2\\ 4 & -3\end{vmatrix}=-17, \Delta_1=\begin{vmatrix}8 & 2\\ 5 & -3\end{vmatrix}=-34, \Delta_2=\begin{vmatrix}3 & 8\\ 4 & 5\end{vmatrix}$=-17 X=$\frac{\Delta_1}{\Delta}$ =2, Y=$\frac{\Delta_2}{\Delta}$ =1	1 1
36	$\begin{vmatrix}1 & 0 & 0\\ a & b-a & c-a\\ a^2 & b^2-c^2 & c^2-a^2\end{vmatrix}$ $c_2^1\to c_2-c_1$, $c_3^1\to c_3-c_2$ =(b-a)(c-a)$\begin{vmatrix}1 & 0 & 0\\ a & 1 & 1\\ a^2 & b+a & c+a\end{vmatrix}$ taking (b-a) common from C_2 taking (c-a) common from C_3 = (a-b)(b-a)(c-a)	1 1 1
37	Two are selected, remaining players selection=$^{12}C_6$ =924 ways Two are excluded, remaining players selection=$^{12}C_8$ =495 ways Selection of 8 players from 14 players=$^{14}C_8$ =3003 ways	1 1 1

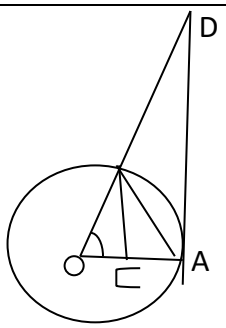
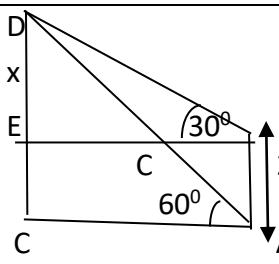
38	Let A; card is red B:card is king P(A)=$\frac{26}{52}$ P(B)=$\frac{4}{52}$ $P(A \cap B)$= $\frac{2}{52}$ Therefore, P(King given card is red) $\Longrightarrow \mathrm{P}\left(\frac{\mathrm{B}}{\mathrm{A}}\right) = \frac{p(A \cap B)}{P(A)} =$ $\frac{2}{52} X \frac{52}{26} = \frac{1}{13}$	1 1 1
39	I st tap can fill $\frac{1}{12}^{th}$ tank in 1 minute. II nd tap can fill $\frac{1}{15}^{th}$ tank in 1 minute. Drain pipe drain out $\frac{1}{20}^{th}$ tank in 1 minute. In 1 minute($\frac{1}{12} + \frac{1}{15} - \frac{1}{20}$) of tank will get filled. In 1 minute $\frac{1}{10}^{th}$ of tank will get filled. Therefore the tank will get filled in 10 minutes.	1 1 1
40	BD=F-Discount value=2920-2916=4 BD=Ftr $\Longrightarrow$ t=10 days Date of drawing = 20-4-97(Legally due date) - 0-6-0 (Bill period) -3-0-0 (Grace period) Date of drawing 17-10-96	1 1 1
41	MV INCOME 6900 720 ? 12 Market value of share=$\frac{6900X12}{720}$ Market value of share=Rs.115.	1 1 1
42	Total amount paid=MP+ST% of MP =32,450+9% of32,450 Total amount paid =Rs.35,370.50	1 1 1
43	Directrix is x=-a$\Longrightarrow$x=-2 Focus is (a,0)=(2,0) Vertex is (0,0)	1 1 1
44 44	xy=aθX$\frac{a}{\theta}$=a^2 y.1+x.$\frac{dy}{dx}$=0 $\frac{dy}{dx}$+$\frac{y}{x}$ =0	1 1 1

