HSSC-I (R&T) FEDERAL BOARD MATHEMATICS TEST – 1 CHAPTER 1+REVIEW EXERCISE

Name:		**Roll No.**		**Section:**	

Total Time: 1:20 Minutes **PAPER OBJECTIVE** **Total Marks: 45**
Total Time: 20 Minutes **SECTION-A (MARKS 13)**

NOTE: Section-A is compulsory. All parts of this section are to be answered on this page and handed over to the center superintendent. Deleting / overwriting in not allowed. Do not use lead pencil.

Q.1 Fill the relevant bubble for each part. All parts carry one mark. (13 × 1 = 13)

	QUESTIONS	A	B	C	D	A	B	C	D
1.	If z is a complex number then its mirror image is:	$\lvert z\rvert$	$\frac{1}{z}$	$-z$	$\bar{z}$	○	○	○	○
2.	If $z=\frac{3+2i}{-2+3i}$ then $\lvert z\rvert=$:	$\sqrt{13}$	$\frac{1}{\sqrt{13}}$	1	5	○	○	○	○
3.	Polar coordinates of the complex number $z=1+\sqrt{3}i$ are:	$\left(\sqrt{3},30°\right)$	$(2,30°)$	$(2,60°)$	$\left(\sqrt{3},60°\right)$	○	○	○	○
4.	If $z=4-3i$, then $\text{Im}\left(z^{-1}\right)$ is:	$\frac{-3}{25}i$	$\frac{3}{25}i$	$\frac{-3}{25}$	$\frac{3}{25}$	○	○	○	○
5.	A system of equations is said to be inconsistent if it has:	At least one solution	Only one solution	Only two solutions	No solution	○	○	○	○
6.	If $z_1=3+2i$ and $z_2=5+6i$ then	$z_1>z_2$	$z_1<z_2$	$\bar{z}_1=\bar{z}_2$	$\lvert z_2\rvert>\lvert z_1\rvert$	○	○	○	○
7.	Algebraic form of the complex number $7\sqrt{2}\left(\cos\frac{5\pi}{4}+i\sin\frac{5\pi}{4}\right)$ is:	$7+7i$	$-7-7i$	$\sqrt{2}+\sqrt{2}i$	$\frac{1}{\sqrt{2}}+\frac{1}{\sqrt{2}}i$	○	○	○	○
8.	If $z=\sqrt{3}-i$ then principal argument of z is written:	$-\frac{\pi}{6}$	$\frac{\pi}{6}$	$-\frac{\pi}{3}$	$\frac{\pi}{3}$	○	○	○	○
9.	$i+i^2+i^3+i^4+...+i^{20}=$	i	$i-1$	0	1	○	○	○	○
10.	If $(2+3i)x+(1+3i)y+2=0$, then value of x and y:	$x=2,$ $y=-2$	$x=-2,$ $y=2$	$x=3,$ $y=2$	$x=-3,$ $y=-2$	○	○	○	○
11.	Principal argument of z lies in the interval:	$0<\theta\leq\pi$	$-\pi<\theta\leq\pi$	$-\pi\leq\theta<\pi$	$-\pi<\theta<\pi$	○	○	○	○
12.	If $\left(\frac{1+i}{1-i}\right)^n=1$, then least positive value of n is:	1	2	3	4	○	○	○	○
13.	If $z=(\cos\theta+i\sin\theta)^n$, if $n=14, \theta=\frac{\pi}{4}$ then imaginary part of z is:	1	0	–1	–2	○	○	○	○

HSSC-I (R&T) FEDERAL BOARD MATHEMATICS TEST – 1 CHAPTER 1+REVIEW EXERCISE

Name:		**Roll No.**		**Section:**	

Time allowed: 60 Minutes **PAPER SUBJECTIVE** **Marks: 32**

Note: Section 'B' AND 'C' comprise page 1 only and questions there in are to be answered on the separate answer book. Use supplementary answer sheet i.e., sheet B if required. Write your answers neatly and legibly.

SECTION-B (MARKS-16)

Q.2 Attempt any FOUR questions. **(4 × 4 = 16)**

(i)	If $\frac{1+z}{1-z}=\cos 2\theta+i\sin 2\theta,$ show that $z=i\tan\theta$	**04**
(ii)	Find the impedance Z for the following values $E=(-50+100i)$ votls, $I=(-6-2i)$amps	**04**
(iii)	Show that for any complex number $\mathrm{Re}(iz)=-\mathrm{Im}(z)$	**04**
(iv)	If $z=x+iy$ then simplify the equation: $\lvert z-2i\rvert=\lvert\bar{z}+3\rvert$	**04**
(v)	If α and β are different complex numbers with $\lvert\beta\rvert=1,$ then find $\left\lvert\frac{\beta-\alpha}{1-\bar{\alpha}\beta}\right\rvert$	**04**

SECTION-C (MARKS 16)

Q.3 Attempt the question. **(1 × 8 = 8)**

	If $\cos\alpha+\cos\beta+\cos\gamma=\sin\alpha+\sin\beta+\sin\gamma=0,$ show that **i)** $\cos 3\alpha+\cos 3\beta+\cos 3\gamma=3\cos(\alpha+\beta+\gamma)$ **ii)** $\sin 3\alpha+\sin 3\beta+\sin 3\gamma=3\sin(\alpha+\beta+\gamma)$	**08**

Q.4 Attempt all parts. **(2 × 4 = 8)**

(a)	Factorize: $x^3-x^2+4x-12$	**04**
(b)	Solve $x^3-x^2+4x-12=0$ and identify real and complex roots.	**04**

HSSC-I (R&T) FEDERAL BOARD MATHEMATIC TEST – 2 CHAPTER 2 (2.1-2.3)

Name:		Roll No.		Section:	

Total Time: 1:20 Minutes **PAPER OBJECTIVE** **Total Marks: 45**

Total Time: 20 Minutes **SECTION-A (MARKS 13)**

NOTE: Section-A is compulsory. All parts of this section are to be answered on this page and handed over to the center superintendent. Deleting / overwriting in not allowed. Do not use lead pencil.

Q.1 Fill the relevant bubble for each part. All parts carry one mark. (13 × 1 = 13)

	QUESTIONS	A	B	C	D	A	B	C	D
1.	$[7]$ is a _____ matrix	Diagonal matrix	Scalar matrix	Identity matrix	All of these	○	○	○	○
2.	If a matrix has 32 elements then what are the possible orders it can have?	2	4	6	16	○	○	○	○
3.	Which of the following is/are Triangular matrices?	Diagonal matrix	Scalar matrix	Both (a) and (b)	None of these	○	○	○	○
4.	If $A=\begin{bmatrix}1&2\\3&4\end{bmatrix}$ and $B=\begin{bmatrix}1&2&3\\4&5&6\end{bmatrix}$ then which of the following is not true?	$(AB)^t=B^tA^t$		$(A+B)^t=A^t+B^t$		○	○		
		$(A^t)^t=A$		$(B^t)^t=B$				○	○
5.	Trace of the matrix $A=\begin{bmatrix}2&3&5\\1&7&9\\4&6&3\end{bmatrix}$ is:	5	12	14	0	○	○	○	○
6.	Which of the following matrix is symmetric?	$\begin{bmatrix}0&1&9\\-1&0&5\\-9&-5&0\end{bmatrix}$		$\begin{bmatrix}3&-6&9\\-6&2&0\\9&0&0\end{bmatrix}$		○	○		
		$\begin{bmatrix}9&0&1\\0&6&3\\0&0&1\end{bmatrix}$		None of these				○	○
7.	If order of $A=3\times2$ and order of $B=2\times3$ then order of A^2B is:	3×3	2×2	2×3	Not possible	○	○	○	○
8.	If A is a square matrix of order 3×3 with $\lvert A\rvert=3$ then value of $\lvert adjA\rvert$ is:	3	$\frac{1}{3}$	9	6	○	○	○	○
9.	For what value of λ the matrix $\begin{bmatrix}\lambda&1&3\\2&1&8\\0&3&1\end{bmatrix}$ has no inverse?	$\lambda=0$	$\lambda=\frac{23}{16}$	$\lambda=\frac{16}{23}$	$\lambda=\frac{-16}{23}$	○	○	○	○
10.	If $A=\begin{bmatrix}1&2&5\\0&-1&2\\4&3&5\end{bmatrix}$, then $M_{21}+A_{32}=?$	–5	–7	–3	7	○	○	○	○
11.	For a square matrix A of order $3\times3, \lvert A\rvert=9, A_{21}=3,\ A_{22}=4, A_{23}=-1,$ $a_{21}=1, a_{23}=2,$ what is the value of a_{22}?	2	3	9	–1	○	○	○	○
12.	If $A=\begin{bmatrix}3&-4\\2&-2\end{bmatrix}$ and $C=\begin{bmatrix}1&0\\0&1\end{bmatrix}$ and $AB=C$ then $B=?$	$\begin{bmatrix}-1&-1\\-2&\frac{3}{2}\end{bmatrix}$	$\begin{bmatrix}\frac{3}{2}&1\\2&1\end{bmatrix}$	$\begin{bmatrix}-1&2\\-1&\frac{3}{2}\end{bmatrix}$	$\begin{bmatrix}1&2\\1&\frac{3}{2}\end{bmatrix}$	○	○	○	○
13.	If A and B are symmetric matrices of same order then $AB-BA$ is:	Anti-symmetric matrix		Symmetric matrix		○	○		
		Identity matrix		Null matrix				○	○

