# EXAMINATION PAPER

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| **FACULTY** | **:** | **COMPUTER SCIENCE AND MULTIMEDIA** | | |
| **COURSE** | **:** | **BACHELOR OF INFORMATION TECHNOLOGY (HONS)** | | |
| **YEAR/ SEMESTER** | **:** | **FIRST YEAR / SEMESTER ONE** | | |
| **MODULE TITLE** | **:** | **MATH I** | | |
| **CODE** | **:** | **BIT 116** | | |
| **DATE** | **:** | **APRIL 08- 2018, SUNDAY** | | |
| **TIME ALLOWED** | **:** | **3 HOURS** | | |
| **START** | **:** | **1:00 PM** | **FINISH** | **: 4:00 PM** |

## Instruction to candidates

1. This question paper has THREE (3) Sections.
2. Answer **ALL** questions in Section A, MCQ.
3. Answer **5** questions in Section B, MSAQ.
4. Answer **2** questions in Section C, MEQ.
5. No scripts or answer sheets are to be taken out of the Examination Hall.
6. For Section A, answer in the OMR form provided.

***Do not open this question paper until instructed***

## SECTION A

**Multiple Choice Questions** **(30*1=30)**

1. **The integral value of the function $4x^3-3x^2+2$ is:**
   a. 4x-3
   b. $4x^2 – x +2$
   c. $x^4 –x^3 + 2x$
   d. d. $x^4 - 2x$

2. **The P-series is convergent if_____.**
   a. P> 1
   b. P = 1
   c. P =0
   d. P≤ 1

3. **The domain of the function y =$\sqrt{x+3}$ is _____.**
   a. (0 ,∞ )
   b. [ 3 , ∞)
   c. (-1 , ∞)
   d. [ 1, ∞)

4. **Which of the following statement is tautology?**
   a. [ p^ (p => q) ] => q
   b. ~p^ q
   c. $p_v$~ q
   d. ~ [ p $_v$ q]

5. **The value of $\lim_{x\to 3} \frac{5x^2-8x-13}{x^2-5}$ is :**
   a. 1
   b. -1
   c. 2
   d. -2

6. **The area between the region y =$x^2$ and y =$\sqrt{x}$ is_____.**
   a. 3
   b. -4
   c. ½
   d. 1/3

**7. The value of $\lim_{x\to\infty} \frac{2x+7}{3x^2-5}$ is _____.**

a. 1
b. 2
c. -1
d. 0

**8. The derivative of the function $y = 6x^2 – 5x +7$ is:**

a. $6x – 5x +7$
b. $12x -5$
c. $12x^2 – 5x +7$
d. $6x^2 -3$

**9. If -3< x<7, then:**

a. $|x - 2| < 5$
b. $|x| < 7$
c. $|x + 3| < 7$
d. $|x + 1| < 4$

**10. Let A = [ -3, 2] and B = [-2, 3], then the value of A-B is :**

a. (2, 3)
b. [-3, -2]
c. (-3, 2]
d. [-3 ,-2]

**11. If ( x+3 , 3) = (2 , y+7x), then the value of x is :**

a. -1
b. 0
c. 2
d. -2

**12. A function $f$ : R→R be given by $f$ (x) = $x^2$ is :**

a. one to one
b. onto
c. both
d. none

**13. If A = { a , b , c , d } and B = { x , y , z , 4} then, which of the following is not a function:**

a. {( a , x) , ( b , y),( c , z) , ( d , 4)}
b. {( a , x) , (b , y), (c , 4)}
c. {(a , z) , ( b , x) , ( c , z) , (d , x)}
d. {( a, 4) , (b , 4) , (c , 4) , (d , 4)}

**14. Which of the following is an exponential function?**

a. $y= x^2 -2$
b. $y= 2^x$
c. $y = \log x$
d. $y = \frac{x^2}{2}$

**15. Which is not true?**

a. log(xy) =logx.logy
b. log(xy) = logx + logy
c. $\log x^m = m\log x$
d. all of the above

