# Presidency University <br> Admission Test, 2013 <br> ECONOMICS MAJOR 

## Model Questions

## Group A : English(30 Marks)

Write an essay on any one of the following topics:
a) Our sweetest songs are those that tell of saddest thought.
b) A good film I have seen and enjoyed.

## Group B : Mathematics (70 Marks)

Answer all questions. You will get 2 marks for a correct answer and -0.5 for an incorrect answer.

1. The radius of a circle is 2.5 cm . The error in the calculated area due to an error of 0.01 cm in the radius is
A. 0.154 sq. cm
B. 0.157 sq. cm
C. 0.161 sq. cm
D. 0.169 sq. cm
2. $\operatorname{Lim}\left\{\frac{\log _{e}(1+x)}{x^{2}}+\frac{x-1}{x}\right\}$ is equal to

$$
x \text {-> } 0
$$

A. $1 / 2$
B. $-1 / 2$
C. 1
D. none of these
3. Let $\mathrm{f}(\mathrm{x})=|\mathrm{x}|$ for $0<|\mathrm{x}| \leq 2$

$$
=1 \quad \text { for } x=0
$$

Then at $\mathrm{x}=0, \mathrm{f}(\mathrm{x})$ has
A. a local maximum
B. no local maximum
C. a local minimum
D. no extremum
4. Find out the points of contact on the curve $y=x^{2}+3 x+4$ of the two tangents which pass through the origin are
A. $(2,14),(-2,2)$
B. $(2,14),(-2,-2)$
C. $(2,14),(2,2)$
D. none of these
5. There are 10 lamps in Vivekananda sporting club. Each lamp can be switched on independently. The number of ways in which the club can be lightened to different amounts of illumination is
A. $10^{2}$
B. 1023
C. $2^{10}$
D. 10 !
6. The area bounded by the curves $y=|x|-1$ and $y=-|x|+1$ is
A. 3 sq.
units
B. 4 sq. units
C. 6 sq. units
D. 2 sq. units
7. Everybody in a room shakes hands with everybody else. The total number of handshakes is 66 . The total number of persons in the room is
A. 11
B. 12
C. 13
D. 14
8. If $a, b, c$ are in G. P. and $a, b, c$ are positive, then the following relation holds
A. $a+c>2 b$
B. $a+c>b$
C. $a+b>2 c$
D. none of these
9. The number of odd numbers between 60 and 360 is
A. 120
B. 125
C. 150
D. none of these
10. If $x^{y}=e^{x-y}$, then the value of $\frac{d y}{d x}$ is
A. $\frac{1-\log x}{\log x}$
B. $\frac{(1-\log x)^{2}}{\log x}$
C. $\frac{\log x}{(1+\log x)^{2}}$
D. $\frac{1+\log x}{1-\log x}$
11. If $y=x+x^{2}+x^{3}+$ $\qquad$ .to $\infty$, then x equals
A. $\frac{y}{y+1}$
B. $\frac{\mathrm{y}+1}{\mathrm{y}}$
C. $\frac{y}{y-1}$
D. $\frac{y-1}{y}$
12. If $f(x+y)=f(x)+f(y)$ for all $x$ and $y$, then
A. $f(x)$ is an even function
B. $f(x)$ is an odd function
C. $f(x)$ is neither odd nor even function
D. $f(x)$ is both odd and even function
13. You are to maximize the value of $f(x, y)=x^{2}-y^{2}$ by choosing a suitable pair of values for $x$ and $y$. If $x$ and $y$ must add up to unity the maximum value of $f(x, y)$ is A. 1
B. -1
C. there is no solution
D. there are multiple solutions
14. At $x=0, f(x)=|x|$ is
A. continuous
B. differentiable
C. continuous and differentiable
D. neither continuous nor differentiable
15. By increasing the value of $x$ we can expect to raise the value of $f(x) / x$ if
A. $f^{\prime}(x)>0$
B. $f^{\prime}(x)>f(x)$
C. $f^{\prime}(x)>f(x) / x$
D. none of these
16. Consider the following statements:
[i] Both $\sin x$ and cosx are decreasing functions in the interval $\left(\frac{\pi}{2}, \pi\right)$
[ii] If a differentiable function decreases in a interval ( $a, b$ ), then its derivative also decreases in (a,b).