HSSC-I (R&T) FEDERAL BOARD MATHEMATIC TEST – 2 CHAPTER 2 (2.1-2.3)

Name:		Roll No.		Section:	

Time allowed: 60 Minutes **PAPER SUBJECTIVE** **Marks: 32**

Note: Section 'B' AND 'C' comprise page 1 only and questions there in are to be answered on the separate answer book. Use supplementary answer sheet i.e., sheet B if required. Write your answers neatly and legibly.

SECTION-B (MARKS-16)

Q.2 Attempt any FOUR questions. **(4 × 4 = 16)**

(i)	If $A=\begin{bmatrix} x & 0 \\ y & 1 \end{bmatrix}$ then, show that: $A^n=\begin{bmatrix} x^n & 0 \\ \dfrac{y\left(x^n-1\right)}{(x-1)} & 1 \end{bmatrix}, n\in Z^+$	**04**
(ii)	If $A=\begin{bmatrix} 2 & 1 \\ 3 & -3 \end{bmatrix}$ then find α and β such that, $A^2+\alpha I=\beta A$	**04**
(iii)	If $A=\left[a_{ij}\right]$ is a matrix of order 3×3 and $a_{ij}=i^2-j^2$, Check whether A is symmetric or skew-symmetric	**04**
(iv)	Find the multiplicative inverse (If it exist) for $A=\begin{bmatrix} i & 0 & 1 \\ 2i & -1 & -i \\ 1 & 0 & 4i \end{bmatrix}$	**04**
(v)	If A and B are square matrices of the same order, then explain why in general: $(A+B)^2\neq A^2+2AB+B^2$ $(A+B)(A-B)\neq A^2-B^2$	**04**

SECTION-C (MARKS 16)

Q.3 Attempt the question. **(1 × 8 = 8)**

	Verify that $(AB)^{-1}=B^{-1}A^{-1}$ for $A=\begin{bmatrix} 1 & 1 & 1 \\ 2 & -1 & 1 \\ 2 & 1 & -3 \end{bmatrix}$, $B=\begin{bmatrix} 3 & -2 & 3 \\ 2 & 1 & -1 \\ 4 & -3 & 2 \end{bmatrix}$	**08**

Q.4 Attempt all parts. **(2 × 4 = 8)**

(a)	Find the matrices X and Y such that $2X-Y=\begin{bmatrix} 1 & 6 & -3 \\ 2 & 1 & 7 \end{bmatrix}$ and $X+3Y=\begin{bmatrix} 4 & 3 & 2 \\ 1 & -3 & 0 \end{bmatrix}$	**04**
(b)	Find X, $\begin{bmatrix} 3 & 2 \\ 0 & 1 \\ 2 & 0 \end{bmatrix}X=\begin{bmatrix} \frac{7}{2} & 11 & 2 \\ 2 & 4 & 1 \\ 1 & 2 & 0 \end{bmatrix}$	**04**

HSSC-I (R&T) FEDERAL BOARD MATHEMATIC TEST – 3 CHAPTER 2 (2.4-2.6) + REVIEW EXERCISE

Name:		**Roll No.**		**Section:**	

Total Time: 1:20 Minutes **PAPER OBJECTIVE** **Total Marks: 45**
Total Time: 20 Minutes **SECTION-A (MARKS 13)**

NOTE: Section-A is compulsory. All parts of this section are to be answered on this page and handed over to the center superintendent. Deleting / overwriting in not allowed. Do not use lead pencil.

Q.1 Fill the relevant bubble for each part. All parts carry one mark. (13 × 1 = 13)

	QUESTIONS	A	B	C	D	A	B	C	D
1.	If A is a matrix of order 3×3, such that $\lvert A\rvert=2$, then $\lvert -3A\rvert=?$	6	9	54	-54	○	○	○	○
2.	If a,b,c are non-zero real numbers, then $\begin{vmatrix} a & 0 & 0 \\ 0 & b & 0 \\ 0 & 0 & c \end{vmatrix} =$	0	$a+b+c$	abc	$a-b+c$	○	○	○	○
3.	$\begin{vmatrix} 1 & 2 & 7 \\ 3 & 5 & -2 \\ 7 & 1 & 11 \end{vmatrix} + \begin{vmatrix} 1 & 2 & -6 \\ 3 & 5 & 5 \\ 7 & 1 & -4 \end{vmatrix} = ?$	$\begin{vmatrix} 1 & 2 & 1 \\ 3 & 5 & -3 \\ 7 & 1 & -7 \end{vmatrix}$	$\begin{vmatrix} 1 & 2 & 1 \\ 3 & 5 & 3 \\ 7 & 1 & 7 \end{vmatrix}$	0	Both (b) and (c)	○	○	○	○
4.	If A is of order 3×3 such that $\lvert adjA\rvert=64$ then $\lvert A^{-1}\rvert=?$	64	$\frac{1}{64}$	8	$\frac{1}{8}$	○	○	○	○
5.	$\begin{vmatrix} 28 & 29 & 30 \\ 40 & 41 & 42 \\ 17 & 18 & 19 \end{vmatrix} = ?$	458	-605	0	1	○	○	○	○
6.	Let A and B be the square matrices of the same order. Which of the following is true about A and B?	$\det(A+B)=\det A+\det B$		$\det(AB)=-\det(BA)$		○	○		
		$\det(AB)=\det\left((AB)^t\right)$		All of these				○	○
7.	The rank of the matrix $\begin{bmatrix} 1 & 0 & 3 \end{bmatrix}$ is:	0	1	2	3	○	○	○	○
8.	System of homogenous linear equations has non-trivial solution if:	$\lvert A\rvert>0$	$\lvert A\rvert<0$	$\lvert A\rvert=0$	$\lvert A\rvert\neq0$	○	○	○	○
9.	A system $\begin{matrix} -3x+2y=1 \\ 6x-4y=5 \end{matrix}$ has:	No solution	Unique solution	Only two solutions	Infinitely many solutions	○	○	○	○
10.	For a system of non-homogeneous equations with three variables, system will have unique solution if:	Rank $A<3$		Rank $A_b<3$.		○	○		
		Rank $A=$ Rank $A_b=3$		Rank $A=$ Rank $A_b<3$				○	○
11.	The $(0,0,0)$ solution of the system $a_1x+b_1y+c_1z=0$, $a_2x+b_2y+c_2z=0$ and $a_3x+b_3y+c_3z=0$ is called:	Consistent	In-consistent	Non-trivial	Trivial	○	○	○	○
12.	If $\begin{vmatrix} a & b \\ c & d \end{vmatrix}=2$ then $\begin{vmatrix} b & a \\ d & c \end{vmatrix} = ?$	2	±2	-2	0	○	○	○	○
13.	In Crammer rule, dimensions of coefficient matrix is:	$1\times mn$	$1-mn$	$n\times n$	$1+mn$	○	○	○	○

HSSC-I (R&T) FEDERAL BOARD MATHEMATIC TEST – 3 CHAPTER 2 (2.4-2.6) + REVIEW EXERCISE

Name:		**Roll No.**		**Section:**	

Time allowed: 60 Minutes **PAPER SUBJECTIVE** **Marks: 32**

Note: Section 'B' AND 'C' comprise page 1 only and questions there in are to be answered on the separate answer book. Use supplementary answer sheet i.e., sheet B if required. Write your answers neatly and legibly.

