DEPARTMENT OF PREUNIVERSITY EDUCATION, BANGALORE

SCHEME OF VALUATION

SUBJECT CODE :75(N/S) BASIC MATHS

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
1	$A^1=\begin{bmatrix}1 & 2\\ -5 & 3\\ 4 & 6\end{bmatrix}$ $4A^1=\begin{bmatrix}4 & 8\\ -20 & 12\\ 16 & 24\end{bmatrix}$	1
2	$n_{c_{n-8}}=n_{c_5}$ n=13	1
3	Let p: Two numbers are equal ,q:Squares of two numbers are equal Symbolically written as p→ q	1
4	7:28::28:x implies 7x=28x28 Therefore x= 112	
5	$\frac{4X8000}{100}$=Rs.320.	1
6	b=$Index\ of\ learning=\frac{Log\ (\ learning\ effect)}{Log2}$	1
7	$\cos 2A$=1-2sin^2 A=1-2X$\frac{1}{4}=\frac{1}{2}$	1
8	$\lim_{x\to 0}\left[\frac{2}{x}\log(1+x)\right]=2$	1
9	$\frac{dy}{dx}$=sec(secx) . tan(secx) . secx tanx	1
10	$\frac{x^{a+1}}{a+1}$+e^x-logX+c Award marks if c is not written.	
Question No.	PART-B	MARKS
11	2A=$\begin{bmatrix}4 & 6 & 2\\ 2 & -4 & 0\end{bmatrix}$ 3B=$\begin{bmatrix}3 & -6 & 12\\ 3 & 9 & 6\end{bmatrix}$ 2A -3B=$\begin{bmatrix}1 & 12 & -10\\ -1 & -13 & -6\end{bmatrix}$	1 1
12	$\frac{6!}{2!}$=360	2
13	P(A∩ B) = $p(A)+P(B)-P(AUB)=\frac{3}{20}$ P(A|B)=$\frac{P(A\cap B)}{P(B)}=\frac{\frac{3}{20}}{\frac{2}{3}}=\frac{3}{8}$	1 1
14	$(\sim PVq)$ is F $\sim r\ is\ F$ P is T ,q is F, r is T	1 1
15	3X+4X+5X=6000 ,X=500	1

	Ist share =1500, 2nd share =2000, 3rd share=2500	1
16	BD=110, $F = \frac{BDXTD}{BG}$ F=1100	1 1
17	sin^2 A+cos^2 A+2SinA CosA =1+sin2A	1 1
18	$\frac{sinx-siny}{sinx+siny}$== $\frac{2\cos(\frac{x+y}{2})\sin(\frac{x-y}{2})}{2\sin(\frac{x+y}{2})\cos(\frac{x-y}{2})}$ =tan($\frac{x-y}{2}$)cot($\frac{x+y}{2}$)	1 1
19	y^2 =4ax , a=5 y^2=20x	1 1
20	$\lim_{x\to a} f(x)$=f(a)» $\lim_{x\to 0} \frac{e^{2x-1}}{x} = f(0)$ $\lim_{2x\to 0} \frac{e^{2x-1}}{2x}$X2=k) »k=2	1 1
21	Y=x^x, then, logy=xlogx $$\frac{dy}{dx} = x^x\ (1+\log x)$$	1 1
22	$$\frac{ds}{dt} = \frac{-1}{2\sqrt{1-t}} = \frac{-1}{2s}$$ $$\frac{ds}{dt} \propto \frac{1}{s}$$	1 1
23	Let 1+$x^9 = t\ then\ 9x^8dx = dt$ $\mathrm{I} = \frac{1}{3}\int \frac{1}{\mathrm{t}}\mathrm{dt} = \frac{1}{3}\log \mathrm{t} + \mathrm{c} = \frac{1}{3}\log\left(1+\mathrm{x}^9\right) + \mathrm{c}$	1 1
24	$$\int_0^{\frac{\pi}{4}} sec^2 3x\ dx = \left[\frac{tan3x}{3}\right]_0^{\frac{\pi}{4}}$$ =$\frac{-1}{3}$	1 1
Question No.	PART-C	MARKS
25	$$A^2 = \begin{bmatrix} 9 & 8 & 8 \\ 8 & 9 & 8 \\ 8 & 8 & 9 \end{bmatrix}$$ $$A^2 - 4A - 5I = \begin{bmatrix} 9 & 8 & 8 \\ 8 & 9 & 8 \\ 8 & 8 & 9 \end{bmatrix} - \begin{bmatrix} 4 & 8 & 8 \\ 8 & 4 & 8 \\ 8 & 8 & 4 \end{bmatrix} - \begin{bmatrix} 5 & 0 & 0 \\ 0 & 5 & 0 \\ 0 & 0 & 5 \end{bmatrix}$$ $$= \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix} = o$$	1 1 1
26	$$\begin{vmatrix} 1 & 0 & 0 \\ a & a-b & b-c \\ bc & -c(a-b) & -a(b-c) \end{vmatrix}_{c_2\to c_1-c_2\ \ c_3\to c_2-c_3}$$ =(a-b)(b-c)$\begin{vmatrix} 1 & 0 & 0 \\ a & 1 & 1 \\ bc & -c & -a \end{vmatrix}$	1 1

