

Admission Test 2007
Economics Department
Presidency College, Kolkata
Group A : English

Time: One hour

Full Marks: 50

- 1) Answer any one of the following questions elucidating and elaborating upon but remaining confined to the content of the relevant passage. The answer must be in the candidate's own words. One can write the answer in Bengali also.

[20]

(a) What is modernity? The term refers to the social order that emerged following the Enlightenment. Though its roots may be traced further back, the modern world is marked by unprecedented dynamism, its dismissal or marginalization of tradition, and by its global consequences. Time seemed to speed up, space to open up. Modernity's forward-looking thrust relates strongly to belief in progress and the power of human reason to produce freedom. But its discontents spring from the same source: unrealized optimism and the inherent doubt fostered by post-traditional thought. These, along with the unintended effects of classifying, ordering and rationalizing modern life, clipped freedom's wings. Though modernity can be seen in achievements such as science and technology or democratic politics, it also affects profoundly the routines of everyday life. "Who says?" - authority questions, and "Who am I?" - identity questions - are posed in new and more urgent ways.

Q. Which two aspects of modernity are discussed by the author?

(b) It has been repeatedly said that the purpose of education is to make people happier. The assumption that it does make people happier needs to be considered separately. That the educated person is happier than the uneducated is by no means self-evident. Those who are conscious of their lack of education are discontented, if they cherish ambitions to excel in occupations for which they are not qualified; they are sometimes discontented, simply because they have been given to understand that more education would have made them happier. Many of us feel some grievance against our elders, our schools or our universities for not having done better by us: this can be a way of extenuating our own shortcomings and excusing our failures. On the other hand, to be educated above the level of those whose social habits and tastes one has inherited, may cause a division within a man which interferes with happiness; even though, when the individual is of superior intellect, it may bring him a fuller and more useful life. And to be trained, taught or instructed above the level of one's abilities and strength may be disastrous; for education is a strain and can impose great burdens upon a mind than that mind can bear. Too much education, like too little education, can produce unhappiness.

Q. Following the author's view explain why education may make people unhappier.

- 2) Write an essay on any one of the following topics :-

[30]

- A. A good book I have read and enjoyed
- B. The world of colour
- C. The menace of regionalism in India.
- D. The lessons of history.

DEPARTMENT OF ECONOMICS
ADMISSION TEST- 2007
GROUP—B: MATHEMATICS

FULL MARKS-50

TIME – 1 HOUR

Section -I

Attempt any ten questions

2 x 10 = 20

Put a tick \checkmark mark in the appropriate box the correct option.

1. If $e^{\sin x} - e^{-\sin x} - 4 = 0$ then the number of real values of x is:

- A. 0 B. 1 C. 2 D. Infinite

2. The population of a country in the year 2000 was 7.54×10^7 . After three years the population rose to 8×10^7 . Find the annual rate of increase, if it is given that $(1.0612)^3 = 1.02$ (approx.)

- A. 2.0 % B. 4.6 % C. 10.2 % D. 10.6 %

3. What is the value of $\lim_{x \rightarrow \pi} \frac{1}{\pi - x}$

- A. 0 B. 1 C. the limit does not exist D. π

4. What will be the first negative term in the expansion of $(1+3x)^{17/2}$?

- A. the 5th term B. the 9th term C. the 11th term D. the 13th term

5. If the area of a circle increases at a constant rate, then the rate of increase of its circumference:

- A. Varies directly as the radius
B. Varies inversely as the radius
C. Varies directly as the square of the radius
D. None of these

6. Wonderland alphabet has only 5 letters A, L, I, C and E. A word in this language is an arbitrary sequence of no more than five letters. Total number of words in Wonderlandish language is

- A. infinity B. 5! C. 5^5 D. $5+5^2+5^3+5^4+5^5$

7. Consider the following premises that

1. A drug addict student received personal attention and effective counselling from a compassionate teacher
2. The student was able to give up the habit of taking drugs with the given support.
3. The social behaviour and academic performance of the student became markedly better

Suggest the most logically sequential order of events between the given premises.

