APPLICATION OF DERIVATIVES

95. **Statements-1:** For the circle $(x-1)^2 + (y-1)^2 = 1$, the tangent at the point (1, 0) is the x-axis.
Statements-2: the derivative of a single valued function y = f(x) at x = a is the slope of the tangent drawn to the curve at x = a.

96. **Statements-1:** Both sin x, and cos x are decreasing functions in $\left(\frac{\pi}{2}, \pi\right)$ **[Good]**
Statements-2: If a differentiable function decreases is an interval (a, b) then its derivative also decreases in (a, b).

97. **Statements-1:** $e^{\pi} > \pi^{e}$ **[Good]**
Statements-2: The function $x^{\frac{1}{x}}\ (x > 0)$ has a local maximum at x = e

98. **Statements-1:** Conditions of LMVT fail in f(x) = |x – 1| (x – 1)
Statements-2: |x – 1| is not differentiable at x = 1

99. Let f(x) = $\sum_{i=1}^{n}(x - x_i)^2$
Statement–1 : Minimum value of f(x) occurs at x = $\frac{\sum x_i}{n}$
Statement–2 : Minimum of f(x) = $ax^2 + bx + c$ (a > 0) occurs at x = –b/2a.

100. **Statement–1 :** $\alpha^{\beta} > \beta^{\alpha}$, for $2.91 < \alpha < \beta$
Statement–2 : f(x) = $\frac{\log_e x}{x}$ is a decreasing function for x > e.

101. **Statement–1 :** Total number of critical points of f(x) = max. {1/2, sinx, cox} $-\pi \le x \le \pi$ are 5
Statement–2 : Total number of critical points of f(x) = max {1/2, x, cosx} $-\pi \le x \le \pi$ are 2

102. Let f(x) = $5p^2 + 4(x-1) - x^2$, $x \in R$ and p is a real constant
Statement–1 : If the maximum values of f(x) is 20, then p = –2.
Statement–2 : If the maximum value of f(x) is 20, then p = 2.

103. Let f(x) = $\sin^{-1} x + \cos^{-1} x + \tan^{-1} x$ and $x \in [-1, 1]$
Statements-1: Range of f(x) is $\left[\frac{\pi}{4}, \frac{3\pi}{4}\right]$.
Statements-2: f(x) is an increasing function.

104. Let f(x) = x^3
Statements-1: x = 0, in the point of inflexion for f(x)
Statements-2: $f''(x) < 0$ for x < 0 and $f''(x) > 0$ for x > 0.

105. Suppose f(x) = $\frac{x^2}{2} + \ell n\, x + 2\cos x$
Statements-1: f is an increasing function.
Statements-2: derivative of f(x) with respect to x is always greater than zero.

106. Let $0 < x \le \frac{\pi}{2}$ and f(x) = $\frac{\sin x}{x}$
Statements-1: The minimum value of f is $\frac{2}{\pi}$, attained at x = $\frac{\pi}{2}$.
Statements-2: $0 < \sin x < x$, $\forall\, x \in \left(0, \frac{\pi}{2}\right]$.

107. **Statements-1:** The equation $x^2 = x \sin x + \cos x$ has only one solution.
Statements-2: The derivative of the function $x^2 - x\sin x - \cos x$ is x(2- cos x).

108. **Statement–1 :** Angle of intersects in between $y = x^2$ and $6y = 7 - x^3$ at (1, 1) is $\pi/4$
Statement–2 : Angle of intersection between any two curve is angle between the tangents at the point of intersection.

109. **Statement – 1 :** The curve $y = x^{1/3}$ has a point of inflection at x = 0

Statement – 2 : A point where y'' fails to exist can be a point of inflection

110. Let f(x) and g(x) are two positive and increasing function
Statement – 1 : If (f(x)) g(x) is decreasing then f(x) < 1
Statement – 2 : If f(x) is decreasing then $f'(x) < 0$ and increasing then $f'(x) > 0$ for all x.

111. **Statement – 1 :** If $f(0) = 0$, $f'(x) = \ln(x + \sqrt{1+x^2})$, then f(x) is positive for all $x \in R_0$
Statements-2: f(x) is increasing for x > 0 and decreasing for x < 0.

112. **Statements-1:** The two curves $y^2 = 4x$ and $x^2 + y^2 - 6x + 1 = 0$ at the point (1, 2) intersect orthogonally.
Statements-2: Two curves y = f(x) & y=g(x) intersect orthogonally at $(x_1\ y_1)$ if $(f'(x_1).g'((x_1)) = -1$.