SECTION-B (MARKS-16)

Q.2 Attempt any FOUR questions. **(4 × 4 = 16)**

(i)	Without expansion show that: $\begin{vmatrix} x & -z & 0 \\ 0 & y & -x \\ -y & 0 & z \end{vmatrix} = 0$	**04**
(ii)	Find the rank of $\begin{bmatrix} 2 & 5 & 7 \\ 1 & 2 & -1 \\ -3 & -6 & 3 \end{bmatrix}$	**04**
(iii)	Using the properties of determinants prove that: $\begin{vmatrix} na_1+b_1 & na_2+b_2 & na_3+b_3 \\ nb_1+c_1 & nb_2+c_2 & nb_3+c_3 \\ nc_1+a_1 & nc_2+a_2 & nc_3+a_3 \end{vmatrix} = (n^3+1)\begin{vmatrix} a_1 & a_2 & a_3 \\ b_1 & b_2 & b_3 \\ c_1 & c_2 & c_3 \end{vmatrix}$	**04**
(iv)	Reduce the matrix $A = \begin{bmatrix} 1 & 2 & 3 & 4 \\ 2 & 3 & 4 & 5 \\ 4 & 5 & 6 & 7 \end{bmatrix}$ into reduced echelon form	**04**
(v)	Use Cramer's rule to solve the system $\begin{aligned} 3x_1 + x_2 - x_3 &= -4 \\ x_1 + x_2 - 2x_3 &= -4 \\ -x_1 + 2x_2 - x_3 &= 1 \end{aligned}$	**04**

SECTION-C (MARKS 16)

Q.3 Attempt the question. **(1 × 8 = 8)**

	If a,b,c are real numbers and $\begin{vmatrix} b+c & c+a & a+b \\ c+a & a+b & b+c \\ a+b & b+c & c+a \end{vmatrix} = 0$, show that either $a+b+c=0$ or $a=b=c$	**08**

Q.4 Attempt all parts. **(2 × 4 = 8)**

(a)	Solve the system of linear equations $\begin{aligned} x_1 + x_2 + x_3 &= 3 \\ 2x_1 - 3x_2 + 2x_3 &= 7 \\ 4x_1 + 2x_2 - 5x_3 &= 10 \end{aligned}$; by Gauss-Jordan method	**04**
(b)	Show that the system of equations $\begin{aligned} 2x - y + 3z &= \alpha \\ 3x + y - 5z &= \beta \\ -5x - 5y + 21z &= \gamma \end{aligned}$; is inconsistent if $\gamma \neq 2\alpha - 3\beta$	**04**

HSSC-I (R&T) FEDERAL BOARD MATHEMATIC TEST – 4 CHAPTER 3 REVIEW EXERCISE

Name:		**Roll No.**		**Section:**	

Total Time: 1:20 Minutes **PAPER OBJECTIVE** **Total Marks: 45**
Total Time: 20 Minutes **SECTION-A (MARKS 13)**

NOTE: Section-A is compulsory. All parts of this section are to be answered on this page and handed over to the center superintendent. Deleting / overwriting in not allowed. Do not use lead pencil.

Q.1 Fill the relevant bubble for each part. All parts carry one mark. (13 × 1 = 13)

	QUESTIONS	A	B	C	D	A	B	C	D
1.	If $\vec{a}$ and $\vec{b}$ are two non-zero vectors then $\vec{a}\times\vec{b}=\lvert\vec{a}\rvert\lvert\vec{b}\rvert\sin\theta\hat{n}$	$0<\theta<\frac{\pi}{2}$	$0<\theta<2\pi$	$0\le\theta\le\frac{\pi}{2}$	$0\le\theta\le\pi$	○	○	○	○
2.	If $\vec{a}\times\vec{b}=\vec{b}\times\vec{c}=\vec{c}\times\vec{a}$ then $\vec{a}+\vec{b}=$	0	$\vec{c}$	$-\vec{c}$	1	○	○	○	○
3.	Projection of $\vec{u}=\vec{i}+2\vec{j}+5\vec{k}$ along x-axis is:	–1	1	5	8	○	○	○	○
4.	If $\sin\theta=0$ then $\vec{a}$ and $\vec{b}$ are said to be	Perpendicular	Coplanar	Concurrent	Parallel	○	○	○	○
5.	$\vec{u}.(\vec{v}\times\vec{w})+\vec{v}.(\vec{w}\times\vec{u})+\vec{w}.(\vec{u}\times\vec{v})=$	1	0	$3\vec{u}.(\vec{v}\times\vec{w})$	$\vec{u}.(\vec{v}\times\vec{w})$	○	○	○	○
6.	Which of the following is the projection law?	$\frac{a}{\sin\alpha}=\frac{b}{\sin\beta}$		$a=b\cos\gamma+c\cos\beta$		○	○		
		$a^2=b^2+c^2-2bc\cos\alpha$		$\cos(\alpha+\beta)=\cos\alpha\cos\beta-\sin\alpha\sin\beta$				○	○
7.	If α,β,γ are the direction angles of a vector then $\sin^2\alpha+\sin^2\beta+\sin^2\gamma=$	0	1	2	3	○	○	○	○
8.	If $\lvert\vec{a}+\vec{b}\rvert=\lvert\vec{a}-\vec{b}\rvert$ then	$\lvert\vec{a}\rvert=\lvert\vec{b}\rvert$	$\vec{a}\perp\vec{b}$	$\vec{a}\parallel\vec{b}$	$\vec{a}=\vec{b}=0$	○	○	○	○
9.	The angle in _____ is a right angle	Circle	Semi-circle	Triangle	None of these	○	○	○	○
10.	If the sum of two unit vectors is a unit vector, then magnitude of their difference is	$\sqrt{3}$	$\sqrt{2}$	$\frac{1}{\sqrt{3}}$	$\frac{1}{\sqrt{2}}$	○	○	○	○
11.	The value of p for which the vectors $2\vec{i}-3\vec{j}+3\vec{k}$ and $p\vec{i}-2\vec{j}-3\vec{k}$ are perpendicular	$\frac{-3}{2}$	$\frac{1}{2}$	$\frac{3}{2}$	$\frac{1}{2}$	○	○	○	○
12.	If $\vec{a},\vec{b}$ and $\vec{c}$ are mutually perpendicular unit vectors, the value of $\lvert\vec{a}+\vec{b}+\vec{c}\rvert$ is:	1	$\sqrt{2}$	$\sqrt{3}$	2	○	○	○	○
13.	Which of the following triples can be the direction angles of a single vector	$45°,45°,60°$		$30°,45°,60°$		○	○		
		$45°,60°,60°$		$45°,45°,45°$				○	○

HSSC-I (R&T) FEDERAL BOARD MATHEMATIC TEST – 4 CHAPTER 3 REVIEW EXERCISE

Name:		**Roll No.**		**Section:**	

Time allowed: 60 Minutes **PAPER SUBJECTIVE** **Marks: 32**

Note: Section 'B' AND 'C' comprise page 1 only and questions there in are to be answered on the separate answer book. Use supplementary answer sheet i.e., sheet B if required. Write your answers neatly and legibly.