45	Let the side of a square is =a, Given $\frac{da}{dt} = 5cm/sec$, $\frac{dA}{dt}$=? A=20 Area of the square=a^2 $Therefore\ \frac{dA}{dt}$=2a$\frac{da}{dt}$ $Therefore\ \frac{dA}{dt}$=200 cm^2/sec	1 1 1
46	Let the numbers be x and y $\therefore$x+y=40 y=40-x P=xy=x(40-x) $\frac{dP}{dx}$ =0$\Rightarrow$ x=20 Y=20, $\frac{d^2p}{dx^2}$=-2<0 $\therefore$product is maximum at x=20,y=20.	 1 1 1
47	$\int u.v$ dx=u$\int v$dx-$\int \frac{du}{dx}(\int v$ dx)dx+c $\int x.cosx$ dx=x$\int cosx$dx-$\int 1.sinx$dx+c (or direct answer 2marks) =x.sinx+cosx+c	1 1 1
48	$\int_0^1 (6x+1)\sqrt{3x^2+x+5}$ dx , $3x^2+x+5=t$, (6x+1)dx=dt When x=0, t=5 and When x=1, t=9 I=$\int_5^9 \sqrt{t}$ dt I=$\frac{2}{3}$(27-5$\sqrt{5}$)	 1 1 1
Question No. VI	**PART-D**	**MARKS (5X5=25)**
49	AX=B A=$\begin{pmatrix}3 & -1 & 2\\ 2 & 1 & -1\\ 1 & 3 & -5\end{pmatrix}$,X=$\begin{pmatrix}x\\ y\\ z\end{pmatrix}$,B=$\begin{pmatrix}13\\ 3\\ -8\end{pmatrix}$ $\lvert A\rvert$=-5$\neq$ 0 adjA=$\begin{pmatrix} +\begin{vmatrix}1 & -1\\ 3 & -5\end{vmatrix} & -\begin{vmatrix}2 & -1\\ 1 & -5\end{vmatrix} & +\begin{vmatrix}2 & 1\\ 1 & 3\end{vmatrix}\\ -\begin{vmatrix}-1 & 2\\ 3 & -5\end{vmatrix} & +\begin{vmatrix}3 & 2\\ 1 & -5\end{vmatrix} & -\begin{vmatrix}3 & -1\\ 1 & 3\end{vmatrix}\\ +\begin{vmatrix}-1 & 2\\ 1 & -1\end{vmatrix} & -\begin{vmatrix}3 & 2\\ 2 & -1\end{vmatrix} & +\begin{vmatrix}3 & -1\\ 2 & 1\end{vmatrix}\end{pmatrix}^T$ A^{-1}=$\frac{1}{\lvert A\rvert}$adjA=$\frac{1}{-5}\begin{pmatrix}-2 & 1 & -1\\ 9 & -17 & 7\\ 5 & -10 & 5\end{pmatrix}\begin{pmatrix}13\\ 3\\ -8\end{pmatrix}$ X=3, y=-2 z=1	1 2 1 1
50	X=x, a=$\frac{2}{x^2}$,n=17 ,T_{r+1}=$nc_r x^{n-r}a^r$ T_{r+1}=$17c_r\ x^{17-r}\left(\frac{2}{x^2}\right)^r$ Tr+1=$17c_r\ x^{17-3r}\ 2^r$	2 2 1

51	$\frac{3x+2}{(x-2)(x+3)^2}=\frac{A}{x-2}+\frac{B}{x+3}+\frac{C}{(x+3)^2}$ A=$\frac{8}{25}$ B=$\frac{8}{-5}$ A=$\frac{7}{5}$ $\frac{3x+2}{(x-2)(x+3)^2}=\frac{8}{25(x-2)}-\frac{8}{25(x+3)}+\frac{7}{5(x+3)^2}$	1 1 1 1 1
52	<table><tr><td>P</td><td>q</td><td>$\sim p$</td><td>$\sim q$</td><td>$(p\wedge\sim q)$</td><td>$(\sim pvq))$</td><td>(5)Λ (6)</td></tr><tr><td>(1)</td><td>(2)</td><td>(3)</td><td>(4)</td><td>(5)</td><td>(6)</td><td></td></tr><tr><td>T</td><td>T</td><td>F</td><td>F</td><td>F</td><td>T</td><td>F</td></tr><tr><td>T</td><td>F</td><td>F</td><td>T</td><td>T</td><td>F</td><td>F</td></tr><tr><td>F</td><td>T</td><td>T</td><td>F</td><td>F</td><td>T</td><td>F</td></tr><tr><td>F</td><td>F</td><td>T</td><td>T</td><td>F</td><td>T</td><td>F</td></tr></table> 1mark 1 mark 1 mark 1 mark conclusion	1
53	66 men and 132 women can do a work in 1 day 72 men and 120 women can do a work in 1 day 1man work =2women,s work 8W:12W=x:33 X=22days	1 1 1 1 1
54	<table><tr><td>Units produced</td><td>Total output in lots</td><td>Cumulative average time/lot(hours)</td><td>Total hours</td></tr><tr><td>1</td><td>1</td><td>800</td><td>800</td></tr><tr><td>1</td><td>2</td><td>80%of800=640</td><td>1280</td></tr><tr><td>2</td><td>4</td><td>80%of640=512</td><td>2048</td></tr><tr><td>4</td><td>8</td><td>80%of512=409.6</td><td>3276.8</td></tr></table>1mark 1 mark 1mark Total time taken for 8 lots=3276.8hrs. Total labor cost for producing8 lots =3276.8X20=65536.	1 1