113. **Statements-1:** If $27a + 9b + 3c + d = 0$, then the equation $4ax^3 + 3bx^2 + 2cx + d = 0$ has atleast one real root lying between (0, 3)
Statements-2: If f(x) is continuous in [a, b], derivable in (a, b), then at least one point $c \in (a, b)$ such that $f'(c)=0$.

114. **Statements-1:** f(x) = {x} has local minima at x = 1.
Statements-2: x = a will be local minima for y = f(x) provided $\lim\limits_{x\to a^-} f(x) > f(a)$ also $\lim\limits_{x\to a^+} f(x) > f(a)$.

115. **Statements-1:** $f(x) = \frac{1}{2} - x\ ; \quad x < \frac{1}{2}$
$= \left(\frac{1}{2} - x\right)^2;\ x \ge \frac{1}{2}$. Mean value theorem is applicable in the interval [0, 1].
S-2: For application of mean value theorem, f(x) must be continuous in [0, 1] and differentiable in (0, 1).

116. **Statements-1:** For some $0 < x_1 < x_2 < \pi/2$, $\tan^{-1}x_2 - \tan^{-1}x_1 < x_2 - x_1$
Statements-2: If $f(x) > f(x_1) \Rightarrow x_2 > x_1$
function is always increasing

117. **Statements-1:** The graph of a continuous function y = f(x) has a cusp at point x = c if $f''(x)$ has same sign on both sides of c.
Statements-2: The concavity at any point x = c depends upon $f''(x)$. If $f''(x) < 0$ or $f''(x) > 0$ the function is either concave up or concave down.

118. **Statements-1:** If f be a function defined for all x such that $|f(x) - f(y)| < (x - y)^2$ then f is constant
Statements-2: If $\alpha(x) < \beta(x) < \gamma(x)$ for all x and $\lim\limits_{x\to a}\alpha(x) = \lim\limits_{x\to a}\gamma(x) = L \Rightarrow \lim\limits_{x\to a}\beta(x) = L$

119. **Statements-1:** $f : R \to R$ be a function such that $f(x) = x^3 + x^2 + 3x + \sin x$. Then f is one-one.
Statements-2: f(x) is neither increasing nor decreasing.

120. **Statements-1:** If α & β are any two roots of equation $e^x \cos x = 1$, then the equation $e^x \sin x - 1 = 0$ has at least one root in (α, β)
Statements-2: f is continuous in [α, β]. f is derivable in (α, β). f(α) = f(β) then these exists $x \in (\alpha, \beta)$ such that $f'(x) = 0$

121. **Statements-1:** The minimum value of the expression $x^2 + 2bx + c$ is $c - b^2$.
Statements-2: The first order derivative of the expression at x = –b is zero and second derivative is always positive.

122. **Statements-1:** Let $\phi(x) = \sin(\cos x)$ in $\left[0, \frac{\pi}{2}\right]$ then $\phi(x)$ is decreasing in $\left[0, \frac{\pi}{2}\right]$
Statements-2: $\phi'(x) \le 0\ \forall x \in \left[0, \frac{\pi}{2}\right]$

123. **Statements-1:** The function $f(x) = x^4 - 8x^3 + 22x^2 - 24x + 21$ is decreasing for every $x \in (2, 3) \cup (-\infty, 1)$
Statements-2: $f'(x) > 0$ for the given values of x.

124. **Statements-1:** For the function $f(x) = x^x$, x = 1/e is a point of local minimum.
Statements-2: $f'(x)$ changes its sign from –ve to positive in neighbourhood of x = 1/e.

125. **Statements-1:** Consider the function $f(x) = (x^3 - 6x^2 + 12x - 8)\, e^x$ is neither maximum nor minimum let x = 2
Statements-2: $f'(x) = 0$, $f''(x) = 0$, $f'''(x) \ne 0$ at x = 2

126. **Statements-1:** Consider the function f(x) $\frac{f(x_1 + x_2)}{2} < \frac{f(x_1) + f(x_2)}{2}$

Statements-2: $f'(x) > 0$, $f''(x) > 0$ where $x_1 < x_2$

127. Consider the following function with regard to the function
$f(x) = (x^3 - 6x^2 + 12x - 8)\, e^x$
Statement-1: f(x) is neither maximum nor minimum at x = 2
Statement-2: $f'(x) = 0$, $f''(x) = 0, f'''(x) \neq 0$ at x = 2.