Which of the following is true?
a)Both (i) and (ii) are wrong
b)Both (i) and (ii) are correct but (ii) is not the correct explanation for (i)
c)(i) is correct and (ii) is the correct explanation for (i)
d) (i) is correct and (ii) is wrong
17. The slope of the tangent to the curve $\mathrm{y}=\int_{0}^{x} \frac{d x}{\left(1+x^{3}\right)}$ at a point where $\mathrm{x}=2$ is:
a) ${ }^{1 / 4}$
b) $1 / 3$
c) $1 / 9$
d) 1
18. The differential equation of the family of circles with centre at the origin is:
a) $x d x+y d y=0$
b) $y d x+x d y=0$
c) $x^{2} d x+y^{2} d y=0$
d) $x d y-y d x=0$
19. The area bounded by $y=x e^{|x|}$ and the straight lines $|x|=1, y=0$ is:
a)1
b) 2
c)4
d) 6
20. Area lying in the first quadrant and bounded by the circle $x^{2}+y^{2}=4$ and the lines $x=$
0 and $x=2$ is
(a) $\pi$
(b) $\frac{\pi}{2}$
(c) $\frac{\pi}{3}$
(d) $\frac{\pi}{4}$
21. If the equation $y=2 x$ is graphed, which of the following values of $x$ would produce a point closest to the $x$-axis?
(a) $8 / 3$
(b) $3 / 4$
(c) $5 / 3$
(d) $1 / 4$
22. The graph of $\left(\frac{x}{2}\right)^{2}-\left(\frac{y}{3}\right)^{2}=1$ is a hyperbola. Which set of equations represents the asymptotes of the hyperbola's graph ?
(a) $y=\frac{3}{2} x, y=-\frac{3}{2} x$
(b) $y=\frac{3}{2} x, y=-\frac{2}{3} x$
(c) $y=\frac{1}{2} x, y=-\frac{1}{2} x$
(d) $y=\frac{1}{3} x, y=-\frac{1}{3} x$
23. Which of the following sentence is true about the graphs of $y=3(x-5)^{2}+1$ and $y=3(x+5)^{2}+1$ ?
(a) Their vertices are maximum
(b) The graphs have the same shape with different vertices
(c) The graphs have different shapes with different vertices
(d) One graph has a vertex that is a maximum, while the other graph has a vertex that is a minimum
24. If $(1,2),(4, y),(x, 6)$ and $(3,5)$ are the vertices of a parallelogram taken in order, values of $x$ and $y$ are, respectively,
(a) $(8,4)$
(b) $(4,8)$
(c) $(6,3)$
(d) $(3,6)$
25. If $\operatorname{Cos} \theta=-4 / 5$ and $\operatorname{Sin} 2 \theta=24 / 25$, then the quadrant in which $\theta$ lies is
a) First
b)Second
c)Third
d)Fourth
26. The value of $\operatorname{Sin} \theta \tan (\theta / 2)$ is
a) always positive b)always negative c)always 1
d)sometimes positive and sometimes negative
27. If the length of the sides of triangle ABC are $\mathrm{a}=\sqrt{3} \mathrm{~cm} ., \mathrm{b}=2 \mathrm{~cm}$. and $\mathrm{c}=1 \mathrm{~cm}$. then the value of angle $A$ is
a) $60^{0}$
b) $30^{0}$
c) $45^{0}$
d) $90^{0}$
28. Out of 120 tickets numbered consecutively from 1 to 120 , one is drawn at random. The probability of getting a number which is a multiple of 5 is
a) $1 / 24$
b) $1 / 8$
c) $1 / 5$
d) $1 / 16$
29. One ball is drawn at random from each of two identical urns. Urn 1 contains 4 red and 3 black balls and urn 2 contains 2 red and 7 black balls. The probability that there will be at least one red ball is
a) $2 / 3$
b) $8 / 63$
c) $1 / 3$
d) $1 / 4$
30. The total number of ways of forming groups by taking any number from $n$ distinct objects is
a) $2^{\text {n }}$
b) $2^{n}+1$
c) $2^{n}-1$
d)None of the above
31. Which of the following is true?
a) If a function is continuous at a point, it must be differentiable there.
b) If a function is differentiable at a point, it must be continuous there.
c) If a function is not differentiable at a point, it cannot be continuous there.
d) If a function is not continuous at a point, it must be differentiable there.
32. If $A$ and $B$ are mutually exclusive events with positive probabilities then
a) $\mathrm{P}(\mathrm{AB})=\mathrm{P}(\mathrm{A}) \cdot \mathrm{P}(\mathrm{B})$
b) $\mathrm{P}(\mathrm{AUB})=\mathrm{P}(\mathrm{A}) \cdot \mathrm{P}(\mathrm{B})$
c) $\mathrm{P}(\mathrm{A} / \mathrm{B}) \neq \mathrm{P}(\mathrm{A}) \quad$ *
d) $\mathrm{P}(\mathrm{A} \cap \mathrm{B})=\mathrm{P}(\mathrm{AUB})$
33. If $y=\log _{10} x$, then the value of $d y / d x$ is
a) $1 / x$
b) $(1 / x) \cdot \log _{10} e$
c) $(1 / \mathrm{x}) \cdot \log _{\mathrm{e}} 10$
d) $\mathrm{x} . \mathrm{e}$
34. A railway half ticket costs half the full fare and the reservation charge is the same on half ticket as on full ticket. One reserved first class ticket from Chennai to Trivandrum costs Rs. 216 and one full and one half reserved first class tickets cost Rs. 327. What is the basic first-class full fare and what is the reservation charge?
(a) Rs. 105 and Rs. 6 (b) Rs. 216 and Rs. 12 (c) Rs. 210 and Rs. 12 (d) Rs. 210 and Rs. 6
35. If $(x+2)^{2}=9$ and $(y+3)^{2}=25$, then the maximum value of $x / y$ is:
(a) $1 / 2$
(b) $5 / 2$
(c) $5 / 8$
(d) $1 / 8$

