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FIFTH SEMESTER UG DEGREE EXAMINATION, NOVEMBER 2022
(Regular/Improvement/Supplementary)
MATHEMATICS OPEN COURSE
GMAT5D04T - MATHEMATICS FOR DECISION MAKING

Time: 2 Hours   Maximum: 60 Marks

SECTION A: Answer the following questions. Each carries 2 marks
(Ceiling 20 Marks)

1. What is the difference between a random sample and a simple random sample?

2. What is the difference between class limits and class boundaries?

3. Explain how to find the range of a data set. What is an advantage of using the range as a measure of variation?

4. Describe the relationship between quartiles and percentiles.

5. Determine the number of outcomes in the event. Then decide whether the event is simple or not. Explain your reasoning.
   For quality control, you randomly select a machine part from a batch that has been manufactured that day. Event A is selecting a specific defective machine part.

6. For anterior cruciate ligament (ACL) reconstructive surgery, the probability that the surgery is successful is 0.95.
   Find the probability that at least one of the three ACL surgeries is successful

7. Determine whether the events are mutually exclusive. Explain your reasoning.
   Event A: Randomly select a vehicle that is a Ford.
   Event B: Randomly select a vehicle that is a Toyota.

8. A psychologist shows a list of eight activities to a subject in an experiment. How many ways can the subject pick a first, second, and third activity?

(P.T.O.)

9. A state's department of transportation plans to develop a new section of inter-state highway and receives 16 bids for the project. The state plans to hire four of the bidding companies. How many different combinations of four companies can be selected from the 16 bidding companies?

10. Determine the missing probability value for the probability distribution.

x	0	1	2	3	4
P(x)	0.07	0.20	0.38	?	0.13

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 certain surgical procedure has an 85% chance of success. A doctor performs the procedure on eight patients. The random variable represents the number of successful surgeries.

12. Find $P(3)$ using the geometric distribution when $p = 0.65$.

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

13. Determine the level of measurement of the given data set. The top five fiction books on The New York Times Best Sellers List on December 23, 2012 are listed.

1. Threat Vector 2. Gone Girl 3. The Forgotten 4. The Racketeer 5. Private London

14. The heights (in inches) of the players on a professional basketball team are listed. What is the mean height?

74, 78, 81, 87, 81, 80, 77, 80, 85, 78, 80, 83, 75, 81, 73.

15. Your college identification number consists of nine digits. The first two digits of each number will be the last two digits of the year you are scheduled to graduate. The other digits can be any number from 0 through 9, and each digit can be repeated. What is the probability of getting your college identification number when randomly generating the other seven digits?

16. You select a card from a standard deck of 52 playing cards. Find the probability that the card is a 4 or an ace.

17. A food manufacturer is analyzing a sample of 400 corn kernels for the presence of a toxin. In this sample, three kernels have dangerously high levels of the toxin. Four kernels are randomly selected from the sample. What is the probability that exactly one kernel contains a dangerously high level of the toxin?

18. Determine whether the random variable x is discrete or continuous. Explain your reasoning.

    (a) Let x represent the speed of a rocket.

    (b) Let x represent the number of calves born on a farm in one year.

19. Basketball player LeBron James makes a free throw shot about 75% of the time. Find the probability that the first free throw shot he makes occurs on the third or fourth attempt.

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

20. Find the coefficient of variation for each of the two data sets. Then compare the results. The ages (in years) and heights (in inches) of all the 12 students in a class are listed.

    Ages: 24 29 37 24 26 25 24 32 22 29 23 31

    Heights: 72 76 73 73 77 76 72 74 75 75 74 79

21. A survey of U.S. adults found that 62% of women believe that there is a link between playing violent video games and teens exhibiting violent behavior. You randomly select four U.S. women and ask them whether they believe that there is a link between playing violent video games and teens exhibiting violent behavior. Find the probability that (1) exactly two of them respond yes, (2) at least two of them respond yes, and (3) fewer than two of them respond yes.

(1x 10 = 10 Marks)