128. **Statements-1:** Equation $f(x) = x^3 + 9x^2 + 2ax + a^2 + a + 1 = 0$ has at least one real negative root.
Statements-2: Every equation of odd degree has at least one real root whose sign is opposite to that of its constant term.

ANSWER

95. B	**96. C**	**97. A**	**98. D**	**99. A**	**100. A**	**101. A**
102. A	**103. A**	**104. A**	**105. A**	**106. B**	**107. D**	**108. D**
109. A	**110. A**	**111. A**	**112. D**	**113. A**	**114. A**	**115. D**
116. A	**117. A**	**118. A**	**119. C**	**120. A**	**121. A**	**122. A**
123. C	**124. A**	**125. A**	**126. A**	**127. A**	**128. A**	

Que. from Compt. Exams

1. $\frac{d}{dx}\tan^{-1}\left[\frac{\cos x - \sin x}{\cos x + \sin x}\right] =$ [AISSE 1985, 87; DSSE 1982,84; MNR 1985; Karnataka CET 2002; RPET 2002, 03]

(a) $\frac{1}{2(1+x^2)}$ (b) $\frac{1}{1+x^2}$ (c) 1 (d) – 1

2. If $y = \frac{x}{2}\sqrt{a^2+x^2} + \frac{a^2}{2}\log(x + \sqrt{x^2+a^2})$, then $\frac{dy}{dx} =$ **[AISSE 1983]**

(a) $\sqrt{x^2+a^2}$ (b) $\frac{1}{\sqrt{x^2+a^2}}$ (c) $2\sqrt{x^2+a^2}$ (d) $\frac{2}{\sqrt{x^2+a^2}}$

3. If $y = \cot^{-1}(\cos 2x)^{1/2}$, then the value of $\frac{dy}{dx}$ at $x = \frac{\pi}{6}$ will be **[IIT 1992]**

(a) $\left(\frac{2}{3}\right)^{1/2}$ (b) $\left(\frac{1}{3}\right)^{1/2}$ (c) $(3)^{1/2}$ (d) $(6)^{1/2}$

4. If $f(x+y) = f(x).f(y)$ for all x and y and $f(5) = 2$, $f'(0) = 3$, then $f'(5)$ will be **[IIT 1981; Karnataka CET 2000; UPSEAT 2002;** MP PET 2002; AIEEE 2002]

(a) 2 (b) 4 (c) 6 (d) 8

5. If $xe^{xy} = y + \sin^2 x$, then at $x = 0, \frac{dy}{dx} =$ **[IIT 1996]**

(a) –1 (b) – 2 (c) 1 (d) 2

6. If $u(x,y) = y\log x + x\log y$, then
$u_x u_y - u_x \log x - u_y \log y + \log x \ \log y =$ **[EAMCET 2003]**

(a) 0 (b) –1 (c) 1 (d) 2

7. If $y = f\left(\frac{2x-1}{x^2+1}\right)$ and $f'(x) = \sin x^2$, then $\frac{dy}{dx} =$ **[IIT 1982]**

(a) $\frac{6x^2-2x+2}{(x^2+1)^2}\sin\left(\frac{2x-1}{x^2+1}\right)^2$ (b) $\frac{6x^2-2x+2}{(x^2+1)^2}\sin^2\left(\frac{2x-1}{x^2+1}\right)$

(c) $\frac{-2x^2+2x+2}{(x^2+1)^2}\sin^2\left(\frac{2x-1}{x^2+1}\right)$ (d) $\frac{-2x^2+2x+2}{(x^2+1)^2}\sin\left(\frac{2x-1}{x^2+1}\right)^2$

8. If $x = \sec\theta - \cos\theta$ and $y = \sec^n\theta - \cos^n\theta$, then **[IIT 1989]**

(a) $(x^2+4)\left(\frac{dy}{dx}\right)^2 = n^2(y^2+4)$ (b) $(x^2+4)\left(\frac{dy}{dx}\right)^2 = x^2(y^2+4)$

(c) $(x^2+4)\left(\frac{dy}{dx}\right)^2 = (y^2+4)$ (d) None of these

9. If $y = x^{x^{x^{\ldots\ldots\infty}}}$, then $\frac{dy}{dx} =$ **[UPSEAT 2004; DCE 2000]**

(a) $\frac{y^2}{x(1+y\log x)}$ (b) $\frac{y^2}{x(1-y\log x)}$ (c) $\frac{y}{x(1+y\log x)}$ (d) $\frac{y}{x(1-y\log x)}$