- A. 1 follows due to 3 while 2 follows due to 1
B. 3 follows from 2 and 2 follows from 1
C. 1 is related to 2 but 3 is unrelated to either of them
D. No relationship exists between the given three premises

8. The straight line $x + y = k$ will be a tangent to the ellipse $\frac{x^2}{9} + \frac{y^2}{16} = 1$, if k equals:
A. 8 B. 5 C. 10 D. ± 6

9. The function $f(x) = \frac{\log(1+ax) - \log(1-bx)}{x}$ is continuous at $x = 0$ if the value of $f(0)$ is
A. $a - b$ B. $a + b$ C. $\log a + \log b$ D. none of these

10. Let α and β be the roots of the equation $x^2 - ax + b = 0$. Then $\lim_{x \rightarrow \alpha} \frac{e^{x^2-ax+b} - 1}{x - \alpha}$ is:
A. $\alpha - \beta$ B. $\beta - \alpha$ C. 1 D. None of these

11. How many 10 digit numbers can be written by using the digits 1 and 2?
A. ${}^{10}C_1 + {}^{10}C_2$ B. 2^{10} C. ${}^{10}C_2$ D. 101

12. If you differentiate $\tan^{-1} \frac{2x}{1-x^2}$ with respect to $\sin^{-1} \frac{2x}{1+x^2}$ the result will be
A. 1 B. -1 C. 2 D. none of these

13. If x is real, what will be the value of $\frac{x^2 + 34x - 71}{x^2 + 2x - 7}$?
A. 6 B. 8 C. nothing in between 5 and 9 D. none of these

14. Disgusted with calculus Dashu tore off several successive pages of his book. The number of the first page was 143 and the number of the last page had same digits in different order. How many pages he tore out of the book?
A. 143 to 314 B. 143 to 341 C. 143 to 413 D. 143 to 431

15. If $y = x - \frac{1}{2}x^2 + \frac{1}{3}x^3 - \frac{1}{4}x^4 + \dots$ ($-1 < x \leq 1$) then dy/dx is:
A. e^x B. $1/(1+x)$ C. $1/(1-x)$ D. e^{-x}

Section: II

Attempt any three of the following

3 X 10 = 30

1. [a] The vertex of an equilateral triangle is at the origin and the other two vertices are given by $2x^2 + 2x + k = 0$. Find the value of k .

[b] A, B, C and D is a convex quadrilateral. 3, 4, 5 and 6 points are marked on the sides AB, BC, CD and DA, respectively. Find the number of triangles with vertices on different sides.

[5+5]

2. [a] Two cyclists start from the junction of two perpendicular roads, their velocities being $3v$ km/hour and $4v$ km/hour. Find the rate at which the cyclists are moving away from each other.

[b] Find the ratios at which the area bounded by the curves $y^2 = 4x$ and $x^2 = 4y$, is divided by the straight line $x = 1$.

[5+5]

3. [a] Differentiate $(\tan x)^{\cot x} + (\cot x)^{\tan x}$.

[b] If $y = \sqrt{\log x + \sqrt{\log x + \sqrt{\log x + \dots \infty}}}$ prove that $x = \frac{1}{(2y-1) \frac{dy}{dx}}$

[5+5]

4. The fuel charges for running a train are proportional to the square of the speed generated in mph and costs Rs. 48/ hour at 16 mph. What is the most economical speed if the fixed charges i.e. salaries etc. amount to Rs. 300/hour.

[10]

5. A telephone company in a town has 500 subscribers on its list and collects fixed charges of Rs. 300/ subscriber/year. The company proposes to increase the annual subscription and it is believed that for every increase of Re 1, one subscriber will discontinue the service. Find what increase will bring maximum income to the company.

[10]

6. [a] If a, b, c are in A.P. and x, y, z are in G.P. find the value of $(b-c) \log x + (c-a) \log y + (a-b) \log z$

[b] Show that $\log_e 2 = \frac{1}{2} + \frac{1}{1.2.3} + \frac{1}{3.4.5} + \frac{1}{5.6.7} + \dots (-1 < x \leq 1)$

[5+5]