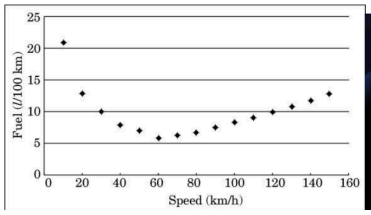
CBT CLASS XII MATHS AUGUST-2024

GENERAL INSTRUCTION :

CHAPTER: CONTINUTY AND DIIFFERENTIABILITY & AOD

Sr.No	Question	Marks
	Case Study 1 Let f(x) be a real valued function, then its *Left Hand Derivative (L.H.D.): $Lf'(a)$= lim ((h→ 0)$\frac{f(a-h)-f(a)}{-h}$ = (f(a+h) – f(a))/-h *Right Hand Derivative (R.H.D.): R$f'(a)$= lim (h→ 0)$\frac{f(a+h)-f(a)}{h}$ Also, a function f(x) is said to be differentiable at $x = a$, if L.H.D = R.H.D. If f(x)= |x-3| for x ≥ 1 and f(x) = $x^2/4$ - 3x/2 +13/4 for x<1	
1	R.H.D. of $f(x)$ at x = 1 is (a) 1 (b) -1 (c) 0 (d) 2	1
2	L.H.D. of $f(x)$ at x = 1 is (a) -1 (b) 1 (c) 2 (d) 0	1
3	$f(x)$ is not-differentiable at (a) x =1 (b) x = 2 (c) x = 3 (d) x = 4	1
4	Find the value of $f'(2)$. (a) -1 (b) 1 (c) 2 (d) 0	1
	Case Study 2 Overspeeding increases fuel consumption and decreases fuel economy as a result of tyre rolling friction and air resistance. While vehicles reach optimal fuel economy at different speeds, fuel mileage usually decreases rapidly at speeds above 80 km/h.   The relation between fuel consumption F (l/100 km) and speed V (km/h) under some constraints is given as F = V^2 /500 - V/4 + 14 On the basis of the above information, answer the following questions :	
5	Find F, when V = 40 km/h. (a) 7.6 (b) 7.4 (c) 7.3	1

	(d) 7.2	
6	dF/dV = (a) V – 1/4 (b) V/250 - 4 (c) V/250 – 1/4 (d) 2V -1/4	1
7	Find the speed V for which fuel consumption F is minimum. (a) 62.5 (b) 63.5 (c) 64.5 (d) 65.5	1
8	Find the quantity of fuel required to travel 600 km at the speed V at which dF/dV = – 0·01. (a) 7.2 (b) 6.2 (c) 5.2 (d) 21.2	1
	Directions: (Q.9 – Q.10) Each of these questions contains two statements: Assertion (A) and Reason (R). Each of these questions also has four alternative choices, any one of which is the correct answer . You have to select one of the options (a) , (b) , (c) and (d) given below : **(a) A is true , R is true and R is a correct explanation for A** **(b) A is true , R is true and R is not a correct explanation for Assertion** **(c) A is true and R is false** **(d) A is false and R is true**	
9	**Assertion:** |x| is continuous at x = 0 **Reason:** f(x) is continuous at x = a if lim x→a f(x) = f (a)	1
10	Let f(x) = x^3 -12x^2+36x+17 **Assertion:** f is strictly increasing in R – (2,6) **Reason:** f is strictly decreasing in (2,6)	1

Answer Key

Ans1	**(b)**
Feedback	*Option (b) is correct,* R.H.D. of $f(x)$ at x = 1 is -1
Ans2	**(a)**
Feedback	*Option (a) is correct,* L.H.D. of $f(x)$ at x = 1 is x = -1
Ans3	**(c)**
Feedback	*Option (c) is correct,* $f(x)$ is not-differentiable at x =3
Ans4	**(a)**
Feedback	*Option (a) is correct,* value of $f'(2)$ = -1
Ans5	**(d)**
Feedback	*Option (d) is correct, put V=40 in* F = V^2 /500 - V/4 + 14 so F = 7.2
Ans6	**(c)**
Feedback	*Option (c) is correct, dF/dV = V/250 -1/4*
Ans7	**(a)**
Feedback	*Option (a) is correct, dF/dV = V/250 -1/4 = 0 and V = 62.5 km/h*
Ans8	**(b)**
Feedback	*Option (b) is correct, dF/dV = V/250 -1/4 = -0.01 and by solving V = 60 km /h and required F =3600/500 – 15 + 14 = 6.2*
Ans9	**(a)**
Feedback	*Option (a) is correct, A is true , R is true and R is a correct explanation for A*
Ans10	**(b)**
Feedback	*Option (b) is correct, A is true , R is true and R is not a correct explanation for A*