10. If $y = (x\log x)^{\log\log x}$, then $\frac{dy}{dx} =$ **[Roorkee 1981]**

(a) $(x\log x)^{\log\log x}\left\{\frac{1}{x\log x}(\log x + \log\log x) + (\log\ \log x)\left(\frac{1}{x} + \frac{1}{x\log x}\right)\right\}$

(b) $(x\log x)^{x\log x}\log\log x\left[\frac{2}{\log x} + \frac{1}{x}\right]$ (c) $(x\log x)^{x\log x}\frac{\log\log x}{x}\left[\frac{1}{\log x} + 1\right]$

(d) None of these

11. $\frac{d}{dx}\left[\tan^{-1}\frac{\sqrt{1+x^2}+\sqrt{1-x^2}}{\sqrt{1+x^2}-\sqrt{1-x^2}}\right] =$ **[Roorkee 1980; Karnataka CET 2005]**

(a) $\frac{-x}{\sqrt{1-x^4}}$ (b) $\frac{x}{\sqrt{1-x^4}}$ (c) $\frac{-1}{2\sqrt{1-x^4}}$ (d) $\frac{1}{2\sqrt{1-x^4}}$

12. If $\sqrt{(1-x^6)} + \sqrt{(1-y^6)} = a^3(x^3 - y^3)$, then $\frac{dy}{dx} =$ **[Roorkee 1994]**

(a) $\frac{x^2}{y^2}\sqrt{\frac{1-x^6}{1-y^6}}$ (b) $\frac{y^2}{x^2}\sqrt{\frac{1-y^6}{1-x^6}}$ (c) $\frac{x^2}{y^2}\sqrt{\frac{1-y^6}{1-x^6}}$ (d) None of these

13. If $y = \sec^{-1}\frac{2x}{1+x^2} + \sin^{-1}\frac{x-1}{x+1}$, then $\frac{dy}{dx}$ is equal to **[Pb. CET 2000]**

(a) 1 (b) $\frac{x-1}{x+1}$ (c) Does not exist (d) None of these

14. The derivative of $\tan^{-1}\left(\frac{\sqrt{1+x^2}-1}{x}\right)$ with respect to $\tan^{-1}\left(\frac{2x\sqrt{1-x^2}}{1-2x^2}\right)$ at $x = 0$, is

(a) $\frac{1}{8}$ (b) $\frac{1}{4}$ (c) $\frac{1}{2}$ (d) 1

15. If $y^2 = p(x)$ is a polynomial of degree three, then $2\frac{d}{dx}\left\{y^3 . \frac{d^2y}{dx^2}\right\} =$ **[IIT 1988; RPET 2000]**

(a) $p'''(x) + p'(x)$ (b) $p''(x).p'''(x)$ (c) $p(x).p'''(x)$ (d) Constant

16. Let $f(x)$ and $g(x)$ be two functions having finite non-zero 3rd order derivatives $f'''(x)$ and $g'''(x)$ for all, $x \in R$. If $f(x)g(x) = 1$ for all $x \in R$, then $\frac{f'''}{f'} - \frac{g'''}{g'}$ is equal to

(a) $3\left(\frac{f''}{g} - \frac{g''}{f}\right)$ (b) $3\left(\frac{f''}{f} - \frac{g''}{g}\right)$ (c) $3\left(\frac{g''}{g} - \frac{f''}{g}\right)$ (d) $3\left(\frac{f''}{f} - \frac{g''}{f}\right)$

17. If $I_n = \frac{d^n}{dx^n}(x^n\log x)$, then $I_n - nI_{n-1} =$ **[EAMCET 2003]**

(a) n (b) $n-1$ (c) $n!$ (d) $(n-1)!$

18. If $x = \sin t$ and $y = \sin pt$, then the value of $(1-x^2)\frac{d^2y}{dx^2} - x\frac{dy}{dx} + p^2y$ is equal to **[Pb. CET 2002]**

(a) 0 (b) 1 (c) -1 (d) $\sqrt{2}$

19. Let $f:(0,+\infty) \to R$ and $F(x) = \int_0^x f(t)\,dt$. If $F(x^2) = x^2(1+x)$, then $f(4)$ equals **[IIT Screening 2001]**