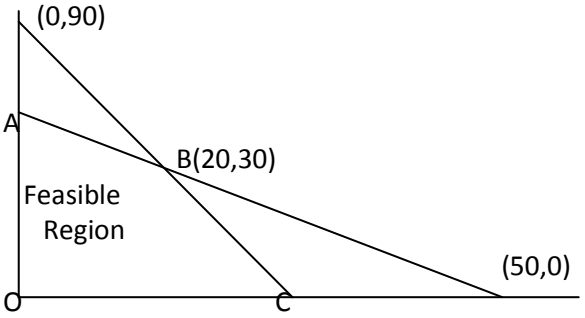
	=(a-b)(b-c)(c-a)	1
27	Writing ${}^{n}c_2 - n$ or$\frac{n(n-3)}{2}$=170 n^2 -3n-340=0 n=20 , number of sides =20	1 1 1
28	P(4 gold coins in first draw)=$\frac{10c_4}{18c_4}$ 4 coins are replaced the total =18 P(4 silver coins in second draw)=$\frac{8c_4}{18c_4}$ P(4 gold coins and 4 silver coins)=$\frac{10c_4}{18c_4}$ X$\frac{8c_4}{18c_4}$	1 1 1
29	Men Hours Days Work 5 9 30 1 X 8 25 8 8:9=5:x inverse proportion 25:30=5:x inverse proportion 1:8=5:x direct proportion X=54, therefore 54 men required to finish the work	 1 1 1
30	Given, BG=24,t=1/2 years,r=0.04, BG=TDtr,TD=1200 BD=24+1200=1224 BD=Ftr, F=61200	1 1 1
31	*Amount received by selling=10000 ,brokerage in selling=25* *Net amount received=9975,Reliance share value=8000* *Net amount paid for reliance shares=8020* *Balance amount=9975-8020=1955, amount paid to sonu=1955*	*1* *1* *1*
32	Let MP=X, S.P.=M.P.+S.T.% of $M.P.$,17600=x+10.%ofx 17600=$\frac{11x}{10}$ MP=Rs.16000 Sales tax=S.P.-M.P.=17600-16000=1600	1 1 1
33	C=(-g,-f)=(-1,-3) one end=A=(3,-7) B=(x ,y)=other end C is mid point of AB (-1 ,-3)=($\frac{3+x}{2}$, $\frac{-7+y}{2}$) X=-5 and y=1	 1 1 1
34	$$\frac{dy}{dx} = \lim_{\Delta x \to 0} \frac{\sin(x+\Delta x) - sinx}{\Delta x}$$ $$\frac{dy}{dx} = \lim_{\Delta x \to 0} \frac{2\cos(\frac{2x+\Delta x}{2}) \sin(\frac{\Delta x}{2})}{\Delta x}$$ $\frac{dy}{dx}$=cosx	1 1 1
35	$\frac{dy}{dx}$ =0 ,x=3,-1, $\left(\frac{d^2y}{dx^2}\right)_{x=3}$ =36> 0, f(x) is minimum at x=3 $\left(\frac{d^2y}{dx^2}\right)_{x=-1}$ =-36< 0, f(x) is maximum at x=-1 Y_{min}=-51 Y_{max}=45	 1 1 1

