**AGA KHAN UNIVERSITY EXAMINATION BOARD**

**HIGHER SECONDARY SCHOOL CERTIFICATE**

**CLASS XII**

**ALTERNATE TO PRACTICAL (ATP)**

**MODEL EXAMINATION PAPER 2021**

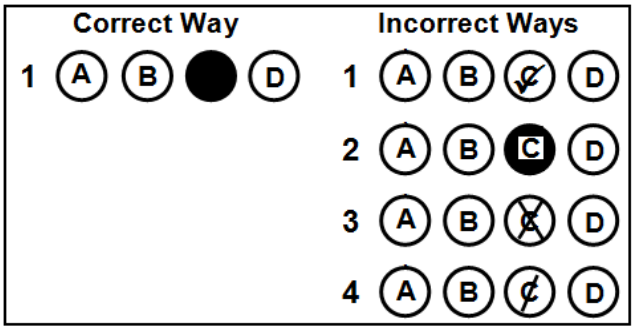
**Statistics Paper III**

**Time: 25 minutes Marks: 15**



**INSTRUCTIONS**

1. Read each question carefully.
2. Answer the questions on the separate answer sheet provided. DO NOT write your answers on the question paper.
3. There are 100 answer numbers on the answer sheet. Use answer numbers 1 to 15 only.
4. In each question, there are four choices A, B, C, D. Choose ONE. On the answer grid, black out the circle for your choice with a pencil as shown below.




**Candidate's Signature**

5. If you want to change your answer, ERASE the first answer completely with a rubber, before blacking out a new circle.
6. DO NOT write anything in the answer grid. The computer only records what is in the circles.
7. You may use a scientific calculator if you wish.

1. If a coin is tossed five times, then the number of outcomes in the sample space is

   A. 32
   B. 25
   C. 16
   D. 10

2. The relation between ${}^{n}P_{r}$ and ${}^{n}C_{r}$ is

   A. ${}^{n}P_{r} = {}^{n}C_{r} \times r$
   B. ${}^{n}P_{r} = {}^{n}C_{r} \times r!$
   C. ${}^{n}P_{r} = \frac{{}^{n}C_{r}}{r}$
   D. ${}^{n}P_{r} = \frac{{}^{n}C_{r}}{r!}$

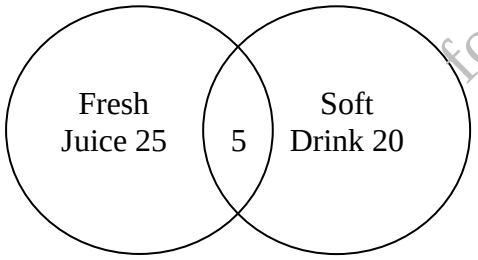
3. From an ordinary deck of cards, two cards are selected at random with replacement. If the first card is a queen and the second card is a king, then selection of two cards are

   A. dependent events.
   B. independent events.
   C. mutually exclusive events.
   D. mutually exhaustive events.



**Use the given information to answer Q.4 and Q.5.**

The given Venn diagram shows the number of students of a class who like fresh juice, soft drink, and both.




4. The probability that a student neither likes soft drink nor fresh juice is

   A. 0
   B. $\frac{5}{50}$
   C. $\frac{45}{50}$
   D. 1

5. The probability that a student likes soft drink only is

A. $\frac{15}{50}$

B. $\frac{20}{50}$

C. $\frac{15}{25}$

D. $\frac{20}{25}$

**Use the given information to answer Q.6 and Q.7.**

Two balls are drawn is succession without replacement from an urn containing 4 red balls and 3 black balls. The discrete random variable *Y*, where *y* is the number of red balls, has possible values of 0, 1 and 2. Its probability distribution is given as

| ***Y*** | **0** | **1** | **2** |
|---|---|---|---|
| ***P* (*Y* = *y*)** | $\frac{1}{4}$ | $\frac{1}{2}$ | $\frac{1}{4}$ |



6. If *R* represents the number of red balls and B represents the number of black balls, then the sample space for this experiment is

A. {*BB*, *RB*, *BR*, *RR*}
B. {*RB*, *BR*, *RR*}
C. {*BB*, *RR*}
D. {*RB*, *BR*}

7. The probability that both the balls drawn are red is

A. 0

B. $\frac{1}{4}$

C. $\frac{1}{2}$

D. 1

8. If $\int_2^3 2k\,x\,dx$ is a probability density function, then the value of $k$ is equal to

   A. $-5$
   B. $-\frac{1}{5}$
   C. $\frac{1}{5}$
   D. $5$

9. The probability that a patient survives from a rare blood disease is 0.3. Only 12 people are affected by this disease. The binomial random variable is defined as the number of people who will survive.

   The standard deviation of this binomial random variable is

   A. 1.59
   B. 1.08
   C. 2.52
   D. 1.17

10. Which of the following is the mean and variance of a standard normal distribution?

| | Mean | Variance |
|---|---|---|
| A | 0 | 0 |
| B | 1 | 0 |
| C | 0 | 1 |
| D | 1 | 1 |



11. If a population consists of 8 items and a sample of 3 items is selected at random from the population without replacement, then the possible number of samples is

   A. 8
   B. 24
   C. 56
   D. 64

12. The mean of the sampling distribution of mean with sample size 5 is 2, then the population mean is

   A. 0.4
   B. 2
   C. 2.5
   D. 10

13. The values of the given standard normal distribution table represent area to the left of the *z* score.

| *Z* | 0.00 | 0.01 | 0.02 | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.09 |
|---|---|---|---|---|---|---|---|---|---|---|
| **0.0** | 0.50000 | 0.50399 | 0.50798 | 0.51197 | 0.51595 | 0.51994 | 0.52392 | 0.52790 | 0.53188 | 0.53586 |
| **0.1** | 0.53983 | 0.54380 | 0.54776 | 0.55172 | 0.55567 | 0.55962 | 0.56356 | 0.56749 | 0.57142 | 0.57535 |
| **0.2** | 0.57926 | 0.58317 | 0.58706 | 0.59095 | 0.59483 | 0.59871 | 0.60257 | 0.60642 | 0.61026 | 0.61409 |
| **0.3** | 0.61791 | 0.62172 | 0.62552 | 0.62930 | 0.63307 | 0.63683 | 0.64058 | 0.64431 | 0.64803 | 0.65173 |
| **0.4** | 0.65542 | 0.65910 | 0.66276 | 0.66640 | 0.67003 | 0.67364 | 0.67724 | 0.68082 | 0.68439 | 0.68793 |
| **0.5** | 0.69146 | 0.69497 | 0.69847 | 0.70194 | 0.70540 | 0.70884 | 0.71226 | 0.71566 | 0.71904 | 0.72240 |

For a standard normal distribution, the area under the curve that lies between $z = 0.15$ and $z = 0.45$ is

A. 0.11559
B. 0.11402
C. 0.55962
D. 0.67364

14. The critical region is a set of values of the test statistics for which the

I. null hypothesis is accepted.
II. alternate hypothesis is accepted.
III. null hypothesis is rejected.

A. I only
B. III only
C. I and II only
D. II and III only



15. For chi-square independence test if $\chi^2 > \chi^2_\alpha$ or $\chi^2_{observed} > \chi^2_{critical}$, then which of the following statements is TRUE?

I. $H_o$ will be rejected.
II. The two attributes are independent.
III. The two attributes are dependent.

A. I only
B. II only
C. I and II
D. I and III

END OF PAPER

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