SECTION-B (MARKS-16)

Q.2 Attempt any FOUR questions. **(4 × 4 = 16)**

(i)	Find the position vector of point Q dividing the line segment $\overline{AB}$ in the ratio 3:2 externally, where position vectors of the points A and B are $\hat{i}-2\hat{j}+\hat{k}$ and $2\hat{i}+3\hat{j}-\hat{k}$ respectively.	**04**
(ii)	Prove the Langrange identity: $\left\|\vec{a}\times\vec{b}\right\|^2=\left\|\vec{a}\right\|^2\left\|\vec{b}\right\|^2-\left(\vec{a}.\vec{b}\right)^2$	**04**
(iii)	Find the volume of tetrahedron if $A(2,1,0),B(-1,2,6),C(2,0,3),D(1,-1,0)$	**04**
(iv)	Find the constant α such that the vectors $\hat{i}-2\alpha\hat{j}+\hat{k}$, $\hat{i}-\hat{j}+2\hat{k}$ and $\alpha\hat{i}-\hat{j}+\hat{k}$ are coplanar.	**04**
(v)	Prove that: $\cos(\alpha-\beta)=\cos\alpha\cos\beta+\sin\alpha\sin\beta$	**04**

SECTION-C (MARKS 16)

Q.3 Attempt the question. **(1 × 8 = 8)**

	Three vertices of triangle are $A(0,-1,-2),B(3,1,4)$ and $C(5,7,1)$. Show that ABC is a right angled triangle and find the other two angles.	**08**

Q.4 Attempt all parts. **(2 × 4 = 8)**

(a)	If the vectors $\vec{a}=\alpha\hat{i}+\hat{j}+\hat{k},\vec{b}=\hat{i}+\beta\hat{j}+\hat{k}$ and $\vec{c}=\hat{i}+\hat{j}+\gamma\hat{k}$ are coplanar then prove that $\frac{1}{1-\alpha}+\frac{1}{1-\beta}+\frac{1}{1-\gamma}=1$	**04**
(b)	For any vector $\vec{a}$; prove that $\left\|\vec{a}\times\hat{i}\right\|^2+\left\|\vec{a}\times\hat{j}\right\|^2+\left\|\vec{a}\times k\right\|^2=2\left\|\vec{a}\right\|^2$	**04**

HSSC-I (R&T) FEDERAL BOARD MATHEMATICS TEST – 5 CHAPTER 4 (4.1-4.5)

Name:		Roll No.		Section:	

Total Time: 1:20 Minutes **PAPER OBJECTIVE** **Total Marks: 45**
Total Time: 20 Minutes **SECTION-A (MARKS 13)**

NOTE: Section-A is compulsory. All parts of this section are to be answered on this page and handed over to the center superintendent. Deleting / overwriting in not allowed. Do not use lead pencil.

Q.1 Fill the relevant bubble for each part. All parts carry one mark. (13 × 1 = 13)

	QUESTIONS	A	B	C	D	A	B	C	D
1.	A sequence is a function whose domain is a subset of	N	R	Z	C	○	○	○	○
2.	The common ratio of a geometric sequence cannot be:	3	1	2	0	○	○	○	○
3.	The sequence $0,1,1,2,3,5,8,...,$ is a	Triangle sequence	Factorial sequence	Pascal sequence	Fibonacci sequence	○	○	○	○
4.	If $3^a,3^b,3^c$ are in G.P then a,b,c are in	A.P	G.P	H.P	None of these	○	○	○	○
5.	If $\frac{1}{a},b,\frac{1}{c}$ are in A.P then $d=?$	$\frac{2ac}{a-c}$	$\frac{a-c}{2ac}$	$\frac{a+c}{2ac}$	$\frac{2a}{a+c}$	○	○	○	○
6.	Two geometric means between 81 and 3.	36, 27	14, 28	27, 9	27, 13	○	○	○	○
7.	Which term of the sequence $-6,-2,2,...$ is 70?	19^{th}	20^{th}	21^{st}	None of these	○	○	○	○
8.	If $a_1=17,a_n=101$ and $S_n=472$ then $n=?$	7	8	9	12	○	○	○	○
9.	If a and b are negative real numbers then	$A>G$	$A<G$	$G\geq A>H$	$A=G$	○	○	○	○
10.	If $\lim_{n\to\infty} S_n$ exists then series will be	Convergent	Divergent	Oscillatory	None of these	○	○	○	○
11.	The sum of infinite geometric series exists only if	$-1\leq r\leq 1$	$0\leq r\leq 1$	$-1<r<1$	$r\leq -1, r\geq 1$	○	○	○	○
12.	If $a_1=16,r=\frac{1}{2}$ then $a_6=?$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{16}$	○	○	○	○
13.	The 9^{th} term of an A.P is 0. Which term is double it's 19^{th} term	20		29		○	○		
		18		38				○	○

HSSC-I (R&T) FEDERAL BOARD MATHEMATICS TEST – 5 CHAPTER 4 (4.1-4.5)

Name:		Roll No.		Section:	

Time allowed: 60 Minutes **PAPER SUBJECTIVE** **Marks: 32**

Note: Section 'B' AND 'C' comprise page 1 only and questions there in are to be answered on the separate answer book. Use supplementary answer sheet i.e., sheet B if required. Write your answers neatly and legibly.

SECTION-B (MARKS-16)

Q.2 Attempt any FOUR questions. **(4 × 4 = 16)**

(i)	Find 3 A.M's between 2 and –18.	**04**
(ii)	Find the sum of geometric series if $a_1 = 343, a_4 = -1, r = -\frac{1}{7}$	**04**
(iii)	Find the sum of all multiples of 4 that are between 14 and 523	**04**
(iv)	The Arithmetic mean between two numbers is 5, and there positive geometric mean is 4. Find the numbers.	**04**
(v)	Find vulgar fraction for $0.151515...$	**04**

SECTION-C (MARKS 16)

Q.3 Attempt the question. **(1 × 8 = 8)**

	Show that the sum of *n* A.Ms between *a* and *b* is equal to *n* times A.M between *a* and *b*.	**08**

Q.4 Attempt all parts. **(2 × 4 = 8)**

(a)	Find four numbers in A.P. whose sum is 6 and sum of whose square is 14.	**04**
(b)	A super ball dropped from the top of the tower (556 ft high) always rebounds three-fourth of the distance fallen. How far (up and down) will the ball have travelled when it hits the ground for the 6^{th} time?	**04**

HSSC-I (R&T) FEDERAL BOARD MATHEMATICS TEST – 6 CHAPTER 4 (4.6-4.9) + REVIEW EXERCISE

Name:		**Roll No.**		**Section:**	

Total Time: 1:20 Minutes **PAPER OBJECTIVE** **Total Marks: 45**

Total Time: 20 Minutes **SECTION-A (MARKS 13)**

NOTE: Section-A is compulsory. All parts of this section are to be answered on this page and handed over to the center superintendent. Deleting / overwriting in not allowed. Do not use lead pencil.

Q.1 Fill the relevant bubble for each part. All parts carry one mark. **(13 × 1 = 13)**

	QUESTIONS	A	B	C	D	A	B	C	D
1.	No term of Harmonic sequence can be:	1	–1	0	2	○	○	○	○
2.	14^{th} term of H.P. $\frac{1}{4},\frac{1}{7},\frac{1}{10},\frac{1}{13},...$ is:	$\frac{1}{40}$	$\frac{1}{43}$	$\frac{1}{46}$	$\frac{1}{41}$	○	○	○	○
3.	Sigma notation for the sum $-2+4-6+8$ is:	$\sum_{k=1}^{3}(-1)^k(k+1)$		$\sum_{k=1}^{5}(-1)^k 2k$		○	○		
		$\sum_{k=1}^{4}(-1)^k 2k$		$\sum_{k=2}^{5}(-1)^k 2k$				○	○
4.	The sum to infinity of the series $5+\frac{7}{3}+1+\frac{11}{27}+...$ is:	9	–9	7	6	○	○	○	○
5.	*n*th term of arithmetic-geometric series is:	$\left[a+(n-1)d\right]r^n$		$\left[a+(n-1)d\right]r^{n-1}.$		○	○		
		$\left[2a+(n-1)d\right]r^n$		$\left[a+(n-1)d\right]br^n$				○	○
6.	In $\frac{1}{4.7}+\frac{1}{7.10}+\frac{1}{10.13}+...$, the *n*th term is:	$\frac{1}{(3n-1)(3n+1)}$		$\frac{1}{(3n-2)(3n+4)}$		○	○		
		$\frac{1}{(3n+1)(3n+4)}$		$\frac{1}{(n+2)(n+6)}$				○	○
7.	$\sum_{k=1}^{n}5$ is equal to:	n	$5n$	5	5^n	○	○	○	○
8.	A,G,H are in:	A.P	H.P	G.P	None of these	○	○	○	○
9.	The harmonic mean between two numbers *a* and *b*:	$\frac{a+b}{2ab}$	$\frac{a-b}{2ab}$	$\frac{2ab}{a-b}$	$\frac{2ab}{a+b}$	○	○	○	○
10.	$\sum_{k=1}^{n}\left(k^m-(k-1)^m\right)=?$	mn	n^m	m^n	m^2	○	○	○	○
11.	Sum the series $1+3+5+7+9+11+...$ is:	n	n^2	$n(n+1)$	$n-1$	○	○	○	○
12.	If *a* and *b* are two negative real numbers then:	$A>G>H$		$A>H>G$		○	○		
		$A<G<H$		$G>H>A$				○	○
13.	Sum of infinite arithmetic-geometric series is:	$S_\infty=\frac{a_1}{1-r}$		$S_\infty=\frac{a_1}{1-r}+\frac{1}{(1-r)^2}$		○	○		
		$S_\infty=\frac{a_1}{1-r}+\frac{dr}{(1-r)^2}$		None of these				○	○

HSSC-I (R&T) FEDERAL BOARD MATHEMATICS TEST – 6 CHAPTER 4 (4.6-4.9) + REVIEW EXERCISE

Name:		**Roll No.**		**Section:**	

Time allowed: 60 Minutes **PAPER SUBJECTIVE** **Marks: 32**

Note: Section 'B' AND 'C' comprise page 1 only and questions there in are to be answered on the separate answer book. Use supplementary answer sheet i.e., sheet B if required. Write your answers neatly and legibly.

