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HSSC-I NATIONAL BOOK FOUNDATION FBISE

MATHEMATICS TEST - CHAPTER 6: PERMUTATION AND COMBINATION

Name:		Roll No.		Section:

Total Time: 3:20 Hour
Time Allowed: 200 Minutes

Total Marks: 200

PAPER OBJECTIVE
SECTION-A (MARKS 200)

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

Q.1 Fill the relevant bubble for each part. All parts carry one mark.

Questions	A	B	C	D	A B C D
1. A coin has 2 outcomes and a die has 6 outcomes. The total outcomes of tossing the coin and rolling the die are:	12	36	6	8	●○○○
2. If event A can happen in m ways and event B can happen in n ways, the pair (A, B) can happen in:	m/n ways	m + n ways	m − n ways	mn ways	○○○●
3. If three events A, B and C can happen in m, n and p ways respectively, the triplet (A, B, C) can happen in:	m + n + p ways	mnp ways	mn + p ways	m + np ways	○●○○
4. The rule of counting which multiplies the number of ways of independent events is called the:	rule of difference	rule of quotient	rule of product	rule of sum	○○●○
5. There are 2 roads from city A to city B and 3 roads from city B to city C. The number of ways to go from A to C through B is:	6	5	1	9	●○○○
6. A person has 3 shirts and 4 pairs of trousers. The number of different outfits is:	24	7	12	1	○○●○
7. The factorial notation was introduced in 1808 by the French mathematician:	Blaise Pascal	Christian Kramp	Isaac Newton	Pierre de Fermat	○●○○
8. n! is defined as the product of all:	positive integers from n down to 1	even integers up to n	prime numbers up to n	integers from 0 to n	●○○○
9. The value of 3! is:	6	9	3	12	●○○○
10. The value of 4! is:	16	10	12	24	○○○●
11. The value of 5! is:	120	24	25	60	●○○○
12. The value of 6! is:	360	36	120	720	○○○●
13. The value of 7! is:	2520	49	5040	720	○○●○
14. The value of 0! is defined as:	−1	1	0	undefined	○●○○

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Questions	A	B	C	D	A B C D
15. The value of 2! × 4! is:	24	48	8	12	○●○○
16. The value of 8!/6! is:	14	8	56	48	○○●○
17. The value of 7!/(5! 2!) is:	21	42	7	14	●○○○
18. The value of 10!/8! is:	10	90	80	45	○●○○
19. The expression (n + 1)!/n! simplifies to:	1	n + 1	$(n + 1)^2$	n	○●○○
20. The expression n!/(n − 2)! simplifies to:	n^2	n(n − 1)	(n − 1)(n − 2)	n − 2	○●○○
21. The value of 1! is:	1	undefined	0	2	●○○○
22. The expression 5 × 4 × 3 × 2 × 1 can be written in factorial form as:	5!	5 × 4!	4!	6!	●○○○
23. The product 6 × 5 × 4 can be written in factorial form as:	5!/3!	6!/4!	6!/3!	6!	○○●○
24. On a scientific calculator, the factorial key x! is used along with the:	root button	memory button	shift button	clear button	○○●○
25. An arrangement of objects in a definite order is called a:	selection	permutation	combination	sum	○●○○
26. The number of permutations of n distinct objects taken r at a time is denoted by:	n/r	$^{r}P_{n}$	$^{n}C_{r}$	$^{n}P_{r}$	○○○●
27. The formula for $^{n}P_{r}$ is:	(n − r)!/n!	n!/[r!(n − r)!]	n!/(n − r)!	n!/r!	○○●○
28. The number of permutations of n distinct objects taken all at a time is:	2n	n^2	n	n!	○○○●
29. The value of $^{n}P_{n}$ is:	1	n	0	n!	○○○●
30. The value of $^{n}P_{1}$ is:	n − 1	n	1	n!	○●○○
31. The value of $^{n}P_{0}$ is:	n	n!	0	1	○○○●

