

OUR LADY OF GOOD COUNSEL GAYAZA

P425/2 APPLIED MATHEMATICS (paper 2)

Holiday work

Attempt all the questions

1. Two points A and B are 526 m apart along a straight road. A car moving along the road passes point A with a constant speed of 25 ms^{-1} . The car maintains this speed for 10 seconds and then decelerates uniformly for 8 seconds until it attains a speed of $V \text{ m}^{-1}$. The car maintains this speed until it passes point B. The total time taken by the car to move from point A to B is 30 seconds.
 - (a) Sketch a velocity – Time graph for the motion of the car.
 - (b) Determine the;
 - (i) Value of V
 - (ii) Deceleration of the car.
2. (a) Show that the formula based on Newton Raphson method for approximating the k^{th} root of a number N is given by $x_{n+1} = \frac{(k-1)x_n^k + N}{kx_n^{k-1}}$, $n = 0, 1, 2, 3, \dots$
 - (b) Find the root of the function when $N = 13$, $x_0 = 1.6$ and $k = 4$
3. (a) A woman travelling to work by a car goes through three police check point A, B and C. The probabilities that she is delayed at A, at B and at C are 0.3, 0.5 and 0.7 respectively. Determine the probability that she is delayed at;
 - (i) only one check point.
 - (ii) two or more check points.(b) A man goes to work by route P and Q. The probability that he takes P is 0.6. The probability that he is late given that he goes through P is $\frac{2}{3}$ and through Q is $\frac{1}{3}$.
 - (i) Find the probability that he is late for work on certain day.
 - (ii) Given that he is not late, determine the probability that he went through P.
4. A particle is projected from a point A at an angle θ to the horizontal with a speed 5 ms^{-1} . Another particle is projected at a point a distance 56m above point A horizontally with 3 ms^{-1} . If the two particles meet after 2 seconds, determine the;
 - (i) Value of angle θ
 - (ii) Value of speed u
 - (iii) Height above the ground where the two particles meet.
 - (iv) Determine the horizontal distance from A where two particles meet at this instant.

5. A continuous random variable X has a cumulative distribution function given by

$$F(x) = \begin{cases} \frac{1+x}{6}, & -1 \leq x \leq 0 \\ \frac{1+2x}{6}, & 0 \leq x \leq 2 \\ \frac{4+3x}{12}, & 2 \leq x \leq \frac{8}{3} \\ 1, & x \geq \frac{8}{3} \end{cases}$$

Find;

- (a) the median.
- (b) the probability density function $f(x)$.
- (c) $P(1 \leq X \leq 2.5)$.
- (d) the mean of X.

END