SECTION-B (MARKS-16)

Q.2 Attempt any FOUR questions. **(4 × 4 = 16)**

(i)	The sum of four numbers in A.P is 24 and their product is 945. Find the number.	**04**
(ii)	Find the sum of *n* terms of the series whose nth term is $2^{n-1}+8n^3-6n^2$	**04**
(iii)	Find arithmetic, geometric and harmonic means of 24 and 16. Also show that $AH=G^2$	**04**
(iv)	Using the method of differences find the sum $3+4+6+10+18+34+66+...$ to *n* terms.	**04**
(v)	Find the sum of the series $\sum_{k=2}^{n}\frac{1}{k^2-k}$	**04**

SECTION-C (MARKS 16)

Q.3 Attempt the question. **(1 × 8 = 8)**

	Prove that $\sum_{k=1}^{n}k^3=\left(\frac{n(n+1)}{2}\right)^2$	**08**

Q.4 Attempt all parts. **(2 × 4 = 8)**

(a)	A new virus is on a remote area. On day one, there were 10 people infected, with the number of new infections increasing at a rate of 40% per day. Find the expected number of infected people on the 7 the day	**04**
(b)	Find *n* so that $\frac{a^{n+1}+b^{n+1}}{a^n+b^n}$ may be harmonic mean between *a* and *b*.	**04**

HSSC-I (R&T) FEDERAL BOARD MATHEMATICS TEST – 7 CHAPTER 5 + REVIEW EXERCISE

Name:		**Roll No.**		**Section:**	

Total Time: 1:20 Minutes **PAPER OBJECTIVE** **Total Marks: 45**
Total Time: 20 Minutes **SECTION-A (MARKS 13)**

NOTE: Section-A is compulsory. All parts of this section are to be answered on this page and handed over to the center superintendent. Deleting / overwriting in not allowed. Do not use lead pencil.

Q.1 Fill the relevant bubble for each part. All parts carry one mark. **(13 × 1 = 13)**

	QUESTIONS	A	B	C	D	A	B	C	D
1.	Which of the following expression is a polynomial?	$\sqrt[3]{x^4}$		$\sqrt{2}x^4-\pi x^2-\sqrt{10}$		○	○		
		$x^2+\frac{1}{x^2}$		All of these				○	○
2.	Which one of the following is not rational expression?	$\frac{2x-1}{x^2+3}$	$\frac{x}{\sqrt{y}}$	$\frac{x^3+x}{x^2+x}$	$\frac{3}{4x^2}$	○	○	○	○
3.	What is the degree of polynomial $2y^3-3(y^3+2)y+2$?	1	2	3	4	○	○	○	○
4.	Factors of $2x^2-3x-2$ are:	$(2x+1)(x+2)$		$(2x+1)(x-1)$		○	○		
		$(x-2)(2x+1)$		$(x-2)(x-1)$				○	○
5.	What is the numerical value of *k*, if the polynomial x^3+2x^2+kx+4 has a remainder 14, when divided by $x-2$?	–3	–4	2	3	○	○	○	○
6.	$\frac{x^2-x-9}{x-3}=x+2+\frac{?}{x-3}$	–27	3	–3	$\frac{3}{x-3}+x+2$	○	○	○	○
7.	If zeros of a polynomial are $0,6,-1$, then the polynomial is:	x^3-5x^2-6x		x^3+5x^2+6x		○	○		
		x^3-x^2+2		x^3+6x^2-5x				○	○
8.	If polynomial x^3+4x^2-2x+5 is divided by $x-1$, then remainder is:	–4	8	12	16	○	○	○	○
9.	Which of the following is factor of the polynomial $2y^3+y^2-8y-4$?	$y-2$	$2y+1$	$y-1$	Both (A) and (B)	○	○	○	○
10.	When the polynomial $3x^3-10x^2+13x-6$ is divided by $x-2$, then the quotient is:	4	$5x-6$	x^2+4x+4	$3x^2-4x+5$	○	○	○	○
11.	If $f(x)=x^4-5x^3+6x^2-4x+8$ and $f(2)=0$ which of the following is true?	$x-2$ is a factor of $f(x)$		$x+2$ is a factor of $f(x)$		○	○		
		$2x-1$ is a factor of $f(x)$		$2x+1$ is a factor of $f(x)$				○	○
12.	If 2 is a zero of the polynomial x^3+5x^2-4x+k, then the value of *k* will be:	0	–4	20	–20	○	○	○	○
13.	For what value of *k*, $x+3$ is a factor of $(x+2)^5+(3x+k)$?	–3		5		○	○		
		10		–3134				○	○

HSSC-I (R&T) FEDERAL BOARD MATHEMATICS TEST – 7 CHAPTER 5 + REVIEW EXERCISE

Name:		**Roll No.**		**Section:**	

Time allowed: 60 Minutes **PAPER SUBJECTIVE** **Marks: 32**

Note: Section 'B' AND 'C' comprise page 1 only and questions there in are to be answered on the separate answer book. Use supplementary answer sheet i.e., sheet B if required. Write your answers neatly and legibly.

SECTION-B (MARKS-16)

Q.2 Attempt any FOUR questions. **(4 × 4 = 16)**

(i)	Suppose that the quotient upon dividing one polynomial by $x+4$ is $3x^2-x+32$ and remainder is 121. What is the dividend?	**04**
(ii)	If zeros of a polynomial are $4,\frac{3}{5},-2,$ find the polynomial.	**04**
(iii)	If $4y^3-4y^2+10+2y$ is completely divisible by any of its factor such that the quotient is $4y^2-8y+10$, then find the other factor.	**04**
(iv)	Find the values of *a* and *b*, if -2 and 2 are the roots of the polynomial x^3-4x^2+ax+b.	**04**
(v)	A rectangular solid has a volume of 14 cubic units. The width is twice the height and the length is 2 units more than the width. Find the dimensions of the solid.	**04**

SECTION-C (MARKS 16)

Q.3 Attempt the question. **(1 × 8 = 8)**

	State and prove remainder theorem. Also find the reminder if x^3-5x^2+7x-6 is divided by $x-3$	**08**

Q.4 Attempt all parts. **(2 × 4 = 8)**

(a)	Factorize the polynomial $f(x)=2x^3+5x^2-9x-18$ by using factor theorem.	**04**
(b)	A rectangular room has a volume of $x^3+11x^2+34x+24$ cubic feet. The height of the room is $x+1$ feet. Find the area of its floor.	**04**

HSSC-I (R&T) FEDERAL BOARD MATHEMATICS TEST – 8 CHAPTER 6 REVIEW EXERCISE

Name:		**Roll No.**		**Section:**	

Total Time: 1:20 Minutes **PAPER OBJECTIVE** **Total Marks: 45**
Total Time: 20 Minutes **SECTION-A (MARKS 13)**

NOTE: Section-A is compulsory. All parts of this section are to be answered on this page and handed over to the center superintendent. Deleting / overwriting in not allowed. Do not use lead pencil.

