## Chapter-11 Section-A

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- 26) Let [x] be the greatest integer less than or equal to x. Then, at which of the following points the function  $f(x) = x \cos(\pi(x + [x]))$  is discontinuous? (JEE Adv.2017)
  - a) x = -1
- b) x = 0
- c) x = 1
- d) x = 2
- 27) Let  $f(x) = \frac{1-x(1+|1-x|)}{|1-x|} \cos\left(\frac{1}{|1-x|}\right)$  for  $x \neq 1$ .Then (JEE Adv.2017)
  - a)  $\lim_{x\to 1^-} f(x) = 0$
  - b)  $\lim_{x\to 1^-}$  does not exist
  - c)  $\lim_{x\to 1^+} f(x) = 0$
  - d)  $\lim_{x\to 1^+}$  does not exist
- 28) Let  $f : \mathbb{R} \to \mathbb{R}$   $g : \mathbb{R} \to \mathbb{R}$  be two non-differentiable functions. If  $f'(x) = (e^{(f(x)-g(x))})g'(x)$  for all  $x \in \mathbb{R}$ ,and f(1) = g(2) = 1, then which of the following statement (s) is (are) TRUE? (JEE Adv.2018)

  - a)  $f(2) < 1 \log_e 2$  b)  $f(2) > 1 \log_e 2$

  - c)  $g(2) > 1 \log_e 2$  d)  $g(2) < 1 \log_e 2$
- 29) Let  $f: \mathbb{R} \to \mathbb{R}$  given by

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$$f(x) = \begin{cases} x^5 + 5x^4 + 10x^3 + 10x^2 + 3x + 1, & \text{if } x < 0; \\ x^2 - x + 1, & \text{if } 0 \le x < 1; \\ \frac{2}{3}x^3 - 4x^2 = 7x - \frac{8}{3} & \text{if } 1 \le x < 3; \\ (x - 2)\log_e(x - 2) - x = \frac{10}{3}, & \text{if } x \ge 3 \end{cases}$$

Then which of the following option is/are correct? (JEE Adv.2019)

- a) f' has a local maximum at at x=1
- b) f is increasing on  $(-\infty, 0)$
- c) f' is NOT differentiable at x = 1
- d) f is onto
- 30) Let  $f: \mathbb{R} \to \mathbb{R}$  be a function. We say that f has

**PROPERTY 1** if  $\lim_{h\to 0} \frac{f(h)-f(0)}{\sqrt{|h|}}$  exists and is finite, and

**PROPERTY 2** if  $\lim_{h\to 0} \frac{f(h)-(0)}{h^2}$  exists and is

Then which of the following options is/are correct? (JEE Adv.2019)

- a)  $f(x) = x^{\frac{2}{3}}$  has **PROPERTY 1**
- b)  $f(x) = \sin x$  has **PROPERTY 2**
- c) (x) = |x| has **PROPERTY 1**
- d) (x) = x |x| has **PROPERTY 2**