C 31124 (Pages : 4) Name.....

Reg. No.....

# THIRD SEMESTER B.Sc. (L.R.P.)/B.M.M.C. DEGREE EXAMINATION NOVEMBER 2017

(CUCBCSS—UG)

Common Course

A 11—BASIC NUMERICAL SKILLS

Time : Three Hours Maximum : 80 Marks

## Part I

*Answer* **all** *questions.*

1. Is ———.

   (a) Not a set. (b) Not a sub-set.

   (c) Sub-set of every set. (d) Not existing.

2. The solution of the equation $4 = 2/3\ X$ is ———.

   (a) 6. (b) 12.

   (c) 8. (d) 16.

3. Variations with some degree of regularity within a period of one year is :

   (a) Seasonal variation. (b) Secular trend.

   (c) Cyclical Variation. (d) Irregular variation.

4. The perpendicular distance from a point to the $x$-axis is called :

   (a) $x$ - co-ordinate. (b) Ordinate.

   (c) $x$ - intercept. (d) None of these.

5. If A is a Symmetric Matrix, then $A' =$ ———.

   (a) A. (b) $|A|$.

   (c) 0. (d) 1.

6. Sum of squares of deviation from their mean is :

   (a) Maximum. (b) Minimum.

   (c) Zero. (d) None of these.

7. What is the median value for 5, 8, 6, 9, 11, 4 :

   (a) 6. (b) 7.

   (c) 8. (d) 11.

**Turn over**

8. Common difference of sequence 5, 8, 11, 14, ..... is :

(a) 3. (b) –3.

(c) 0. (d) 1.

9. ——— is a three dimensional diagram.

(a) Simple bar diagram. (b) Cube.

(c) Multiple bar diagram. (d) Pie diagram.

10. Which *one* of these sampling methods is a probability method ?

(a) Quota. (b) Judgment.

(c) Convenience. (d) Simple random.

(10 × 1 = 10 marks)

## Part II (Short Answer Questions)

*Answer any* **eight** *questions.*

11. Why Fisher's Index Number is called Ideal Index Number ?

12. Define Statistics.

13. What is Lorenz Curve ?

14. Sate any two differences between primary and secondary data.

15. What is a scalar matrix ?

16. Find the 6th term of the G. P. : 4, 8, 16,...

17. A = B = C = verify A.

18. Solve the equation $2x^2 + 8x + 8 = 0$.

19. Find the compound interest on Rs. 8,000 for 4 years if interest is payable half yearly for the first three years at the rate of 8% p.a. and for the fourth year, the interest is payable quarterly at the rate of 6% p.a.

20. From the following matrix, calculate (a) A + B and (b) A – B

$$A = \begin{matrix} 2 & 3 & 5 \\ 5 & 4 & 2 \\ 2 & 5 & 9 \end{matrix} \qquad B = \begin{matrix} 5 & -9 & 6 \\ 2 & 3 & -5 \\ 4 & -9 & 7 \end{matrix}$$

(8 × 2 = 16 marks)

## Part III (Short Essays)

*Answer any* **six** *questions.*

21. A man sells 7 horses and 8 cows at Rs.2,940 and 5 horses and 6 cows at Rs.2,150. What is the selling price of each ?

22. By means of Venn diagram, prove that.

23. From the following data, compute Karl Pearson's Co-efficient of skewness.

25 18 32 20 25 48 72 24 50 25.

24. The marks obtained by 50 students are given below. Construct a grouped frequency distribution following the steps in constructing frequency distribution.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 31 | 13 | 46 | 31 | 30 | 45 | 38 | 42 | 30 | 9 | 30 |
| 30 | 46 | 36 | 2 | 41 | 44 | 18 | 29 | 63 | 44 | 30 |
| 19 | 5 | 44 | 15 | 7 | 25 | 12 | 30 | 6 | 22 | 24 |
| 37 | 15 | 6 | 39 | 32 | 21 | 20 | 42 | 31 | 19 | 14 |
| 23 | 28 | 17 | 53 | 22 | 21 | | | | | |

25. Compute Standard Deviation and Co-efficient of Variation from the following data :—

| Temperature | –40 to –30 | –30 to –20 | –20 to –10 | –10 to 0 | 0 to 10 | 10 - 20 | 20 - 30 |
|---|---|---|---|---|---|---|---|
| No. of Days | 10 | 28 | 30 | 42 | 65 | 180 | 10 |

26. Solve the following equation by using matrix.

$2x - 3y = 3$ and $4x - y = 11$.

27. The first term of an A. P. is 10, the last term is 50. If the sum of all the terms is 480, find the common difference and the number of terms.

28. An enquiry into the budgets of middle class families in a city gave the following information :

| Expenses on | Food (35%) | Rent (15%) | Clothing (20%) | Fuel (10%) | Others (20%) |
|---|---|---|---|---|---|
| Price (2015) | 150 | 30 | 75 | 25 | 40 |
| Price (2016) | 145 | 30 | 65 | 23 | 45 |

Construct Cost of Living Index Number from the following.