Q.1 Fill the relevant bubble for each part. All parts carry one mark. (13 × 1 = 13)

	QUESTIONS	A	B	C	D	A	B	C	D
1.	If n is a negative integer than $n!$ is:	1	n	Zero	Not defined	○	○	○	○
2.	$\frac{(n+2)!(n-2)!}{(n+1)!(n-1)!} =$:	$n-3$	$n-1$	$\frac{n+1}{n+2}$	$\frac{n+2}{n-1}$	○	○	○	○
3.	If ${}^{15}C_{3r} = {}^{15}C_{r+3}$ then value of r is:	3	4	5	15	○	○	○	○
4.	How many diagonals can be drawn in a plane figure of 8 sides?	20	21	35	81	○	○	○	○
5.	How many 6-digit numbers can be formed from the digits 0,1,2,3,4,5 when repetition is not allowed?	120	300	600	720	○	○	○	○
6.	How many different words can be formed by using all letters of the word "COLLEGE" So that every word starts with G?	1260	5040	180	720	○	○	○	○
7.	How many integers greater than 1000, can be formed from the digits 0,2,3 and 6, if no digit is repeated?	9	18	24	36	○	○	○	○
8.	In an examination, a candidate has to pass in each 5 subjects. In how many ways he cannot qualify the examination?	1	5	31	32	○	○	○	○
9.	${}^{n}P_{r}$ equals:	${}^{n}C_{r}$	$r! \times {}^{n}C_{r}$	$\frac{1}{r!} \times {}^{n}C_{r}$	$r \times {}^{n}C_{r}$	○	○	○	○
10.	Decrypt the word "TNLUMA" by using the permutation $(4\,6\,3\,2\,1\,5)$:	MULTAN	MLTUAN	NATLUM	ULTMAN	○	○	○	○
11.	A student has to answer 10 out of 12 questions in an examination such that he must choose at least 4 from first five questions. The number of choices is:	30	35	66	56	○	○	○	○
12.	The number of all possible matrices of order 3×3 with each entry 0 and 1 is:	18	27	512	81	○	○	○	○
13.	In how many different ways can garland of 7 flowers be made?	5040		720		○	○		
		360		2520				○	○

HSSC-I (R&T) FEDERAL BOARD MATHEMATICS TEST – 8 CHAPTER 6 REVIEW EXERCISE

Name:		Roll No.		Section:	

Time allowed: 60 Minutes **PAPER SUBJECTIVE** **Marks: 32**

Note: Section 'B' AND 'C' comprise page 1 only and questions there in are to be answered on the separate answer book. Use supplementary answer sheet i.e., sheet B if required. Write your answers neatly and legibly.

SECTION-B (MARKS-16)

Q.2 Attempt any FOUR questions. **(4 × 4 = 16)**

(i)	Find n, if $\frac{(2n)!}{4!(2n-3)!}.\frac{4!(n-4)!}{n!}=52$	**04**
(ii)	A committee of 5 members is to be formed out of 6 men and 4 women. In how many ways can it be done if it has (i) exactly 2 women (ii) at least 2 women (iii) at most 2 women?	**04**
(iii)	How many odd numbers less than 10,000 can be formed using the digits 0,2,3,5,6 without repeating the digits.	**04**
(iv)	Prove for $n \in N$, ${}^{n}P_{r} = {}^{n-1}P_{r} + r.{}^{n-1}P_{r-1}$	**04**
(v)	Find the number of permutations of the word 'Excellence'. How many of these permutations (i) begin with E and end with C (ii) contain two L's together (ii) do not contain two L's together.	**04**

SECTION-C (MARKS 16)

Q.3 Attempt the question. **(1 × 8 = 8)**

	Find the value of n and r, if ${}^{n+1}C_{r+1} : {}^{n}C_{r} : {}^{n-1}C_{r-1} = 22:12:6$	**08**

Q.4 Attempt all parts. **(2 × 4 = 8)**

(a)	How many numbers can be formed with the digits 1,1,2,2,3,3,4 so that the even digits always occupy the even places, using all the digits and no digit is repeated?	**04**
(b)	Twelve persons are seated at a round table. Find the number of ways of their arrangements, if two particular persons don't want to sit together.	**04**

HSSC-I (R&T) FEDERAL BOARD MATHEMATICS TEST – 9 CHAPTER 7 (7.1-7.2)

Name:		Roll No.		Section:	

Total Time: 1:20 Minutes **PAPER OBJECTIVE** **Total Marks: 45**
Total Time: 20 Minutes **SECTION-A (MARKS 13)**

NOTE: Section-A is compulsory. All parts of this section are to be answered on this page and handed over to the center superintendent. Deleting / overwriting in not allowed. Do not use lead pencil.

Q.1 Fill the relevant bubble for each part. All parts carry one mark. (13 × 1 = 13)

	QUESTIONS	A	B	C	D	A	B	C	D
1.	Mathematical induction is used to verify results for all *n*, where *n* is a/an	Real number	Rational number	Integer	None of these	○	○	○	○
2.	$1+2+4+...+2^n=$	2^{n-1}	2^n-1	$2^{n+1}-1$	2^n+1	○	○	○	○
3.	$8\times10^n-2$ is divisible by	4	5	6	7	○	○	○	○
4.	If number of terms in expansion of $(3+4x)^n$ is 11 then $n=$	7	8	9	10	○	○	○	○
5.	If 3rd term in expansion of $(1+x)^p$ is $\frac{-1}{8}x^2$ then $p=?$	2	$\frac{1}{2}$	4	3	○	○	○	○
6.	The coefficients of x^p and x^q $(p,q\in N)$ in the expansion of $(1+x)^{p+q}$ are	Reciprocal of each other with opposite sign		Equal		○	○		
		Equal with opposite signs		None of these				○	○
7.	If 7 coins are tossed, how many times '4' heads appear?	15	10	21	35	○	○	○	○
8.	Which term is independent of '*x*' in expansion $\left(x^1+\frac{3}{x^1}\right)^{10}$	6026	60259	61236	8064	○	○	○	○
9.	Sum of even binomial coefficients in expansion of $(2+5x)^{10}$ is	2^9	2^{10}	7^{10}	0	○	○	○	○
10.	Coefficients of terms in expansion of $(1+x)^4$ are	1,4,6,6,1	1,4,3,6,1	1,4,6,4,1	1,4,6,6,1	○	○	○	○
11.	Number of terms in the expansion of $(a+x)^4-(a-x)^4$ is	2	3	5	6	○	○	○	○
12.	If ${}^{22}C_r$ is the largest coefficient in the expansion of $(1+x)^{22}$ then ${}^{13}C_r=?$	216	78	256	108	○	○	○	○
13.	Sum of coefficients in expansion of $(3-4x)^7$	2^7	–1	1	0	○	○	○	○

HSSC-I (R&T) FEDERAL BOARD MATHEMATICS TEST – 9 CHAPTER 7 (7.1-7.2)

Name:		Roll No.		Section:	

Time allowed: 60 Minutes **PAPER SUBJECTIVE** **Marks: 32**

Note: Section 'B' AND 'C' comprise page 1 only and questions there in are to be answered on the separate answer book. Use supplementary answer sheet i.e., sheet B if required. Write your answers neatly and legibly.

SECTION-B (MARKS-16)

Q.2 Attempt any FOUR questions. **(4 × 4 = 16)**

(i)	Expand $(1+2x)^6$ with the help of pascal's triangle.	**04**
(ii)	Prove by mathematical induction '$7^n - 2^n$' is divisible by 5.	**04**
(iii)	If coefficients of 2nd , 3rd and 4th terms in the expansion of $(1+x)^{2m}$ are in A.P, then show that $2m^2 - 9m + 7 = 0$	**04**
(iv)	Find middle term in expansion of $\left(a - \frac{3}{x^2}\right)^{12}$.	**04**
(v)	Find the term independent of x in expansion of $(1+x^2)^3 . \left(1+\frac{1}{x^2}\right)^4$	**04**

SECTION-C (MARKS 16)

Q.3 Attempt the question. **(1 × 8 = 8)**

	If coefficients of three consecutive terms in the expansion of $(1+x)^n$ are in ratio $6:33:110$, then find value of 'n' and the position of terms.	**08**

Q.4 Attempt all parts. **(2 × 4 = 8)**

(a)	Prove that ${}^nC_0 + \frac{1}{2}{}^nC_1 + \frac{1}{2^2}{}^nC_2 + ... + \frac{1}{2^n}{}^nC_n = \left(\frac{3}{2}\right)^n$	**04**
(b)	Calculate by means of binomial theorem $(2.02)^4$.	**04**

HSSC-I (R&T) FEDERAL BOARD MATHEMATICS TEST – 10 CHAPTER 7 (7.3-7.4) REVIEW EXERCISE

Name:		**Roll No.**		**Section:**	

Total Time: 1:20 Minutes **PAPER OBJECTIVE** **Total Marks: 45**
Total Time: 20 Minutes **SECTION-A (MARKS 13)**

NOTE: Section-A is compulsory. All parts of this section are to be answered on this page and handed over to the center superintendent. Deleting / overwriting in not allowed. Do not use lead pencil.