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Questions	A	B	C	D	A B C D
32. A vehicle number plate has four distinct digits from 1, 2, 3, 4, 5, 6. The number of plates is:	360	720	24	1296	●○○○
33. A student arranges four different subject books on a shelf. The number of arrangements is:	4	16	24	12	○○●○
34. The number of ways in which 6 people out of 8 can be seated in a row is:	720	336	40 320	20 160	○○○●
35. The value of $^{6}P_{2}$ is:	12	36	15	30	○○○●
36. The value of $^{5}P_{3}$ is:	15	10	125	60	○○○●
37. The value of $^{7}P_{2}$ is:	42	21	49	14	●○○○
38. The value of $^{10}P_{3}$ is:	720	1000	120	30	●○○○
39. If $^{n}P_{2} = 20$, then n equals:	4	10	5	6	○○●○
40. For the first place in an arrangement of r out of n distinct objects, the number of choices is:	1	n	r	n − 1	○●○○
41. In the arrangement of r objects out of n, the number of choices for the rth object is:	r	n − 1	n − r + 1	n − r	○○●○
42. The number of permutations of n objects of which n_1 are alike of one kind, n_2 alike of another kind, ... is:	$n_1!\, n_2!/n!$	$n!/(n_1 + n_2)$	$n!/(n_1!\, n_2!\, \ldots)$	$n!(n_1!\, n_2!\, \ldots)$	○○●○
43. The number of arrangements of the letters of the word EVENING is:	5040	2520	630	1260	○○○●
44. In the word EVENING, the repeated letters are:	I and N	only N	E and N, each twice	only E	○○●○
45. The number of arrangements of the letters of the word FRIDAY is:	5040	360	120	720	○○○●
46. The number of arrangements of the letters of the word MATH is:	24	12	16	4	●○○○
47. The number of arrangements of the letters of the word LEVEL is:	120	60	30	15	○○●○
48. The number of arrangements of the letters of the word BANANA is:	60	120	720	30	●○○○

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Questions	A	B	C	D	A B C D
49. The number of arrangements of the letters of the word MISSISSIPPI is:	34 650	1 152	39 916 800	11 550	●○○○
50. The number of arrangements of the letters of the word GARDEN is:	24	360	120	720	○○○●
51. The number of permutations of the word STATESMAN using all the letters is:	90 720	45 360	22 680	362 880	○●○○
52. Different signals using 2 blue, 3 yellow and 4 green flags all at a time can be made in:	362 880	630	2520	1260	○○○●
53. The number of arrangements of letters of the word OPTICAL with vowels always together is:	120	720	1440	5040	○●○○
54. In OPTICAL, the vowels O, I and A when kept together can be arranged among themselves in:	3! ways	4! ways	1 way	2! ways	●○○○
55. The number of arrangements of the letters of the word MACHINE with all vowels together is:	5040	720	120	360	○●○○
56. The number of 3-letter words (repetition not allowed) from the letters of the word ENGLISH is:	210	120	343	35	●○○○
57. The number of ways of arranging 5 Mathematics, 3 English and 2 Urdu books so that books of the same subject are together is:	1440	720	8640	3 628 800	○○●○
58. The arrangement of objects about a circle is called a:	circular permutation	linear permutation	combination	selection	●○○○
59. In a circular arrangement, only the relative positions of the objects matter, so the number of arrangements of n distinct objects in a circle is:	n!	(n − 1)!	(n + 1)!	n!/2	○●○○
60. The number of ways in which 8 people can sit around a circular table is:	720	40 320	5040	362 880	○○●○
61. The abcd, bcda, cdab and dabc arranged in a circle are:	four different arrangements	two different arrangements	the same arrangement	impossible arrangements	○○●○
62. Five men and five women are seated at a round table with no restriction. The number of ways is:	9!	5! × 5!	8!	10!	●○○○
63. Five men and five women are seated at a round table so that they sit alternately. The number of ways is:	120	3600	2880	14 400	○○●○
64. For alternate seating at a round table of 5 men and 5 women, the men can be seated in:	5! ways	9! ways	4! ways	10! ways	○○●○
65. Ten secretaries sit at a round table with three particular secretaries always together. The number of ways is:	720	40 320	30 240	5040	○○●○