(a) $\frac{5}{4}$ (b) 7 (c) 4 (d) 2

20. The volume of a spherical balloon is increasing at the rate of 40 *cubic centrimetre per minute*. The rate of change of the surface of the balloon at the instant when its radius is 8 *centimetre*, is **[Roorkee 1983]**

(a) $\frac{5}{2}$ *sq cm/min* (b) 5 *sq cm/min* (c) 10 *sq cm/min* (d) 20 *sq cm/min*

21. A man of height 1.8 *metre* is moving away from a lamp post at the rate of 1.2 $m/\sec$. If the height of the lamp post be 4.5 *metre*, then the rate at which the shadow of the man is lengthening is **[MP PET 1989]**

(a) $0.4\ m/\sec$ (b) $0.8\ m/\sec$ (c) $1.2\ m/\sec$ (d) None of these

22. The radius of the cylinder of maximum volume, which can be inscribed in a sphere of radius R is **[AMU 1999]**

(a) $\frac{2}{3}R$ (b) $\sqrt{\frac{2}{3}}R$ (c) $\frac{3}{4}R$ (d) $\sqrt{\frac{3}{4}}R$

23. The distance travelled s (in *metre*) by a particle in t seconds is given by, $s = t^3 + 2t^2 + t$. The speed of the particle after 1 second will be **[UPSEAT 2003]**

(a) 8 *cm/sec* (b) 6 *cm/sec* (c) 2 *cm/sec* (d) None of these

24. If $y = 4x - 5$ is tangent to the curve $y^2 = px^3 + q$ at (2, 3), then **[IIT 1994; UPSEAT 2001]**

(a) $p = 2, q = -7$ (b) $p = -2, q = 7$ (c) $p = -2, q = -7$ (d) $p = 2, q = 7$

25. At what points of the curve $y = \frac{2}{3}x^3 + \frac{1}{2}x^2$, tangent makes the equal angle with axis **[UPSEAT 1999]**

(a) $\left(\frac{1}{2}, \frac{5}{24}\right)$ and $\left(-1, -\frac{1}{6}\right)$ (b) $\left(\frac{1}{2}, \frac{4}{9}\right)$ and $(-1, 0)$ (c) $\left(\frac{1}{3}, \frac{1}{7}\right)$ and $\left(-3, \frac{1}{2}\right)$ (d) $\left(\frac{1}{3}, \frac{4}{47}\right)$ and $\left(-1, -\frac{1}{3}\right)$

26. If the normal to the curve $y = f(x)$ at the point $(3, 4)$ makes an angle $\frac{3\pi}{4}$ with the positive x-axis then $f'(3)$ is equal to

(a) -1 (b) $-\frac{3}{4}$ (c) $\frac{4}{3}$ (d) 1

27. The point(s) on the curve $y^3 + 3x^2 = 12y$ where the tangent is vertical (parallel to y-axis), is (are) **[IIT Screening 2002]**

(a) $\left(\pm\frac{4}{\sqrt{3}}, -2\right)$ (b) $\left(\pm\frac{\sqrt{11}}{3}, 1\right)$ (c) $(0, 0)$ (d) $\left(\pm\frac{4}{\sqrt{3}}, 2\right)$

28. Let $f(x) = \int_0^x \frac{\cos t}{t} dt, x > 0$ then $f(x)$ has **[Kurukshetra CEE 2002]**

(a) Maxima when $n = -2, -4, -6, ...$ (b) Maxima when $n = -1, -3, -5, ...$

(c) Minima when $n = 0, 2, 4, ...$ (d) Minima when $n = 1, 3, 5....$

29. If $f(x) = x^2 + 2bx + 2c^2$ and $g(x) = -x^2 - 2cx + b^2$ such that $min\ f(x) > max\ g(x)$, then the relation between b and c is **[IIT Screening 2003]**

(a) No real value of b and c (b) $0 < c < b\sqrt{2}$

(c) $|c| < |b|\sqrt{2}$ (d) $|c| > |b|\sqrt{2}$

30. N characters of information are held on magnetic tape, in batches of x characters each; the batch processing time is $\alpha + \beta x^2$ seconds; α and β are constants. The optimal value of x for fast processing is **[MNR 1986]**

(a) $\frac{\alpha}{\beta}$ (b) $\frac{\beta}{\alpha}$ (c) $\sqrt{\frac{\alpha}{\beta}}$ (d) $\sqrt{\frac{\beta}{\alpha}}$