Q.1 Fill the relevant bubble for each part. All parts carry one mark. (13 × 1 = 13)

	QUESTIONS	A	B	C	D	A	B	C	D
1.	Number of terms in the expansion of $(1-x)^{\frac{1}{2}}$	3	5	7	Infinite	○	○	○	○
2.	Binomial series $(3-4x)^{-1}$ is valid if	$\lvert x\rvert > \frac{3}{4}$	$\lvert x\rvert < \frac{3}{4}$	$\lvert x\rvert > \frac{4}{3}$	$\lvert x\rvert < \frac{4}{3}$	○	○	○	○
3.	The coefficient of x^n in expansion of $\left[(1-x)^{-1}\right]^n$ "where 'n' is even integer" is	1	–1	n	$1-n$	○	○	○	○
4.	If fractional part of the number $\frac{2^{403}}{15}$ is $\frac{k}{15}$ then $k=?$	6	7	8	11	○	○	○	○
5.	Unit digit of 23^{107} is	1	3	7	9	○	○	○	○
6.	In the expansion of $(1-2x)^{\frac{1}{3}}$, sum of coefficients of first three terms is	$\frac{1}{9}$	$-\frac{1}{9}$	$\frac{2}{3}$	$-\frac{4}{9}$	○	○	○	○
7.	When $(1+x)^{\frac{-1}{2}}$ is expanded upto '4' terms, sum of coefficients of x and x^2 is	$\frac{-1}{2}$	$\frac{-1}{4}$	$\frac{-1}{8}$	$\frac{1}{8}$	○	○	○	○
8.	The coefficient of x^{20} in expansion of $(1-x)^{-3}$ is	20	200	231	–10	○	○	○	○
9.	$9^{n+1}-8n-9$ is divisible by _____; $\forall n \in N$	8	9	42	64	○	○	○	○
10.	If $a=99^{50}+100^{50}$, $b=101^{50}$ then which of the following is true?	$a<b$	$a>b$	$a=b$	$a\geq b$	○	○	○	○
11.	$(99)^{\frac{1}{2}}=$	9.95	9.92	9.93	9.96	○	○	○	○
12.	The coefficient of x^n in the expansion of $(1-x+x^2-x^3+...)^2$ is	$n+1$		$(-1)^n(n+1)$		○	○		
		$\frac{(-1)^n(n+1)(n+2)}{2}$		None of these				○	○
13.	$1+\frac{1}{4}+\frac{1.3}{4.8}+\frac{1.3.5}{4.8.12}+...=$	$2\sqrt{2}$	$\sqrt{3}$	$\sqrt{2}$	$\sqrt{5}$	○	○	○	○

HSSC-I (R&T) FEDERAL BOARD MATHEMATICS TEST – 10 CHAPTER 7 (7.3-7.4) REVIEW EXERCISE

Name:		**Roll No.**		**Section:**	

Time allowed: 60 Minutes **PAPER SUBJECTIVE** **Marks: 32**

Note: Section 'B' AND 'C' comprise page 1 only and questions there in are to be answered on the separate answer book. Use supplementary answer sheet i.e., sheet B if required. Write your answers neatly and legibly.

SECTION-B (MARKS-16)

Q.2 Attempt any FOUR questions. **(4 × 4 = 16)**

(i)	Using binomial theorem then find the approximate value upto four terms $(65)^{\frac{1}{3}}$	**04**
(ii)	If x is so small that its square and higher powers can be neglected then prove that: $\frac{\sqrt{2+x}.(1-x)^{\frac{3}{2}}}{(3+x)} \approx \frac{\sqrt{2}}{3}\left(1-\frac{19}{12}x\right)$.	**04**
(iii)	Find the last two digits of $(13)^{10}$.	**04**
(iv)	Show that $12^{15}+8^{15}$ is divisible by 10.	**04**
(v)	Find coefficient of x^n in the expansion of $\frac{(1+x)^2}{(1-x)^2}$	**04**

SECTION-C (MARKS 16)

Q.3 Attempt the question. **(1 × 8 = 8)**

	If $y=\frac{3}{2^2.1!}+\frac{3}{2^4.2!}-\frac{3}{2^6.3!}+...,$ then show that $8y^2+16y-19=0$	**08**

Q.4 Attempt all parts. **(2 × 4 = 8)**

(a)	Show that $6^{n+3}-8n-6$ is divisible by '6'.	**04**
(b)	If x is very nearly equal to 1 then show that $\frac{ax^b-bx^a}{x^b-x^a} \approx \frac{1}{1-x}$.	**04**

HSSC-I (R&T) FEDERAL BOARD MATHEMATICS TEST – 11 CHAPTER 8 + REVIEW EXERCISE

Name:		**Roll No.**		**Section:**	

Total Time: 1:20 Minutes **PAPER OBJECTIVE** **Total Marks: 45**
Total Time: 20 Minutes **SECTION-A (MARKS 13)**

NOTE: Section-A is compulsory. All parts of this section are to be answered on this page and handed over to the center superintendent. Deleting / overwriting in not allowed. Do not use lead pencil.

Q.1 Fill the relevant bubble for each part. All parts carry one mark. (13 × 1 = 13)

	QUESTIONS	A	B	C	D	A	B	C	D
1.	If θ lies in 3rd quadrant, then $\frac{\theta}{2}$ lies in _____ quadrant.	I	II	III	IV	○	○	○	○
2.	$\frac{1+\cos x}{\sin x} = ?$	$\tan\left(\frac{x}{2}\right)$	$-\tan\left(\frac{x}{2}\right)$	$\cot\left(\frac{x}{2}\right)$	$-\cot\left(\frac{x}{2}\right)$	○	○	○	○
3.	Which of the following is the fundamental law of trigonometry?	$\sin(\alpha-\beta)=\sin\alpha\cos\beta-\cos\alpha\cos\beta$				○			
		$\sin(\alpha+\beta)=\sin\alpha\cos\beta+\cos\alpha\sin\beta$					○		
		$\cos(\alpha-\beta)=\cos\alpha\cos\beta+\sin\alpha\sin\beta$						○	
		$\cos(\alpha+\beta)=\cos\alpha\cos\beta-\sin\alpha\sin\beta$							○
4.	If α,β,γ are the angles of a triangle ABC, than $\tan(\alpha+\gamma)=?$	$\tan\beta$	$-\tan\alpha$	$\tan\gamma$	$-\tan\beta$	○	○	○	○
5.	$\sin 45°+\sin 15°=$	$\sin 75°$	$-2\sin 15°$	$\sqrt{3}\sin 15°$	$-\frac{\sqrt{3}}{2}\sin 30°$	○	○	○	○
6.	$\cos\frac{\alpha}{2}=$	$\pm\sqrt{\frac{1-\cos\alpha}{2}}$	$\pm\sqrt{\frac{1+\cos\alpha}{2}}$	$\pm\sqrt{\frac{1-\cos 2\alpha}{2}}$	$\pm\sqrt{\frac{1+\cos 2\alpha}{2}}$	○	○	○	○
7.	Distance between $(5,4)$ and $(3,2)$ is:	4	2	$2\sqrt{2}$	$\sqrt{2}$	○	○	○	○
8.	If $\cos\theta=-\frac{3}{5}$ where $\frac{\pi}{2}<\theta<\pi$ then $\sin\frac{\theta}{2}=$	$\frac{1}{\sqrt{5}}$	$\frac{5}{2}$	$-\frac{2}{\sqrt{5}}$	$\frac{2}{\sqrt{5}}$	○	○	○	○
9.	The value of $\cos 47°\sec 133°+\sin 44°\operatorname{cosec}136°$ is:	$\frac{1}{2}$	1	0	–1	○	○	○	○
10.	$\cos\left(\frac{\pi}{2}-2\alpha\right)=$	$\cos^2\alpha-\sin^2\alpha$		$\cos^2\frac{\alpha}{2}+\sin^2\frac{\alpha}{2}$		○	○		
		$-2\sin\frac{\alpha}{2}\cos\frac{\alpha}{2}$		$2\sin\alpha\cos\alpha$				○	○
11.	$\tan^2\left(\frac{\pi}{8}\right)=$	$3-2\sqrt{2}$	$3-\sqrt{2}$	$\sqrt{2}+3$	$3+2\sqrt{2}$	○	○	○	○
12.	$\tan 3\alpha=$	$\frac{\tan\alpha+3\tan^3\alpha}{1-3\tan^2\alpha}$		$\frac{3\tan\alpha-\tan^2\alpha}{1-\tan^2\alpha}$		○	○		
		$\frac{3\tan\alpha-\tan^3\alpha}{1+3\tan\alpha}$		$\frac{3\tan\alpha-\tan^3\alpha}{1-3\tan^2\alpha}$				○	○
13.	$2\sin\left(\frac{p-q}{2}\right)\cos\left(\frac{p+q}{2}\right)=$	$\sin p-\sin q$		$\sin p+\sin q$		○	○		
		$\cos p+\cos q$		$\cos p-\cos q$				○	○