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Questions	A	B	C	D	A B C D
66. Six men and six women are seated at a round table so that they sit alternately. The number of ways is:	86 400	720	5040	14 400	●○○○
67. When a necklace or garland can be flipped over, the number of arrangements of n distinct beads is:	$(n-1)!$	$n!/2$	$(n-1)!/2$	$n!$	○○●○
68. The number of ways of arranging 7 keys on a key chain is:	5040	360	2520	720	○●○○
69. Twelve persons sit at a round table. The number of ways in which two particular persons do not sit together is:	$12! - 2 \times 11!$	$11!$	$10! \times 2$	$11! - 2 \times 10!$	○○○●
70. Permutations are used in cryptography to:	find the slope of a line	measure angles	find the volume of a solid	encrypt and decrypt messages	○○○●
71. The word PAK is encrypted by labelling P as 1, A as 2 and K as 3. The total number of permutations of its labels is:	6	27	9	3	●○○○
72. The number of 3-digit even numbers that can be formed from the digits 1, 2, 3, 4, 5, 6 without repeating a digit is:	180	60	120	20	○●○○
73. The number of 4-digit numbers that can be formed from the digits 1, 2, 3, 4, 5, 6 when repetition is allowed is:	360	1296	24	720	○●○○
74. The number of 4-digit numbers that can be formed from the digits 1, 2, 3, 4, 5, 6 when repetition is not allowed is:	720	1296	360	24	○○●○
75. The number of 4-digit odd numbers that can be formed from the digits 1, 2, 3, 4, 5 without repetition is:	48	96	120	72	○○○●
76. The number of 3-digit numbers having 0 at the unit place is:	10	81	90	100	○○●○
77. The selection of objects in which the order is not important is called a:	arrangement	factorial	permutation	combination	○○○●
78. The number of combinations of n distinct objects taken r at a time is denoted by:	n/r	${}^{n}P_{r}$	${}^{r}C_{n}$	${}^{n}C_{r}$	○○○●
79. The formula for ${}^{n}C_{r}$ is:	$n!/[r!(n-r)!]$	$r!(n-r)!/n!$	$n!/(n-r)!$	$n!/r!$	●○○○
80. The relation between ${}^{n}P_{r}$ and ${}^{n}C_{r}$ is:	${}^{n}P_{r} = {}^{n}C_{r}/r!$	${}^{n}P_{r} = {}^{n}C_{r} - r!$	${}^{n}P_{r} = {}^{n}C_{r} + r!$	${}^{n}P_{r} = r! \times {}^{n}C_{r}$	○○○●
81. In a combination, the r! arrangements of the same r objects are treated as:	distinct ways	one way	r ways	zero ways	○●○○
82. The three objects a, b, c in the combination abc, acb, bac, bca, cab, cba are counted as:	one combination	three combinations	two combinations	six combinations	●○○○

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Questions	A	B	C	D	A B C D
83. The value of $^{n}C_{0}$ is:	0	n	n!	1	○○○●
84. The value of $^{n}C_{n}$ is:	0	1	n!	n	○●○○
85. The value of $^{n}C_{1}$ is:	n − 1	n!	1	n	○○○●
86. The relation $^{n}C_{r} = {}^{n}C_{n-r}$ means:	n is always equal to r	r is always equal to n	permutations equal combinations	selecting r objects is the same as leaving n − r objects	○○○●
87. The relation $^{n}C_{r} + {}^{n}C_{r-1}$ equals:	$^{n+1}C_{r}$	$^{n-1}C_{r}$	$^{n+1}C_{r-1}$	$^{n}C_{r+1}$	●○○○
88. The value of $^{10}C_{6}$ is:	720	210	60	151 200	○●○○
89. The number of ways of choosing 6 scholarship winners out of 10 students is:	151 200	720	5040	210	○○○●
90. The value of $^{8}C_{3}$ is:	24	56	336	120	○●○○
91. The value of $^{5}C_{2}$ is:	10	5	25	20	●○○○
92. The value of $^{6}C_{3}$ is:	18	6	20	120	○○●○
93. The value of $^{7}C_{4}$ is:	28	210	35	840	○○●○
94. The value of $^{12}C_{2}$ is:	66	144	24	132	●○○○
95. The value of $^{9}C_{9}$ is:	81	9	0	1	○○○●
96. The value of $^{20}C_{1}$ is:	19	1	190	20	○○○●
97. If $^{n}C_{2} = 10$, then n equals:	6	5	4	−4	○●○○
98. In $^{n}C_{2} = 10$, the value n = −4 is rejected because n must be:	negative	a positive integer	a fraction	zero	○●○○
99. In a committee of 5 men chosen from 8 men and 6 women chosen from 10 women, the number of ways is:	15 120	11 760	2520	560	○●○○