31. On the interval [0, 1], the function $x^{25}(1-x)^{75}$ takes its maximum value at the point **[IIT 1995]**

(a) 0 (b) 1/2 (c) 1/3 (d) 1/4

32. The function $f(x) = \int_{-1}^{x} t(e^t - 1)(t-1)(t-2)^3(t-3)^5 dt$ has a local minimum at $x =$ **[IIT 1999]**

(a) 0 (b) 1 (c) 2 (d) 3

33. The maximum value of exp $(2 + \sqrt{3}\cos x + \sin x)$ is **[AMU 1999]**

(a) $\exp(2)$ (b) $\exp(2 - \sqrt{3})$ (c) $\exp(4)$ (d) 1

34. If the function $f(x) = 2x^3 - 9ax^2 + 12a^2x + 1$, where $a > 0$ attains its maximum and minimum at p and q respectively such that $p^2 = q$, then a equals **[AIEEE 2003]**

(a) 3 (b) 1 (c) 2 (d) $\frac{1}{2}$

35. The function $f(x)=\dfrac{\ln(\pi+x)}{\ln(e+x)}$ is **[IIT 1995]**

(a) Increasing on $[0,\infty)$ (b) Decreasing on $[0,\infty)$

(c) Decreasing on $\left[0,\dfrac{\pi}{e}\right)$ and increasing on $\left[\dfrac{\pi}{e},\infty\right)$ (d) Increasing on $\left[0,\dfrac{\pi}{e}\right)$ and decreasing on $\left[\dfrac{\pi}{e},\infty\right)$

36. The function $f(x)=\sin^4 x+\cos^4 x$ increases, if **[IIT 1999; Pb. CET 2001]**

(a) $0<x<\dfrac{\pi}{8}$ (b) $\dfrac{\pi}{4}<x<\dfrac{3\pi}{8}$ (c) $\dfrac{3\pi}{8}<x<\dfrac{5\pi}{8}$ (d) $\dfrac{5\pi}{8}<x<\dfrac{3\pi}{4}$

37. Let $h(x)=f(x)-(f(x))^2+(f(x))^3$ for every real number x. Then **[IIT 1998]**

(a) h is increasing whenever f is increasing (b) h is increasing whenever f is decreasing
(c) h is decreasing whenever f is decreasing (d) Nothing can be said in general

38. In [0, 1] Lagrange's mean value theorem is NOT applicable to **[IIT Screening 2003]**

(a) $f(x)=\begin{cases}\dfrac{1}{2}-x, & x<\dfrac{1}{2}\\ \left(\dfrac{1}{2}-x\right)^2, & x\ge\dfrac{1}{2}\end{cases}$ (b) $f(x)=\begin{cases}\dfrac{\sin x}{x}, & x\ne 0\\ 1, & x=0\end{cases}$

(c) $f(x)=x\,|x|$ (d) $f(x)=|x|$

39. If the function $f(x)=x^3-6ax^2+5x$ satisfies the conditions of Lagrange's mean value theorem for the interval [1, 2] and the tangent to the curve $y=f(x)$ at $x=\dfrac{7}{4}$ is parallel to the chord that joins the points of intersection of the curve with the ordinates $x=1$ and $x=2$. Then the value of a is **[MP PET 1998]**

(a) $\dfrac{35}{16}$ (b) $\dfrac{35}{48}$ (c) $\dfrac{7}{16}$ (d) $\dfrac{5}{16}$

40. Let $f(x)=\begin{Bmatrix}x^{\alpha}\ln x, & x>0\\ 0, & x=0\end{Bmatrix}$, Rolle's theorem is applicable to f for $x\in[0,1]$, if $\alpha=$ **[IIT Screening 2004]**

(a) -2 (b) -1 (c) 0 (d) $\dfrac{1}{2}$

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1	**d**	**2**	**a**	**3**	**a**	**4**	**c**	**5**	**c**
6	**c**	**7**	**d**	**8**	**a**	**9**	**b**	**10**	**a**
11	**a**	**12**	**c**	**13**	**c**	**14**	**b**	**15**	**c**
16	**b**	**17**	**d**	**18**	**a**	**19**	**c**	**20**	**c**
21	**b**	**22**	**b**	**23**	**a**	**24**	**a**	**25**	**a**
26	**d**	**27**	**d**	**28**	**b,d**	**29**	**d**	**30**	**c**
31	**d**	**32**	**b,d**	**33**	**c**	**34**	**c**	**35**	**b**
36	**b**	**37**	**a, c**	**38**	**a**	**39**	**b**	**40**	**d**