Comprehension # 1 (Q. 33 to 35)

If f(x) is continuous at x = 0 then xf(x) is differentiable at x = 0. By changing origin we can say that if f(x – a) is continuous at x = a then (x – a) f(x – a) is differentiable at x = a

33. The largest set over which $\frac{x\sin|x|}{1-|x|^2}$ is differentiable is

(A) R – {0, 1, –1} (B) R (C) R – {1, –1} (D) None of these

34. The number of points where f(x) = (x – 3) $|x^2 - 7x + 12|$ + cos|x – 3| is not differentiable is

(A) 1 (B) 2 (C) 3 (D) infinite

35. Let f(x) = |x|, g(x) = sinx and h(x) = g(x) f(g(x)) then

(A) h(x) is continuous but not differentiable at x = 0

(B) h(x) is continuous and differentiable everywhere

(C) h(x) is continuous everywhere and differentiable only at x = 0

(D) all of these

Comprehension # 2 (Q. No. 36 to 37)

If left hand derivative and right hand derivative of a function is same and finite then the function is continuous as well as differentiable. If left hand and right hand derivatives are different but finite then the function is continuous but not differentiable. If one of the derivatives is infinite then the function may be continuous but not differentiable.

36. If f(x) = $\int_0^x [t]dt$ then

(A) f(x) is continuous and differentiable at x ∈ N (B) f(x) is continuous but not differentiable at x ∈ N

(C) f(x) is discontinuous at x ∈ N (D) f(x) is continuous and differentiable at x ∈ Q

37. f(x) = $\frac{x}{1+2^{1/x}}$ is

(A) continuous at all points (B) differentiable at all points

(C) continuous for x ∈ R – {0} (D) non-differentiable at x = 0, 1

Comprehension # 3 (Q. No. 38 to 40)

$\phi : R \to R$ is a continuous function satisfying relation $\phi(x) - 2\phi\left(\frac{x}{2}\right) + \phi\left(\frac{x}{4}\right) = x^2$ and $\phi(0) = 1$.

38. The graph of y = ϕ(x) is a

(A) parabola (B) ellipse (C) hyperbola (D) circle

39. One of the vertices of the conic is

(A) (1, 0) (B) (0, 1) (C) (1, 1) (D) $\left(\frac{1}{2},\frac{1}{2}\right)$

40. Length of latus rectum of conic is

(A) $\frac{9}{16}$ (B) $\frac{16}{25}$ (C) $\frac{16}{9}$ (D) $\frac{25}{16}$

ANSWER KEY

DPP # 1

1.	(B)	**2.**	(D)	**3.**	(A)	**4.**	(A)	**5.**	(B)
6.	(C)	**7.**	(A)	**8.**	(D)	**9.**	(B)	**10.**	(C)
11.	(AB)	**12.**	(BD)	**13.**	(ABC)	**14.**	(ACD)		
15.	(ABCD)	**16.**	(ABCD)	**17.**	(ABC)	**18.**	(ABCD)	**19.**	(ABC)
20.	(ACD)	**21.**	(AB)	**22.**	(BC)	**23.**	(BCD)	**24.**	(ABD)
25.	(ABC)	**26.**	(AB)	**27.**	(BCD)	**28.**	(ABC)	**29.**	(AC)
30.	(ABD)	**31.**	(AB)	**32.**	(ACD)	**33.**	(B)	**34.**	(A)
35.	(D)	**36.**	(C)	**37.**	(B)				
38.	(A) → (p), (B) → (p), (C) → (p, q, s), (D) → (s)					**39.**	5	**40.**	4