**16. The value of x if $\log_3 x = 3$, is_____.**

a. 9
b. 18
c. 21
d. 27

**17. Which of these is not an indeterminate form?**

a. $\infty.0$
b. $\infty - \infty$
c. 0. 0
d. $\frac{0}{0}$

**18. Which of the following is true?**

a. $\lim_{x\to p} c = c$
b. $\lim_{x\to p} c = p$
c. $\lim_{x\to p} c = x$
d. None of the above

**19. If $f(x) = x^2 - 5x + 1$, then f (-1) is_____.**

a. 7
b. -3
c. 0
d. -5

**20. The derivative of log 2x is_____.**

**a. $\frac{1}{x}$**
b. $\frac{1}{2x}$
c. 2x
d. $\frac{1}{2}$

**21. The derivative of $e^{2x}$ is_____.**

a. $e^{2x}$
b. 2x
c. $2e^{2x}$
d. $e^{x}$

**22. If $f(x) = x^{-3}$, then $f'(x)$ is_____.**

a. $-3\,x^{-4}$
b. $x^{-3}$
c. $-3x^{-2}$
d. $-x^{-4}$

**23. If $f(x) = x^3 + 2x$, then $f''(x)$ is_____.**

a. $3x^2$
b. $3x^2+2$
c. 6x
d. 6

**24. A function is even function if_____.**

a. f(-x) =-f(x)
b. f(-x) =f(x)
c. f(-x) =-f(-x)
d. - f(-x) = f(x)

**25. Which of the following is not the rational number?**

a. $\sqrt{2}$
b. -2
c. 0
d. $\frac{1}{5}$

**26. Which of the following is not the irrational number?**

a. $\pi$
b. $\sqrt{3}$
c. 16
d. $\sqrt{14}$

**27. If ydx + xdy = 0, then which of the following is true?**

a. x+ y = c
b. xy = c
c. x-y=c
d. xy =x+y +c

**28. The integral value of $\int_1^4 x^2$ dx is _____.**

a. 12
b. 14
c. 21
d. 30

**29. The range of the function $-x^2+4x-3$ is_____.**

a. (-∞∞)
b. (-∞ 1]
c. (∞ 0)
d. (∞ 0)

**30. What is the value of f (6) if *f* (x) = 2x+6?**

a. 18
b. 12
c. 1
d. 15

## SECTION B
## Short Answer Questions
**Attempt any five (5) questions out of eight (8) questions (5*6=30)**

**1.** Show that $f(x) = x^2$ is continuous at x = 4.

**2.** Determine the area of the region enclosed by y = sinx, y = cosx, x = $_2$, and the y-axis.

**3.** Find the volume of the solid obtained by revolving the region bounded by y = $x-x^2$ and y = 0 about the y-axis.

**4.** Show that the function $f(x) = |x - 6|$ is not differentiable at 6. Find a formula for f ' and sketch its graph**.**

**5.** Prove that the p-series converges if p >1 and diverges if p ≤ 1.

**6.** The arc of the parabola $y = x^2$ from (1, 1) to (2, 4) is rotated about the y-axis. Find the area of the resulting surface.

**7.** State and prove mean value theorem.

**8.** Find the domain and range of $f(x) = x^2 - 2x + 5$**.**

## SECTION C
## Long Answer Questions
**Attempt any two (2) questions out of three (3) questions (2*20=40)**

**1.** Suppose that $\sum an$ and $\sum bn$ are two series with positive terms.

**a.** If $\sum bn$ is convergent and $an \leq bn$, then $\sum an$ is also convergent. (10)

**b.** If $\sum bn$ is divergent and $an \geq bn$, then $\sum an$ is also divergent. (10)

**2.** Solve:

**a.** $(x^2+y^2)dy+2xydx = 0$ (10)

**b.** Find the derivative of $\sqrt{x}$. from first principle (10)

**3.** Solve:

**a.** $\int (\frac{x^2 + x + 1}{x}) dx$ (7)

**b.** $\int \left(\frac{e^x - e^{-x}}{e^x + e^{-x}}\right) dx$ (7)

**c.** $\lim_{x \to 2} \left(\frac{4-8x+5x^2-x^3}{2x^3-9x^2+12x-4}\right)$ (6)

*****BEST OF LUCK****