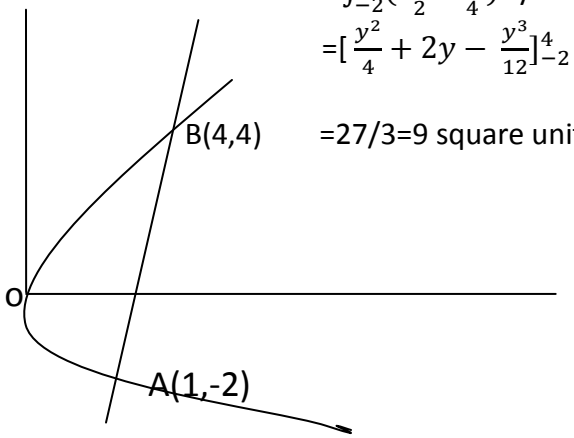
36	A 6m C B 2m x D y E Z $\frac{dx}{dt}$=rate of manwalking=6km/hr $\frac{dy}{dt}$=rate of shadow length increase, $\frac{dZ}{dt}$=tip of shadow moving. 2y=x $\frac{dy}{dt}$ =3km/hr $\frac{dZ}{dt}=\frac{dx}{dt}+\frac{dy}{dt}$=6+3=9 km/hr	1 1 1
37	x$\int cosx\,dx-\int(\int cosxdx)\,dx+c$ =xsinx-$\int sinx\,dx$+c =xsinx +cosx+c (award marks if cis not written)	1 1 1
38	$\int\frac{1}{1+cosx}$dx=$\int\frac{1}{2cos^2\frac{x}{2}}dx$ $=\frac{1}{2}\int sec^2\frac{x}{2}\,dx$ = Tan $\frac{x}{2}$+c	1 1 1

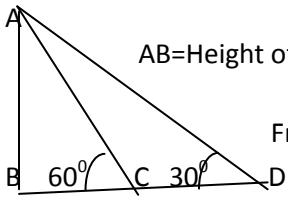
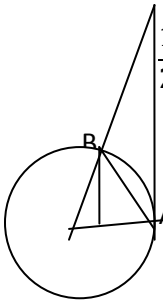
Question No.	PART-D	MARKS
39	T_{r+1} = 17C_r x^{17-r} $(\frac{1}{x^2})^r$ =17C_r x$^{17-r-2r}$ For equating 17-3r=5 r=4 Finding coefficient 17C_r	1 1 1 1 1
40	$\frac{3x+2}{(x-2)(x+3)^2}=\frac{A}{x-2}+\frac{B}{x+3}+\frac{C}{(x+3)^2}$ Finding A=$\frac{8}{25}$ Finding B=$\frac{-8}{25}$ Finding c=$\frac{7}{5}$ Therefore $\frac{3x+2}{(x-2)(x+3)^2}=\frac{8}{25(x-2)}-\frac{8}{25(x+3)}+\frac{7}{5(x+3)^2}$	1 1 1 1 1
41	1 2 3 4 5 6 p q p→ q $\sim(p\rightarrow q)$ $\sim q$ p∧~q T T T F F F T F F T T T F T T F F F F F T F T F 1M 1M 1M 1M	

	Conclusion: Columns 4 and 6 are identical hence proved 1mark	
42	Quantity of Liquid A and B initially are 7x and 5x,	1
	Drawn mixture of A=$\frac{63}{12}$ liters Drawn mixture of B=$\frac{45}{12}$ Therefore new ratio of A and B is $\frac{7x-\frac{7X9}{12}}{5X-\frac{5X9}{12}+9}=\frac{7}{9}$ Getting x=3 Initially the quantity of A=21 liters	1 1 1 1

43	Units produced	total output in units	Cumulative avg.timetotal hours Per unit	Total hours
	1	1	20,000	20000
	1	2	$90\%of20000=18000$	36000
	2	4	$90\%of18000=16200$	64800
	4	8	$90\%of16200=14580$	116640
	1M		2M	1M
	Total cost=23,32,800			1M

