

FIFTH SEMESTER UG DEGREE EXAMINATION, NOVEMBER 2024**(Regular/Improvement/Supplementary)****MATHEMATICS (OPEN COURSE)****GMAT5D04T: MATHEMATICS FOR DECISION MAKING****Time: 2 Hours****Maximum Marks: 60****Section A: All questions can be answered. Each carries 2 marks.****(Ceiling 20 marks).**

1. What is the difference between a frequency polygon and an ogive?
2. What do you mean by outlier?
3. Describe the difference between the calculation of population standard deviation and that of sample standard deviation.
4. A child's IQ is in the 93rd percentile for the child's age group. Make an observation about the child's IQ.
5. Determine the number of outcomes in the event. Then decide whether the event is simple or not. Explain your reasoning.
You roll a six-sided die. Event B is rolling at least a 4.
6. Five of the 100 digital video recorders (DVRs) in an inventory are known to be defective. What is the probability you randomly select an item that is not defective?
7. For anterior cruciate ligament (ACL) reconstructive surgery, the probability that the surgery is successful is 0.95.
Find the probability that three ACL surgeries are successful.
8. Determine whether the events are mutually exclusive. Explain your reasoning.
Event A: Randomly select a male student.
Event B: Randomly select a nursing major.

(PTO)

9. A student advisory board consists of 20 members. Two members serve as the board's chair and secretary. Each member is equally likely to serve in either of the positions. What is the probability of selecting at random the two members who currently hold the two positions?
10. Determine the missing probability value for the probability distribution.
- | | | | | | | | |
|------|-----|---|------|------|------|------|------|
| x | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| P(x) | 0.5 | ? | 0.23 | 0.21 | 0.17 | 0.11 | 0.08 |
11. Determine whether the experiment is a binomial experiment. If it is, specify the values of n , p , and q , and list the possible values of the random variable x . If it is not, explain why.
- A jar contains five red marbles, nine blue marbles, and six green marbles. You randomly select three marbles from the jar, without replacement. The random variable represents the number of red marbles.
12. Find $P(2)$ using the Poisson distribution when $\mu = 1.5$.

**SECTION B: Answer the following questions. Each carries 5 marks.
(Ceiling 30 Marks)**

13. The data represents the ages of the 50 most powerful women in the world in 2012.
26, 31, 35, 37, 43, 43, 43, 44, 45, 47, 48, 48, 49, 50, 51, 51, 51, 51, 52, 54, 54, 54, 54, 55, 55, 55, 56, 57, 57, 57, 58, 58, 58, 58, 59, 59, 59, 62, 62, 63, 64, 65, 65, 65, 66, 66, 67, 67, 72, 86.
- Construct a frequency distribution dividing the data into seven classes.
14. Define z-score.
- The mean speed of vehicles along a stretch of highway is 56 miles per hour with a standard deviation of 4 miles per hour. The speeds of three cars traveling along this stretch of highway are 62 miles per hour, 47 miles per hour, and 56 miles per hour. Find the z-score that corresponds to each speed. Assume the distribution of the speeds is approximately bell-shaped. What do you interpret?

15. You roll a six-sided die. Find the probability of each event.
 - (a) Event A: rolling a 3
 - (b) Event B: rolling a 7
 - (c) Event C: rolling a number less than 5

16. The probability that a salmon swims successfully through a dam is 0.85. Find the probability that two salmon swim successfully through the dam.

17. A jury consists of five men and seven women. Three jury members are selected at random for an interview. Find the probability that all three are men.

18. The mean number of accidents per month at a certain intersection is three. What is the probability that in any given month four accidents will occur at this intersection?

19. In Pittsburgh, Pennsylvania, about 56% of the days in a year are cloudy. Find the mean, variance, and standard deviation for the number of cloudy days during the month of June. Interpret the results and determine any unusual values.

SECTION C: Answer any 1 question. Each carries 10 marks.

20. Explain different types of sampling techniques. Identify the sampling technique used, and discuss potential sources of bias, if any for the data: “Questioning students as they leave a university library, a researcher asks 358 students about their drinking habits.”

21. A company tracks the number of sales new employees make each day during a 100-day probationary period. The results for one new employee are shown below. Construct and graph a probability distribution.

sales per day, x	0	1	2	3	4	5	6	7
number of days, f	16	19	15	21	9	10	8	2

(1 x 10 =10 Marks)