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Questions	A	B	C	D	A B C D
100. The number of ways of choosing 11 players out of 16 is:	3003	1365	4368	5005	○○●○
101. The number of ways of choosing 11 players out of 16 if one particular player is always chosen is:	1365	3003	4368	5005	○●○○
102. From 5 men and 3 women, a committee of 3 with at least one man can be formed in:	56	45	60	55	○○○●
103. From 6 men and 4 women, a committee of 5 with exactly 2 women can be formed in:	120	252	60	240	●○○○
104. From 6 men and 4 women, a committee of 5 with at least 2 women can be formed in:	126	252	120	186	○○○●
105. From 6 men and 4 women, a committee of 5 with at most 2 women can be formed in:	120	186	126	60	○●○○
106. The number of lines that can be drawn through 10 points on a circle is:	45	100	20	90	●○○○
107. The number of triangles that can be formed with 10 points on a circle as vertices is:	720	45	120	30	○○●○
108. The number of diagonals of an n-sided polygon is:	$n(n-3)/2$	$n(n-2)/2$	$n(n+3)/2$	$n(n-1)/2$	●○○○
109. The number of diagonals of a decagon (10-sided polygon) is:	45	40	35	30	○○●○
110. A polygon has 35 diagonals. The number of its sides is:	10	9	12	7	●○○○
111. The number of ways to divide a group of 10 girls into two groups of 3 and 7 is:	120	720	45	210	●○○○
112. A question paper has parts A, B and C each with 8 questions. Choosing 5 from A and 3 each from B and C can be done in:	56	175 616	1344	168	○●○○
113. In an examination a candidate must pass each of 6 subjects. The number of ways in which he cannot pass is:	64	720	63	6	○○●○
114. There are 100 applicants for 6 posts, of which 2 are reserved for serving candidates (20 serving candidates). The number of selections is:	$^{100}C_6$	$^{20}C_2 \times {}^{100}C_4$	$^{20}C_6$	$^{20}C_2 \times {}^{80}C_4$	○○○●
115. The number of ways of posting r letters in n letter boxes is:	$^{n}C_r$	$^{n}P_r$	r^n	n^r	○○○●
116. The product of r consecutive positive integers is divisible by:	2r	r!	(r + 1)!	r	○●○○

