

BOARD OF INTERMEDIATE & SECONDARY EDUCATION, SAHIAL

SUBJECT: Mathematics EXAM II - Annual 2022 CLASS: II-Y
 GROUP: 1st DATE: 07-12-22

(GENERAL INSTRUCTIONS FOR MARKING KEY)

Q.S (a)
$$f(x) = \begin{cases} 3x & \text{if } x \leq -2 \\ x^2 - 1 & \text{if } -2 < x < 2 \\ 3 & \text{if } x \geq 2 \end{cases}$$

 at $x=2$, $x = -2$
 Left hand limit

$$\lim_{x \rightarrow 2^-} f(x) = \lim_{x \rightarrow 2^-} x^2 - 1 = 3$$

 Right hand limit

$$\lim_{x \rightarrow 2^+} f(x) = \lim_{x \rightarrow 2^+} 3 = 3$$

at $x=3$, $f(x) = 3$
 $L.H.L = R.H.L = f(3)$
 $\therefore f(x)$ is Continuous at $x=2$ (3M)

at $x = -2$

$$L.H.L \lim_{x \rightarrow -2^-} f(x) = \lim_{x \rightarrow -2^-} 3x = -6$$

$$R.H.L \lim_{x \rightarrow -2^+} f(x) = \lim_{x \rightarrow -2^+} x^2 - 1 = 4 - 1 = 3$$

 $L.H.L \neq R.H.L$
 $\Rightarrow \lim_{x \rightarrow -2} f(x)$ does not exist
 $f(x)$ is not Continuous at $x = -2$ (2M)

Q.S (b)

$$y = e^x \sin x$$

$$\frac{dy}{dx} = e^x \cos x + e^x \sin x \quad (1M)$$

$$\frac{d^2y}{dx^2} = -e^x \sin x + e^x \cos x + e^x \sin x + e^x \sin x \quad (2M)$$

$$= 2e^x \cos x$$

$$L.H.S \frac{d^2y}{dx^2} - 2 \frac{dy}{dx} + 2y = 2e^x \cos x - 2e^x \cos x - 2e^x \sin x + 2e^x \sin x = 0 \quad R.H.S. \quad (2M)$$

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تم نے درج بالا سوال پرچہ (انشائیہ + سرورشی) اور دیات کے حوالے سے مکمل طور پر تکرار ہے۔ کسی قسم کی کوئی غلطی نہ ہے۔

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