

INDIAN SCHOOL MUSCAT

NAME OF THE EXAMINATION	SECOND PERIODIC TEST	CLASS: XII
DATE OF EXAMINATION	30. 05. 22	SUBJECT: APPLIED MATHEMATICS
TYPE	MARKING SCHEME	SET - A

Q.NO	VALUE POINTS	MARK
1.	$N = 5, p = 1/3 \text{ so } q = 2/3$ $P(X > 3) = P(X=4) + P(X=5)$ $\frac{5}{4}C \left(\frac{1}{3}\right)^4 \left(\frac{2}{3}\right)^1 + \frac{5}{5}C \left(\frac{1}{3}\right)^5 \left(\frac{2}{3}\right)^0$ $\frac{5 \times 2}{243} + \frac{1}{243} = \frac{11}{243}$	$\frac{1}{2}$ 1 $\frac{1}{2}$
2.	$7k + 0.3 = 1 \Rightarrow k = 0.1 = \frac{1}{10}$ $E(x) = 2k + 6k + 0.3 + 10k = 18k + 0.3$ $= 1.8 + 0.3 = 2.1$	1 1
3.	$\frac{d}{15} + \frac{d/2}{3} = 28$ $\Rightarrow d = 120 \text{ kms}$	1 1
4.	i) Using correct formula we get $\frac{2}{3} = \frac{20-x}{x-15}$ $\Rightarrow x = \text{Rs. } 18 / \text{kg}$ ii) amount of milk left = $40(1 - \frac{2}{40})^3$ $= 40 \times (\frac{19}{20})^3 = 34.295 \text{ lts}$	$\frac{1}{2}$ 1 1 $\frac{1}{2}$
5.	Time taken = $\frac{1}{\frac{1}{8} + \frac{1}{12}} = \frac{24}{5} \text{ hrs} = 4 \text{ hrs } 48 \text{ mins}$ Let tap A works for x hours, then B works for x-1 and C for x-2 hrs. Then according to the question it implies that $\Rightarrow \frac{x}{8} + \frac{x-1}{12} + \frac{x-2}{24} = 1$ $\Rightarrow \frac{6x-4}{24} = 1 \Rightarrow 6x - 4 = 24 \Rightarrow x = \frac{28}{6}$ $\Rightarrow x = 4 \text{ hrs and } 40 \text{ minutes}$ This means as starting time is 2 am then containers will be filled at $x + 2$ hours So time taken by A is $2 + 4 : 40$ minutes = 6 : 40 am	$\frac{1}{2} + \frac{1}{2}$ 1 $\frac{1}{2}$ $\frac{1}{2}$
6.	$(3 \times 4 \times 1 \times 1) \bmod 5 = 12 \bmod 5 = 2$ $X \in \{4, 10, 16, 22, 28\}$ Any three entries correct 1 mark	1 + $\frac{1}{2}$ mk $1 \frac{1}{2}$ mk

<p>7. $p = \frac{1}{20}$ and $q = \frac{19}{20}$ and $n = 10$</p> <p>i) $1 - P(\text{no defective}) = 1 - {}^0C_0 \left(\frac{1}{20}\right)^0 \left(\frac{19}{20}\right)^{10}$ $= 1 - \left(\frac{19}{20}\right)^{10}$</p> <p>ii) Mean = $np = 10 \times \frac{1}{20} = \frac{1}{2}$ Variance = $npq = 10 \times \frac{1}{20} \times \frac{19}{20} = \frac{19}{40} = 0.475$</p>	$\frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2}$ 1 1
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SET-B

Q.NO	VALUE POINTS	MARK
1.	$N= 6, p = 1/2 \text{ so } q = 1/2$ $P(X > 4) = P(X=5) + P(X=6)$ ${}^6C_5 \left(\frac{1}{2}\right)^5 \left(\frac{1}{2}\right)^1 + {}^6C_6 \left(\frac{1}{2}\right)^6 \left(\frac{1}{2}\right)^0$ $\frac{6 \times 1}{64} + \frac{1}{64} = \frac{7}{64}$	$\frac{1}{2}$ 1 $\frac{1}{2}$
2.	$7k + 0.3 = 1 \Rightarrow k = 0.1 = \frac{1}{10}$ $E(x) = 0 + 3k + 4k + 0.6 + 10k = 17k + 0.6$ $= 1.7 + 0.6 = 2.3$	1 1
3.	$\frac{d}{3} + \frac{d/2}{15} = 44$ $\Rightarrow d = 120 \text{ kms}$	1 1
4.	i) Using correct formula we get $\frac{3}{2} = \frac{25-x}{x-20}$ $\Rightarrow x = \text{Rs.}22 / \text{kg}$ ii) amount of milk left = $20(1 - \frac{3}{20})^3$ $= 20 \times (\frac{17}{20})^3 = 12.28 \text{ lts}$	1 $\frac{1}{2}$ 1 $\frac{1}{2}$
5.	Time taken = $\frac{1}{\frac{1}{12} + \frac{1}{8}} = \frac{24}{5} \text{ hrs} = 4 \text{ hrs } 48 \text{ mins}$ Let tap A works for x hours, then B works for $x-1$ and C for $x-2$ hrs. Then according to the question it implies that $\Rightarrow \frac{x}{12} + \frac{x-1}{8} + \frac{x-2}{24} = 1$ $\Rightarrow \frac{6x-5}{24} = 1 \Rightarrow 6x - 5 = 24 \Rightarrow x = \frac{29}{6}$ $\Rightarrow x = 4 \text{ hrs and } 50 \text{ minutes}$ This means as starting time is 3 am then containers will be filled at $x + 3$ hours	$\frac{1}{2} + \frac{1}{2}$ 1 $\frac{1}{2}$

	So time taken by A is $3 + 4 : 50$ minutes = $7 : 50$ am	$\frac{1}{2}$
6.	$(3 \times 4 \times 1 \times 1) \bmod 5 = 12 \bmod 5 = 2$ $X \in \{1, 8, 15, 22, 29\}$ Any three entries correct 1 mark	$1 + \frac{1}{2}$ mk $1 \frac{1}{2}$ mk
7.	$p = \frac{1}{25}$ and $q = \frac{24}{25}$ and $n = 8$ i) $1 - P(\text{no defective}) = 1 - {}_0^8C \left(\frac{1}{25}\right)^0 \left(\frac{24}{25}\right)^8$ $= 1 - \left(\frac{24}{25}\right)^8$ ii) Mean = $np = 8 \times \frac{4}{100} = 0.32$ or $8/25$ Variance = $npq = 10 \times \frac{1}{25} \times \frac{24}{25} = \frac{240}{625} = 0.475$	$\frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2}$ 1 1