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Questions	A	B	C	D	A B C D
117. The number of 7-digit numbers formed with distinct digits 1–7 using each digit once is:	5040	823 543	720	49	●○○○
118. Permutation and combination concepts are applied in estimating the odds of winning a:	chess match by colour	lottery	race by speed only	quiz by marks only	○●○○
119. The number of possible DNA sequences or protein structures can be estimated by using:	permutations and combinations	only matrices	only complex numbers	only vectors	●○○○
120. Choosing a different set of songs for a certain occasion is an application of:	polynomial division	combinations	matrices	complex numbers	○●○○
121. The number of ways of choosing 3 books from a set of 7 different books is:	35	210	343	21	●○○○
122. The number of ways of arranging 3 books out of 7 different books on a shelf is:	21	35	210	343	○○●○
123. The number of ways to select a president and a vice-president from 8 members is:	64	28	56	16	○○●○
124. The number of ways to select a committee of 2 from 8 members is:	28	64	56	16	●○○○
125. The number of handshakes among 6 persons, each shaking hands with each other exactly once, is:	12	15	30	36	○●○○
126. The number of ways 4 persons can sit in a row is:	16	4	24	12	○○●○
127. The number of ways 5 students can stand in a queue is:	20	60	25	120	○○○●
128. The number of ways of selecting 2 boys and 2 girls from 5 boys and 4 girls is:	20	120	60	90	○○●○
129. The number of ways of selecting 3 vowels out of the 5 vowels is:	5	60	20	10	○○○●
130. The number of ways of arranging 3 vowels out of the 5 vowels is:	20	125	60	10	○○●○
131. The factorial of a negative integer is:	negative	one	zero	not defined	○○○●
132. A permutation lock with a 3-digit code using distinct digits 0–9 can be set in:	504 ways	1000 ways	720 ways	120 ways	○○●○
133. A combination lock with a 3-digit code in which digits may repeat and each digit is from 0–9 has:	720 possible codes	1000 possible codes	120 possible codes	504 possible codes	○●○○

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Questions	A	B	C	D	A B C D
134. The number of different ways in which 3 prizes can be awarded to 3 out of 10 students (different prizes) is:	720	30	1000	120	●○○○
135. The number of different ways in which 3 identical prizes can be awarded to 3 out of 10 students is:	30	1000	720	120	○○○●
136. The number of subsets of size 2 of a set of 6 elements is:	15	12	36	30	●○○○
137. The number of subsets of size 0 of any set is:	1	2	the size of the set	0	●○○○
138. The total number of subsets of a set with n elements is:	2^n	2n	n!	n^2	●○○○
139. The sum $^nC_0 + {}^nC_1 + \ldots + {}^nC_n$ equals:	n!	n^2	2^n	2n	○○●○
140. The product of 4 consecutive integers is divisible by:	12	24	8	4	○●○○
141. The number of permutations of the letters of the word ALLAH is:	30	60	120	20	●○○○
142. The number of permutations of the letters of the word LAHORE is:	120	5040	360	720	○○○●
143. The number of permutations of the letters of the word PAKISTAN is:	20 160	40 320	10 080	5040	●○○○
144. The number of ways of choosing 4 cards from a pack of 52 cards is:	4^{52}	$^{52}C_4$	52^4	$^{52}P_4$	○●○○
145. The number of ways of choosing a captain and a vice-captain from 11 players is:	22	121	110	55	○○●○
146. The number of ways of choosing a team of 2 players from 11 players is:	110	22	55	121	○○●○
147. The number of permutations of 10 objects taken 2 at a time minus the combinations of 10 objects taken 2 at a time equals:	55	100	90	45	○○○●
148. The number of ways of arranging the letters of the word SUCCESS is:	420	840	5040	210	●○○○
149. The number of ways of arranging the letters of the word COMMITTEE is:	362 880	45 360	181 440	90 720	○●○○
150. A boy has 5 pens and 4 pencils. The number of ways of choosing one pen and one pencil is:	9	54	20	1	○○●○

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Questions	A	B	C	D	A B C D
151. A caterer offers 4 types of tea and 3 types of snacks. The number of ways of choosing one tea and one snack is:	81	12	1	7	○●○○
152. The number of 2-digit numbers formed from the digits 1 to 9 without repeating a digit is:	36	72	81	90	○●○○
153. The number of signals using 2 flags at a time out of 5 different flags is:	20	10	32	25	●○○○
154. The value of 9!/7! is:	2	9	63	72	○○○●
155. The value of 6!/(4! 2!) is:	12	30	6	15	○○○●
156. The value of 4! + 3! is:	27	10	30	24	○○●○
157. The value of 5! − 4! is:	24	1	96	120	○○●○
158. If (n − 1)! = 24, then n equals:	25	6	4	5	○○○●
159. The value of 10!/9! is:	9	1	90	10	○○○●
160. The value of $^{8}P_{2}$ is:	64	56	16	28	○●○○
161. The value of $^{9}P_{3}$ is:	27	504	84	729	○●○○
162. The value of $^{4}P_{4}$ is:	24	4	1	16	●○○○
163. The value of $^{12}P_{2}$ is:	24	66	144	132	○○○●
164. If $^{n}P_{2}$ = 30, then n equals:	7	5	6	10	○○●○
165. The value of $^{6}P_{3}$ is:	18	216	120	20	○○●○
166. The number of arrangements of the letters of the word COMMON is:	90	720	180	360	○○●○
167. The number of arrangements of the letters of the word SEVEN is:	60	120	30	24	●○○○

