Federal Board - Annual 2004 Paper I

Mathematics Paper-I , Time Allowed: 2.40 Hours
Max. Marks: 80 , Available online @ http://www.mathcity.org/fsc

Section –B (4 × 10 =40 marks)

Q # 2 (i) Simply $\left(3-\sqrt{-4}\right)^3$ **OR** Construct a truth table of $\left[\left(p\to q\right)\wedge p\right]\to q$.	Ex 1.3 - 7(viii) – p28 Ex 2.4 – Exp4 – p53
(ii) Without expansion show that $\begin{vmatrix} a-b & b-c & c-a \\ b-c & c-a & a-b \\ c-a & a-b & b-c \end{vmatrix}=0$ **OR** Find A, G, H and verify that $A>G>H$ $(G>0)$ if $a=2$, $b=8$.	Ex 3.3 – 5(v) – p113 Ex 6.10 – 14(i) – p225
(iii) Determine the middle term in $\left(\frac{3}{2}x-\frac{1}{3x}\right)^{11}$ **OR** Find n and r when ${}^{n-1}C_{r-1} : {}^{n}C_{r} : {}^{n+1}C_{r+1} = 3:6:11$.	Ex 8.2 – 10(ii) – p274 Ex 7.4 – 3(ii) – p242
(iv) Find period and domain of $5\tan\frac{x}{7}$ **OR** Show that $\cos^{-1}(-x)=\pi-\cos^{-1}x$.	Ex 11.1 – New – p341 Ex 13.2 – 18- p400
(v) Show that the roots of $x^2+\left(mx+c\right)^2=a^2$ will be equal if $c^2=a^2\left(1+m^2\right)$.	Ex 4.7 – 5 – p167
(vi) Resolve $\frac{3x-11}{\left(x^2+1\right)\left(x+3\right)}$ into partial fraction.	Ex 5.3 – Exp1– p186
(vii) Prove that $\frac{1+\cos\theta}{1-\cos\theta}=\left(\operatorname{cosec}\theta+\cot\theta\right)^2$	Ex 10.2 – 5 – p327
(viii) Prove that; $\frac{\sin 3\theta}{\cos\theta}+\frac{\cos 3\theta}{\sin\theta}=2\cot 2\theta$	Ex 9.4 – 13 – p312
(ix) Find the smallest angle of the triangle ABC when $a=37.34$, $b=3.24$, $c=35.06$	Ex 12.6 – 6 – p373
(x) Solve; $\sin 2x+\sin x=0$	Ex 14 – 13 - p407

Section C (40 Marks (5+5 each))

Note: Attempt any four questions. Graph paper will be supplied on demand.

Q # 3 (a) If $z_1=2+i$, $z_2=3-2i$, $z_3=1+3i$, find real and imaginary part of $\frac{\overline{z_1}\,\overline{z_3}}{z_2}$.	Ex 1.3 – Exp2 – p25
(b) Convert $\left(A\cap B\right)\cap C=A\cap\left(B\cap C\right)$ to logical form and prove by constructing a truth table.	Ex 2.5 – 3 – p57

Q # 4 (a) Solve; $x+2y+z=2$, $2x+y+2z=-1$, $2x+3y-z=9$ **(b)** Solve; $\left(x+\frac{1}{x}\right)^2-3\left(x+\frac{1}{x}\right)-4=0$	**Ex 3.5 – 3(ii) – p138** **Ex 4.2 – 18 – p147**
Q # 5 (a) Resolve $\frac{2x-5}{(x^2+2)^2(x-2)}$ into partial fraction. **(b)** If S_1, S_3, S_5 are the sums of $2n$, $3n$, $5n$ terms of an A.P. Show that $S_5=5(S_3-S_2)$.	**Ex 5.3 – 3 – p188** **Ex 6.4 – 8 – p199**
Q # 6 (a) Two dice are thrown twice, What is probability that the sum of the dots in the first throw is 7 and that of the 2nd throw is 11? **(b)** Show that $\left[\frac{n}{2(n+N)}\right]^{1/2}\approx\frac{8n}{9n-N}-\frac{n+N}{4n}$, where n and N are nearly equal.	**Ex 7.8 – 7 – p255** **Ex 8.3 – 8 – p284**
Q # 7 (a) Without using calculator/tables, prove that $\sin 19^\circ\cos 11^\circ+\sin 71^\circ\sin 11^\circ=\frac{1}{2}$ **(b)** If $\tan\theta=8/15$ and the terminal arm of the angle is in 3rd quadrant. Find the value of other trigonometric functions of θ.	**Ex 10.4 – Exp2 – p334** **Ex 9.2 – Exp1 – p299**
Q # 8 (a) Draw graphs of $y=\sin x$ and $y=\sin 2x$ on the same axes and to the same scale for their complete period. **(b)** Two men are on the opposite sides of a 100m high tower. If the measure of the angles of elevation of the top of the tower are 18° and 22° respectively. Find the distance between them.	**Ex 12.2 – 2(i) – p351** **Ex 12.3 – 10 – p360**
Q # 9 (a) Prove that $\sin^{-1}\frac{4}{5}+\sin^{-1}\frac{5}{13}+\sin^{-1}\frac{16}{65}=\frac{\pi}{2}$ **(b)** Solve $\tan^2\theta-\sec\theta-1=0$	**Ex 13.2 – 10 – p400** **Ex 14 – 4 – p407**

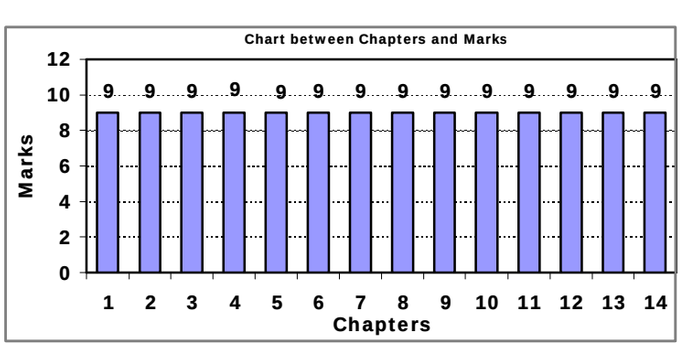
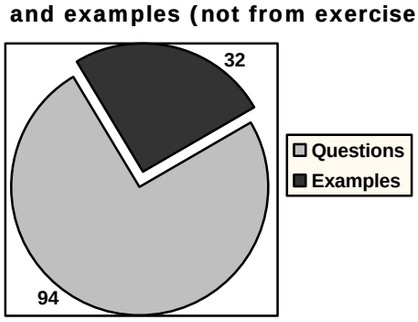
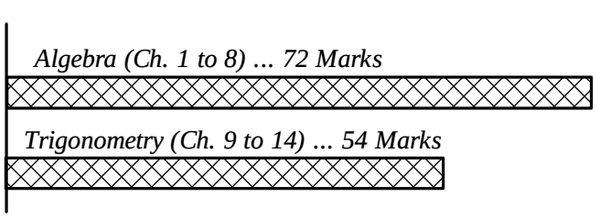


Chart between Chapters and Marks

Chart between questions from exercise and examples (not from exercise)





Relation between Algebraic & Trigonometric portion.