HSSC-I (R&T) FEDERAL BOARD MATHEMATICS TEST – 11 CHAPTER 8 + REVIEW EXERCISE

Name:		Roll No.		Section:	

Time allowed: 60 Minutes **PAPER SUBJECTIVE** **Marks: 32**

Note: Section 'B' AND 'C' comprise page 1 only and questions there in are to be answered on the separate answer book. Use supplementary answer sheet i.e., sheet B if required. Write your answers neatly and legibly.

SECTION-B (MARKS-16)

Q.2 Attempt any FOUR questions. **(4 × 4 = 16)**

(i)	Express $\sin\theta - \cos\theta$ in the form of $r\sin(\theta - \phi)$.	**04**
(ii)	Given that $\sin\phi = \frac{5}{13}$ and $\sin\theta = \frac{3}{5}$ where ϕ is acute and θ is obtuse angle. Find the value of $\cos(\theta - \phi)$.	**04**
(iii)	Prove that $\tan\alpha = \frac{2 - \tan\theta}{1 - 2\tan\theta}$ if $\sin(\alpha + \theta) = 2\cos(\alpha - \theta)$.	**04**
(iv)	Express $4\sin^4 x$ in terms of an expression containing only cosines to the power 1.	**04**
(v)	Prove that: $\frac{\tan^2\left(\frac{3\pi}{2} - x\right)\sin^2(\pi + x)\sin(2\pi - x)}{\cos^2(\pi - x)\cot\left(\frac{3\pi}{2} + x\right)} = \cos x$	**04**

SECTION-C (MARKS 16)

Q.3 Attempt all parts. **(2 × 4 = 8)**

(a)	Prove that: $\cos 80° \cos 60° \cos 40° \cos 20° = \frac{1}{16}$	**04**
(b)	Verify the identity: $\frac{\cos^3 x - \sin^3 x}{\cos x - \sin x} = \frac{2 + \sin 2x}{2}$	**04**

Q.4 Attempt all parts. **(2 × 4 = 8)**

(a)	If $\alpha + \beta + \gamma = 180°$, prove that: $\tan\alpha + \tan\beta + \tan\gamma = \tan\alpha \tan\beta \tan\gamma$	**04**
(b)	Prove the identity: $\frac{\cot 3\theta + \cot\theta}{\cot 3\theta - \cot\theta} = -\cos 2\theta \cot\theta$	**04**

HSSC-I (R&T) FEDERAL BOARD MATHEMATICS TEST – 12 CHAPTER 9 REVIEW EXERCISE

Name:		**Roll No.**		**Section:**	

Total Time: 1:20 Minutes **PAPER OBJECTIVE** **Total Marks: 45**
Total Time: 20 Minutes **SECTION-A (MARKS 13)**

NOTE: Section-A is compulsory. All parts of this section are to be answered on this page and handed over to the center superintendent. Deleting / overwriting in not allowed. Do not use lead pencil.

Q.1 Fill the relevant bubble for each part. All parts carry one mark. (13 × 1 = 13)

	QUESTIONS	A	B	C	D	A	B	C	D
1.	The range of $y = 4\tan 2x$ is:	$-4 < x < 4$	$-4 \le y \le 4$	$0 \le y < \infty$	$-\infty < y < \infty$	○	○	○	○
2.	The domain of $f(\theta) = \text{cosec}\,\theta$ is:	$\theta = R - \left\{(2n-1)\frac{\pi}{2}\right\}; n \in Z$		$\theta = R - \left\{(2n+1)\frac{\pi}{2}\right\}; n \in Z$		○	○		
		$\theta = R - \{n\pi\}; n \in Z$		$\theta = R - \left\{n\frac{\pi}{2}\right\}; n \in Z$				○	○
3.	The trigonometric functions which are odd and having period π are:	$\sin x$ and $\cos x$	$\tan x$ and $\cot x$	$\sin x$ and $\text{cosec}\,x$	$\sec x$ and $\cos x$	○	○	○	○
4.	The maximum value of $\cos x$ for $x \in [0, \pi]$ is:	0	1	–1	2	○	○	○	○
5.	The interval $x \in [a, b]$ can also be written as:	$a < x < b$	$a > x > b$	$a \le x < b$	$a \le x \le b$	○	○	○	○
6.	The period of the trigonometric function $f(x) = \sin(bx + c)$ is:	π	2π	$\frac{\pi}{\lvert b \rvert}$	$\frac{2\pi}{\lvert b \rvert}$	○	○	○	○
7.	The graph of sine function is symmetric with respect to:	$x-axis$	$y-axis$	Origin	All of these	○	○	○	○
8.	The amplitude of $y = \pi\cos 3x$ is:	$\frac{\pi}{2}$	π	2π	$\frac{\pi}{3}$	○	○	○	○
9.	If the range of the function $f(\theta) = a\sin(2\theta) + b$ where $a > 0$ is $[3, 5]$	14	9	5	11	○	○	○	○
10.	In which of the following trigonometric function is continuous:	$\cos x$	$\cot x$	$\frac{1}{\sin x}$	$\frac{\sin x}{\cos x}$	○	○	○	○
11.	Period of a trigonometric function is the _____ positive number.	Rational	Largest	Smallest	Any	○	○	○	○
12.	The function $y = \sec x$ is not defined at:	$x = \frac{\pi}{2}$	$x = \frac{\pi}{4}$	$x = 0$	$y = \frac{\pi}{2}$	○	○	○	○
13.	If function $f(x) = \sin 8x$ is a periodic function and its period equals:	π	$\frac{\pi}{2}$	$\frac{\pi}{4}$	2π	○	○	○	○

HSSC-I (R&T) FEDERAL BOARD MATHEMATICS TEST – 12 CHAPTER 9 REVIEW EXERCISE

Name:		**Roll No.**		**Section:**	

Time allowed: 60 Minutes **PAPER SUBJECTIVE** **Marks: 32**

Note: Section 'B' AND 'C' comprise page 1 only and questions there in are to be answered on the separate answer book. Use supplementary answer sheet i.e., sheet B if required. Write your answers neatly and legibly.

SECTION-B (MARKS-16)

Q.2 Attempt any FOUR questions. **(4 × 4 = 16)**

(i)	Check whether the functions $y=\frac{\sin^2 x}{x+\tan x}$ and $y=x^3\sin x\cos x$ are even or odd?	**04**
(ii)	Find domain, Range and period of $y=\frac{1}{3}\sec\frac{\pi}{4}x$	**04**
(iii)	Find the maximum and minimum values of $y=\frac{1}{3+\frac{2}{5}\sin(5\theta-7)}$ and $y=3+2\cos(3\theta-2)$	**04**
(iv)	If $\cos\theta-\sin\theta=\sqrt{2}\sin\theta$, then show that $\cos\theta+\sin\theta=\sqrt{2}\cos\theta$	**04**
(v)	Draw the graph $y=2\cos x;[0,2\pi]$	**04**

SECTION-C (MARKS 16)

Q.3 Attempt the question. **(1 × 8 = 8)**

	Prove that $\frac{\cos 7\alpha-\cos 8\alpha}{1+2\cos 5\alpha}=\cos 2\alpha-\cos 3\alpha$	**08**

Q.4 Attempt the question. **(1 × 8 = 8)**

	(i) Solve graphically: $\sin x=\cos x$ **(ii)** $\frac{1+\sin 2\theta-\cos 2\theta}{1+\sin 2\theta+\cos 2\theta}=\tan\theta$	**08**