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Questions	A	B	C	D	A B C D
168. The number of arrangements of the letters of the word APPLE is:	60	24	120	30	●○○○
169. The number of arrangements of the letters of the word BOOK is:	6	24	12	4	○○●○
170. The number of arrangements of the letters of the word PEPPER is:	30	60	720	120	○●○○
171. The number of ways in which 6 persons can sit around a round table is:	720	60	24	120	○○○●
172. The number of ways in which 5 persons can sit around a round table is:	24	120	12	60	●○○○
173. The number of different necklaces that can be made with 7 distinct beads is:	360	720	2520	5040	●○○○
174. Six persons sit around a round table with three particular persons always together. The number of ways is:	24	36	120	72	○●○○
175. The value of $^{15}C_2$ is:	210	105	225	30	○●○○
176. The value of $^{9}C_3$ is:	504	84	27	36	○●○○
177. The value of $^{10}C_2$ is:	20	100	90	45	○○○●
178. The value of $^{8}C_4$ is:	32	70	1680	35	○●○○
179. The value of $^{6}C_6$ is:	0	36	6	1	○○○●
180. The value of $^{7}C_0$ is:	1	7	0	49	●○○○
181. The value of $^{11}C_9$ is:	110	99	55	11	○○●○
182. The value of $^{13}C_2$ is:	156	169	26	78	○○○●
183. The value of $^{12}C_{10}$ is:	120	66	12	132	○●○○
184. The number of ways of selecting 3 boys from 5 boys is:	10	15	125	60	●○○○

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Questions	A	B	C	D	A B C D
185. A committee of 3 is to be chosen from 7 persons. The number of ways is:	21	343	210	35	○○○●
186. The number of ways of selecting 2 men and 2 women from 4 men and 3 women is:	7	18	35	12	○●○○
187. The number of ways of selecting a team of 5 from 9 players is:	45	15 120	126	59 049	○○●○
188. From 3 boys and 2 girls, two persons are chosen with at least one girl. The number of ways is:	6	10	7	3	○○●○
189. The number of ways of choosing 4 cards from the 13 cards of one suit is:	17 160	2380	52	715	○○○●
190. The number of ways of choosing 3 colours out of 6 colours is:	18	120	20	216	○○●○
191. The number of ways of choosing 8 questions out of 10 is:	1814 400	80	90	45	○○○●
192. The number of handshakes among 8 persons, each shaking hands once with every other, is:	56	28	16	64	○●○○
193. In a tournament with 5 teams, each team plays every other team once. The total number of matches is:	25	20	10	5	○○●○
194. The number of diagonals of a hexagon is:	6	12	15	9	○○○●
195. The number of diagonals of a pentagon is:	5	20	10	15	●○○○
196. The number of triangles formed by joining 6 points on a circle is:	15	6	120	20	○○○●
197. The number of straight lines formed by joining 6 points on a circle is:	30	15	20	36	○●○○
198. The number of different 3-digit numbers that can be formed with the digits 1, 2, 3 without repetition is:	27	3	6	9	○○●○
199. The number of different 3-digit numbers that can be formed with the digits 1, 2, 3 with repetition allowed is:	3	27	9	6	○●○○
200. The number of ways of seating 3 men and 3 women in a row so that men and women sit alternately starting with a man is:	144	36	72	720	○●○○

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