Mathematics Revision Test for IIT-JEE

TOPICS TO BE COVERED

COMPLETE

CALCULUS

GENERAL INSTRUCTIONS:

1. *Duration of Test is 1 hour.*
2. *Test Booklet consists of 30 questions.The maximum marks are 120..*
3. *Each question carries +4 marks for CORRECT answer and -1 mark for each INCORRECT answer.*
4. *In case,any question has more than one correct options,mark all correct options.*
5. *Each question has four options,only one or more than one option is correct.*

Name of Student:.....

.

ID-No..... Registration No..... student's signature.....

Invigilator signature.....

1. $\lim_{x\to 0}(x/(\sqrt{4-x}-\sqrt{(4+x)})$ equals to
(a) 2 (b) -2 (c) 0 (d) -1

2.The value of :
$\lim_{x\to a}((\sqrt{a+2x}-\sqrt{3x})/\sqrt{3a+x}-2\sqrt{x}))$,
Where $a \neq 0$
(a) $\frac{2}{3\sqrt{3}}$ (b) $\frac{-2}{3\sqrt{3}}$ (c) $\frac{2}{2\sqrt{5}}$ (d) $\frac{-2}{2\sqrt{5}}$

3. Find $\lim_{x\to\infty}\frac{\sqrt{x+2}}{\sqrt{x+\sqrt{x}}+\sqrt{x+5}}$
(a) 1/2 (b) -1/2 (c) 2/3 (d) -2/3

4. Evaluate $\lim_{x\to 0}(3x-sinx)/(tanx+x)$
(a) 0 (b) 2 (c) 1 (d) -1

5.The value of $\lim_{x\to 0}(tan^2 3x)/(sin^2 5x)$
(a) 25/9 (b) 25/9 (c) 5/3 (d) 3/5

6. $\lim_{x\to\frac{\pi}{4}}(cosx-sinx)/\left[(\frac{\pi}{4}-x)(cosx+sinx)\right]$=
(a) 1/3 (b) -1/3 (c) -2 (d) ∞

7. Determine f(0) so that the function f(x) defined by
$f(x)=(4^x-1)^3/(\sin(\frac{x}{4})\log(1+\frac{x^2}{7})$
becomes continuous at x=0.
(a) 28 $(\log_e 4)^3$ (b) 28 $(\log_e 3)^2$
(a) (c) 28 $(\log_5 10)^3$ (d) 18 $(\log_e 4)^3$

8. For what value of k is the following function continuous at x=2 ?
$$f(x)=\begin{cases}2x+1; & x<2\\ k\ ; & x=2\\ 3x-1 & ;x>2\end{cases}$$
(a) 4 (b) 0 (c) 5 (d) 1

9. If f(x) ,defined by the following,is continuous at x=0, find the values of a,b, and c
$$f(x)\begin{cases}(\sin(a+1)x+sinx)/x & ;if\ x<0\\ c & ;\ \ if\ x=0\\ \frac{(\sqrt{x+bx^2}-\sqrt{x})}{bx^{\frac{3}{2}}} & ;if\ x>0\end{cases}$$
(a) a= -3/2, c=1/2 ,b may be any real value
(b) a=-2/3 ,c = 2/3, b may be any natural no.
(c) a=-3/2, c= 1/2, b=0
(d) none of these.

10. If $y=f(\frac{2x-1}{(x^2+1)}$ and f '(x)=sinx^2, find dy/dx
(a) 2sin $\left(\frac{2x-1}{x^2+1}\right)$ {(1 + x – x^2)/(x^2 + 1)^2}
(b) 4sin $\left(\frac{2x-1}{x^2+1}\right)$ {(1 + 2x – x^2)/(x^2 + 1)^2}
(c) 2sin $\left(\frac{2x-1}{x^2+1}\right)$ {(1 – x + x^2)/(x^2 + 1)^2}
(d) 2sin $\left(\frac{2x-1}{x^2+1}\right)$ {(1 + x – x^2)/(x^2 – 1)^2}

11. Differentiate the given below infinite series and find the dy/dx in terms of y
$$y=(\sqrt{x})^{(\sqrt{x})^{(\sqrt{x})^{\cdots\infty}}}$$
(a) $\frac{y^2}{x(2-ylogx)}$ (b) $\frac{y}{x(2-y^2logx)}$
(c) $\frac{y^2}{2x(2-ylogx)}$ (d) none of these

12.Find the set of values of K for which the equation I lnx I-Kx = 0 possess three distinct roots.
(a) 0 < K < e (b) 0 < K < 1/e
(c) 0 < K < ∞ (d) none of these

13. Find the acute angle between the curves y =I x^2 -3I at Their points of intersection.
(a) $\tan^{-1}\frac{\sqrt{2}}{7}$ (b) $\sin^{-1}\frac{(4\sqrt{2})}{7}$
(c) $\tan^{-1}\frac{(4\sqrt{2})}{7}$ (d) $\tan^{-1}\frac{2}{7}$

14. Find the length of tangent for the curve $y=x^3+3x^2+4x-1$ at point x=0
(a) $\sqrt{17}/6$ (b) $\sqrt{17}/3$
(c)) $\sqrt{17}/8$ (d)) $\sqrt{17}/4$

15.Find the smallest positive constant K such that $lnx \leq Kx^2$ for all x > 0.
(a) 1/e (b) 1/2e (c) e (d) 2e

16.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 to :
(a) 3 (b) 1 (c) 2 (d) 1/2

17.If 2a+ 3b+ 6c = 0, then at least one root of

the equation $ax^2 + bx + c = 0$ lies in the interval:

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

18.The function $f(x) = \tan^{-1}(sinx + cosx)$ is an increasing function in:

(a) (π/4, π/2) (b) (-π/2, π/4)

(c) (0, π/2) (d) (-π/2, π/2)

19.Let: $R \to R$ be defined by

$f(x) = \begin{cases} k - 2x, if x \leq -1 \\ 2x + 3, if\ x > -1 \end{cases}$ if f has a local minimum at x=-1,then a possible value of k is:

(a) 0 (b) -1/2 (c) -1 (d) 1

20. Evaluate : $\int e^x \left(\frac{1-sinx}{1-cosx}\right)dx$

(a) $I = -e^x\ sinx/2 + C$ (b) $I = -e^x\ cotx/2 + C$

(c) $I = -e^x\ tanx/2 + C$ (d) none of these

21.Evaluate $\int e^{sinx}.\frac{xcos^3x-sinx}{cos^2x}.dx$

(a) $e^{sinx}(x - cotx) + C$ (b) $e^{sinx}(x + secx) + C$

(c) $e^{sinx}(x - tanx) + C$ (d) $e^{sinx}(x - secx) + C$

22.Evaluate $\int \frac{x^2-4}{x^4+16}.dx$

(a) $\frac{1}{4\sqrt{2}}\ log\left|\frac{x^2+4-2\sqrt{2}x}{x^2+4+2\sqrt{2}x}\right| + C$

(b) $\frac{1}{4\sqrt{2}}\ log\left|\frac{x^2+4+2\sqrt{2}x}{x^2+4-2\sqrt{2}x}\right| + C$

(c) $\frac{1}{2\sqrt{2}}\ log\left|\frac{x^2+4-2\sqrt{2}x}{x^2+4+2\sqrt{2}x}\right| + C$

(d) none of these.

23.Let $f(x) = \int e^x(x-1)(x-2)dx$ then f decreases in the interval:

(a) $(-\infty, 2)$ (b) (-2,-1)

(c) (1,2) (d) $(2, +\infty)$

24.$\int \frac{dx}{cosx-sinx}$ *is equal to*:

(a) $\frac{1}{\sqrt{2}}log\left|\tan(\frac{x}{2} - \frac{\pi}{8})\right| + C$

(b) $\frac{1}{\sqrt{2}}log\left|\cot\frac{x}{2}\right| + C$

(c) $\frac{1}{\sqrt{2}}log\left|\tan(\frac{x}{2} - \frac{3\pi}{8})\right| + C$

(d) $\frac{1}{\sqrt{2}}log\left|\tan(\frac{x}{2} + \frac{3\pi}{8})\right| + C$

25.Evaluate : $\int_0^{\pi} \log(1 + cosx).dx$

(a) $-\pi \log_e 2$ (b) $\pi \log_e 2$

(c) $-\frac{\pi}{2}\log_e 2$ (d) $\frac{\pi}{2}\log_e 2$

26.The value of g'(1/2) is:

(a) $\frac{\pi}{2}$ (b) $-\frac{\pi}{2}$ (c) π (d) 0

27.If the area bounded by $y = x^2 + 2x - 3$ and the line $y = kx + 1$ is least. k and least area respectively are:

(a) 2; 32/3 (b) 1; 3/32

(c) 2; 3/32 (d) 1; 32/3

28. If area enclosed between the curves $y = ax^2$ and $x = ay^2$ in the first quadrant is 1.Then possible values of a is:

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

29.The solution of y =y(x) of the differential equation $(x^2+y^2)dy = xy\ dx$ satisfies the conditions y (1) =1 And $y(x_0)=e$,then value of x_0 is:

(a) $\sqrt{3}e$ (b) $\sqrt{2(e^2-1)}$

(c) $\sqrt{2(e^2+1)}$ (d) $\sqrt{(e^2-1)/2}$

30.The degree and order of the differential equation of the family of all parabolas whose axis is x- axis , are respectively:

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

SPACE FOR ROUGH WORK

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ANSWER SHEET-MATHEMATICS for IIT Jee
(Complete CALCULUS)

DATE OF TEST:...../...../20..... **DAY**.....

NAME OF STUDENT:.....

ID NUMBER..... **REGISTRATION NO**:.....

STUDENT'S CONTACT NO: | | | | | | | | | | |

GUARDIAN'S/PARENTS CONTACT NO: | | | | | | | | | | |

INVIGILATOR SIGN.:.....

TO BE FILLED BY EXAMINER

TOTAL ATTEMPT:..... OUT OF 30 TOTAL MARKS OBTAINED.....OUT OF 120

TOTAL CORRECT..... RANK.....

TOTAL INCORRECT..... EXAMNER'S SIGN.....

OMR SHEET (To be filled by student)

	a	b	c	d		a	b	c	d
1.	○	○	○	○	**16.**	○	○	○	○
2.	○	○	○	○	**17.**	○	○	○	○
3.	○	○	○	○	**18.**	○	○	○	○
4.	○	○	○	○	**19.**	○	○	○	○
5.	○	○	○	○	**20.**	○	○	○	○
6.	○	○	○	○	**21.**	○	○	○	○
7.	○	○	○	○	**22.**	○	○	○	○
8.	○	○	○	○	**23.**	○	○	○	○
9.	○	○	○	○	**24.**	○	○	○	○
10.	○	○	○	○	**25.**	○	○	○	○
11.	○	○	○	○	**26.**	○	○	○	○
12.	○	○	○	○	**27.**	○	○	○	○
13.	○	○	○	○	**28.**	○	○	○	○
14.	○	○	○	○	**29.**	○	○	○	○
15.	○	○	○	○	**30.**	○	○	○	○

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