55	X+y=50 Finding coordinate points 2x+y=80 Feasible region (shaded region) Identifying OBEC is the feasible region. At O(0,0,) Z=0 At B(0,50), Z=4,50,000 At E(30,20)Z=4,95,000 (max) AtC(40,0) Z=4,20,000 Z is maximum at E(30,20) and Z_{max}=4,95,000	1 1 1 1 1
56	LHS=$\frac{(sin5A+sinA)+(sin4A+sin2A)}{(cos5A+cosA)+cos4A+cos2A)}$ =$\frac{(2sin3Acos2A)+(2sin3AcosA)}{(2cos3Acos2A)+2cos3AcosA)}$ =$\frac{2sin3A(cos2A+cosA)}{2cos3A(cos2A+cosA)}$ =tan3A	1 2 1 1
57	Y=log(x+$\sqrt{x^2+1}$) Y_1=$\frac{1}{x+\sqrt{x^2+1}}$ $\frac{x+\sqrt{x^2+1}}{\sqrt{x^2+1}}$ Y_1= $\frac{1}{\sqrt{x^2+1}}$ $\therefore \sqrt{x^2+1}$ .Y_1 =1 $\therefore \sqrt{x^2+1}$ .Y_2 +$\frac{xy_1}{\sqrt{x^2+1}}$=0 $\therefore (x^2+1)$ .Y_2+ xy_1=0	1 1 1 1 1



58	Finding x=0,4 Curve and line intersect at x=0 ,4 (Solving given equatons) A=$\int_0^4 [f(x)-g(x)]$dx A=$\int_0^4 2\sqrt{x}-x]$dx A=$(2\frac{2\,x^{\frac{3}{2}}}{3} - \frac{x^2}{2})\Big|_0^4$ $\therefore$A=$\frac{8}{3}$ =9square units	1 1 1 1 1
Question No. VII	**PART-E**	**MARKS**
59 a)	Let the equation of the circle be $x^2+y^2+2gx+2fy+c=0$……..(1) Let equation (1) passes through (0,0) $\Rightarrow$0+0+0+0+c=0 $\Rightarrow c=0$ Let equation (1) passes through (1,1) g+f= -1 (2) Let equation (1) passes through (5,-5) g-f= -5 (3) Solving equation (2) and (3) g=-3 ,f=2 $\therefore$ required equation of the circle is x^2+y^2 -6x+4y=0 (4) (6,-4) passes through (4) $\therefore$ 36+16-36-16=0 All the 4 points (0,0), (1,1), (5,-5), (6,-4) are concyclic.	 1 1 1 1 1 1
59 b)	 From ΔDOA DA=r tanθ From ΔBOC BC=r sinθ Drawing figure Area of ΔOAB< Area of sectorOAB< Area of ΔOAD (1) (1) Becomes, sin$\theta < \theta < \tan\theta$ $\Rightarrow \cos\theta < \frac{\sin\theta}{\theta} < 1$ $\lim_{\theta\to 0} \frac{\sin\theta}{\theta} = 1$	1 1 1 1 1 1
60 a)	 Drawing figure From ΔADC AC=$\frac{DC}{\sqrt{3}}$ From ΔDEB AC=DE$\sqrt{3}$ Total height of the tower=30meters	1 1 1 1

60 b)	$(1.01)^5=(1+0.01)^5$ $=1^5 +5C_1(0.01)+ 5C_2(0.01)^2 +5C_3(0.01)^3+ 5C_4(0.01)^4+ 5C_5(0.01)^5$ =1+(0.01)+10(0.0001)+10(0.000001)+ignoring the further terms =1+0.05+0.001+0.00001 =1.0510	1 1 1 1