INDIAN SCHOOL MUSCAT
SECOND PERIODIC TEST

APPLIED MATHEMATICS

CLASS: XII   Sub. Code: 241   Time Allotted: 50 min.

30.05.2022   Max. Marks: 20

GENERAL INSTRUCTIONS:

(i) This question paper consists of 7 questions. All questions are compulsory.

(ii) Questions 1 – 3 are MCQ carrying 2 mark each.

(iii) Questions 4 and 5 carry 3 marks each.

(iv) Questions 6 and 7 carry 4 marks each.

SECTION-A

1. For binomial distribution given as $X \sim B\left(5, \frac{1}{3}\right)$, find P(X > 3).

2. For the probability distribution given below,

X	0	1	2	3	4	5
P(X)	0.2	2k	3k	0.1	0	2k

find the value of

i) k

ii) Find E(X)

3. A boat takes 28 hours for travelling downstream from point A to point B and coming back to point C midway between A and B. If the velocity of the stream is 6km/hr and the speed of the boat in still water is 9 km/hr, what is the distance between A and B?

SECTION – B

4. i) The cost of Type I rice is Rs. 15 per kg and Type 2 rice is Rs 20 per kg. If both Type 1 and Type 2 are mixed in the ratio 2: 3, then find the price per kg of the mixed variety of rice.

ii) A container contains 40 litres of milk. From this container, 2 litres of milk was taken out and replaced by water. This process was repeated further two times. How much milk is now contained by the container?

5. i) Tap A can fill a tank in 8 hours, Tap B can fill the same in 12 hours, then in how much time the tank will be completely fill?

ii) If Tap C can fill the above tank in 24 hours and it is known that the three taps A, B and C are open at 2 am, 3 am, and 4am respectively, then at what time the tank will be completely fill?

SECTION -C

6. Using the concept of modular arithmetic
   a) Find the remainder when 783 x 594 x 346 x 251 is divided by 5
   b) If $28 \equiv x \pmod 6$, find first five positive values of x.

7. A factory making plates knows that, on average, 5% of its plates are defective.
   a) Find the probability that in a random sample of 10 plates, at least one is defective.
   b) Find the mean and variance of the probability distribution.
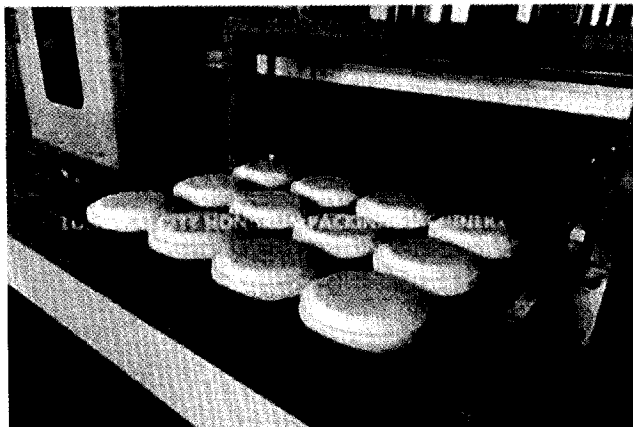
End of the Question Paper

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SECTION-A

1. For binomial distribution given as $X \sim B\left(6, \frac{1}{2}\right)$, find $P(X > 4)$.

2. For the probability distribution given below,

X	0	1	2	3	4	5
P(X)	0.1	3k	2k	0.2	0	2k

find the value of
i) k
ii) Find the mean of the distribution.

3. A boat takes 44 hours for travelling upstream from point A to point B and coming back to point C midway between A and B. If the velocity of the stream is 6km/hr and the speed of the boat in still water is 9 km/hr, what is the distance between A and B?

SECTION - B

4. i) The cost of Type A wheat is Rs. 20 per kg and Type B wheat is Rs 25 per kg. If both Type A and Type B are mixed in the ratio 3 : 2, then find the price per kg of the mixed variety of wheat.

    ii) A container contains 20 litres of milk. From this container, 3 litres of milk was taken out and replaced by water. This process was repeated further two times. How much milk is now contained by the container?

5. i) Pipe X can fill a vessel in 12 hours, Pipe Y can fill the same in 8 hours, then in how much time the vessel will completely fill?

ii) If Pipe Z can fill the above tank in 24 hours and it is known that these three pipes X, Y and Z are open at 3 am, 4 am, and 5 am respectively, then at what time the tank will be completely fill?

SECTION - C

6. Using the concept of modular arithmetic
   a) Find the remainder when 383 x 694 x 246 x 551 is divided by 5

   b) If 29 ≡ x (mod 7), find first five positive values of x.

7. A factory making plates knows that, on an average, 4% of its plates are defective.
   a) Find the probability that in a random sample of 8 plates, at least one is defective.
   b) Find the mean and variance of the probability distribution.

End of the Question Paper

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SECTION-A

1. For binomial distribution given as $X \sim B\left(7, \frac{1}{4}\right)$, find $P(X < 2)$.

   For the probability distribution given below,

2.
X	0	1	2	3	4	5
P(X)	0.2	k	4k	0.04	0.06	2k

   find the value of
   i) k
   ii) Find the expected value of X.

3. A boat takes 48 hours for travelling downstream from point X to point Y and going back upstream to X. If the velocity of the stream is 6km/hr and the speed of the boat in still water is 9 km/hr, what is the distance between A and B?
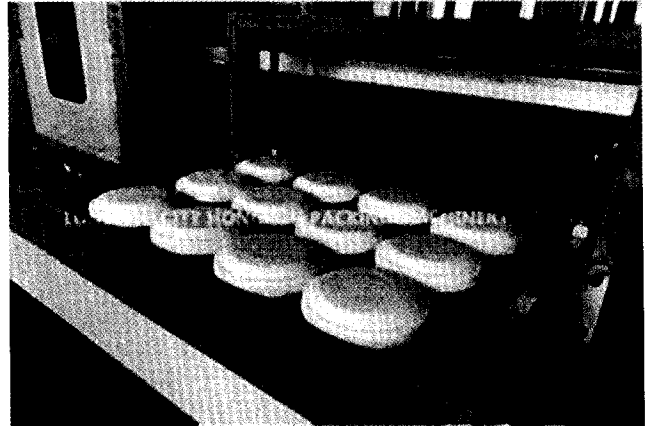
SECTION - B

4. i) The cost of Type I grains is Rs. 50 per kg and Type 2 grains is Rs 80 per kg. If both Type 1 and Type 2 are mixed in the ratio 4 : 1, then find the price per kg of the mixed variety of grains.

   ii) A container contains 30 litres of milk. From this container, 3 litres of milk was taken out and replaced by water. This process was repeated further two times. How much milk is now contained by the container?

5. i) Tap A can fill a tank in 24 hours, Tap B can fill the same in 8 hours, then in how much time the tank will be completely fill?

ii) If Tap C can fill the above tank in 12 hours and it is known that the three taps A, B and C are open at 5 am, 6 am, and 7 am respectively, then at what time the tank will be completely fill?

SECTION - C

6. Using the concept of modular arithmetic
    a) Find the remainder when 481 x 294 x 546 x 351 is divided by 5

    b) If $22 \equiv x \pmod 8$, find first five positive values of x.

7. A factory making plates knows that, on average, 2% of its plates are defective.
    a) Find the probability that in a random sample of 6 plates, at least one is defective.
    b) Find the mean and variance of the probability distribution.

End of the Question Paper