44	Writing x+y=50, x=0 then y=50, if x=50 then y=0 3x+y=90, if x=0,then y=90, ifx=30 then y=0	1
		
	Drawing graph	1
	Finding feasible region	1
	writing corner points	1
	Corner points Z=60x+15y A(0,50) Z=750 B(20,30) Z=1650 C(30,0) Z=1800 therefore Z_{Max} =1800 ,at x=30, y=0 O(0,0) Z=0	1
45	$Sin20^0sin40^0\ sin60^0sin80^0=(sin40^0sin20^0)\sqrt{3}/2\ sin80^0$ $=\sqrt{3}/2\ sin80^0\ -1/2(cos60^0-cos20^0)$ $=\frac{-\sqrt{3}}{4}sin80^0\frac{1}{2}+\frac{\sqrt{3}}{8}(sin(80^0+20^0)sin(80^0-20^0))$ $=\frac{-\sqrt{3}}{8}sin80^0+\frac{\sqrt{3}}{8}sin80^0+\frac{3}{16}$ $=\frac{3}{16}$	1 1 2 1
46	Getting ,2g+4f+c=-5 4g+2f+c=-5 g=0 f=0	1 1 1 1

	c=-5 and required eqn $x^2+y^2-5=0$	1
47	$Y_1=12x.(a^2+x^2)^5$	1
47	$Y_2=120x^2.(a^2+x^2)^4 + 12(a^2+ x^2)^5$ $(a^2 +x^2)y_2 -10xy_1-12y=120x^2 (a^2+ x^2)^5 +12(a^2 +x^2)^6 -120x^2 (a^2+ x^2)^5$ $-12(a^2 +x^2)^6$ Proving LHS=0	1 2 1
48	$X=\frac{y^2}{4}$ .....(1) $X=\frac{y+4}{2}$ .....(2) Y=-2,4 and x=1,4 therefore the points of intersection are(1,-2)and (4,4) $A=\int_{-2}^{4}(\frac{y+4}{2}-\frac{y^2}{4})dy$ $=[\frac{y^2}{4}+2y-\frac{y^3}{12}]_{-2}^{4}$ =27/3=9 square units  	1 1 1 1 1
Question No.	PART-C	MARKS
49(a)	Let x=bus fare charged per child, y= bus fare charged per Senior citizen Z= bus fare charged per adult, data in equations x+y+z=9,3x+2y+z=10 X+2y+3z=14, AX=B Where $A=\begin{bmatrix}1&1&2\\3&2&1\\1&2&3\end{bmatrix}$ $B=\begin{bmatrix}9\\10\\14\end{bmatrix}$ $C=\begin{bmatrix}x\\y\\z\end{bmatrix}$ $A^{-1}=\frac{adjA}{\lvert A\rvert}=\frac{\begin{bmatrix}4&1&-3\\-8&1&5\\4&-1&-1\end{bmatrix}}{4}$, $X=A^{-1}B$ X=1,y=2,z=3.	1 1 3 1

49 (b)	 AB=Height of tree =h, CD=40meters, BC=x diagram From triangle ABC tan60^0=$\frac{AB}{BC}$ ∴x=$\frac{h}{\sqrt{3}}$ From triangle ABD $\frac{1}{\sqrt{3}} = \frac{h}{x+40}$ Height of the Tree=20$\sqrt{3}$ meters breadth of the river=x=20meters	1 1 1 1
50 a)	 $\frac{1}{2} oA.BC \leq \frac{1}{2} OA^2\ \theta \leq \frac{1}{2} OA\ DA$ …….(1) Figure DA=rtanθ, BC=rsinθ (1) gives BC≤ θ ≤DA 1≤ $\frac{\theta}{sin\theta} \leq \frac{1}{cos\theta}$ $\frac{lim}{\theta \to 0}\left(\frac{sin\theta}{\theta}\right)$ =1	1 1 1 1 2
50(b)	$(1+0.1)^5$ =(1+0.1)^5 =1+5c_1 (0.01) +5c_2(0.01)^2 +5c_3(0.01)^3 +5c_4(0.01)^4 +5c_5(0.01)^5 =1.0510	1 1 2