(6 × 4 = 24 marks)

## Part IV (Long Essays)

*Answer any* **two** *questions.*

29. Find the inverse of Matrix A where A = $\begin{matrix} 3 & 5 & 7 \\ 2 & -3 & 1 \\ 1 & 1 & 2 \end{matrix}$

30. Compute the trend values by the method of Least Square. Also estimate the trend value in 2019 :

| Year | : | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|---|---|---|
| Value | : | 56 | 55 | 51 | 47 | 42 | 38 | 35 | 32 |

31. Calculate Mode by (a) Algebraic method ; and (b) Histogram :

| Size | : | 10-15 | 15-20 | 20-25 | 25-30 | 30-35 |
|---|---|---|---|---|---|---|
| Frequency | : | 5 | 20 | 47 | 38 | 10 |

(2 × 15 = 30 marks)

D 92216 (Pages : 4) Name.....

Reg. No.....

# THIRD SEMESTER B.Sc./B.M.M.C. DEGREE EXAMINATION NOVEMBER 2015

(CUCBCSS—UG)

Common Course

A 11—BASIC NUMERICAL SKILLS

Time : Three Hours Maximum : 80 Marks

## Part I

*Answer* **all** *questions in this part.*
*Each question carries* 1 *mark.*

Choose the correct answer from the choices given :

1. When are two sets A and B said to be disjoint?

   (a) $A \cap B = \varnothing$. (b) $A \cap B \neq \varnothing$.

   (c) $A \cup B = \varnothing$. (d) $A \cup B \neq \varnothing$.

2. The arithmetic mean between 2 and 8 is :

   (a) 10. (b) 6.

   (c) 5. (d) 16.

3. If a matrix has 13 elements, what are the possible dimensions (orders) it can have ?

   (a) $1 \times 13, 13 \times 1$. (b) $13 \times 1$.

   (c) $1 \times 3$. (d) $13 \times 13$.

4. Statistics are :

   (a) Aggregate of fact. (b) Systematically collected.

   (c) Numerically expressed. (d) All these.

5. For a distribution mean = 20, mode = 25, SD = 10, then coefficient of skewness is :

   (a) 0. (b) – .05.

   (c) 0.5. (d) 1.

Fill in the blanks :—

6. The geometric mean between $a$ and $b$ is ————.

7. A set which doesn't contain any element is called ————.

8. If $a, b, c$ are in GP, then $b^2$ = ————.
9. The measure of dispersion based on all the observations of the series is ————.
10. The sales of a departmental store on Onam and Christmas are associated with the components of time series is ————.

(10 × 1 = 10 marks)

## Part II

*Answer any* **eight** *questions.*
*Each question carries 2 marks.*

11. Prove $A \cap B = B \cap A$.
12. Solve $x^2 + 10x + 21 = 0$.
13. Which term in the AP 5, 2, – 1, ..... is – 22 ?
14. What is a power set ? State the relation between cardinalities of a finite set and its power set.
15. If $A = \begin{bmatrix} 1 & 3 & 4 \\ 2 & 6 & 8 \\ 0 & 7 & 5 \end{bmatrix}$, find $A \times I_3$.
16. Define consumer price index number.
17. Define Kurtosis.
18. Eight coins were tossed together. The number of heads obtained is given below. Find the mean :

| No. of heads : | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| No. of times : | 1 | 9 | 26 | 59 | 72 | 52 | 29 | 7 | 1 |

19. Define variance.
20. Why Arithmetic mean is considered to be the best average ?

(8 × 2 = 16 marks)

## Part III

*Answer any* **six** *questions.*
*Each question carries 4 marks.*

21. Using Venn diagram, proved $A \cap (B \cap C) = (A \cap B) \cap C$ and $A \cup (B \cup C) = (A \cup B) \cup C$.

22. If $A = \begin{bmatrix} 3 & -5 \\ -4 & 2 \end{bmatrix}$, prove that A satisfies the equation $x^2 - 5x - 14 = 0$.

23. Find the middle term in the AP 20, 16, 12, ....., – 176.

24. Solve the following systems of simultaneous equation :

$3x + 4y = 37, 8x + 5y = 76$

Using :

(a) Elimination method : (b) Substitution method.

25. Find $f(A)$ if $A = \begin{bmatrix} 2 & 0 & 1 \\ 2 & 1 & 3 \\ 1 & -1 & 0 \end{bmatrix}$, where $f(x)$ is given by $f(x) = x^2 - 5x + 6$.

26. Explain the components of time series.

27. An economy grows at the rate of 2 % in the first year, 2.5 % in the second year, 3 % in the third year, 4 % in the fourth year, 5 % in the fifth year, 6 % in the sixth year ——— and 10 % in the tenth year. What is the average rate of growth of the company ?

28. Find coefficient of variation :

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Age | : | 0 – 10 | 10 – 20 | 20 – 30 | 30 – 40 | 40 – 50 | 50 – 60 | 60 – 70 | 70 – 80 |
| No. of persons | : | 15 | 30 | 53 | 75 | 100 | 110 | 115 | 125 |

(6 × 4 = 24 marks)

## Part IV

*Answer any* **two** *questions.*
*Each question carries* 15 *marks.*

29. Solve the following equations by matrix method :

$2x + 3y + 3z = 5$

$x - 2y + z = -4$

$3x - y - 2z = 3.$

30. Calculate the appropriate measure of skewness for the following data :

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Income | : | below 100 | 100 – 139 | 140 – 179 | 180 – 219 | 220 – 259 | 260 – 299 |
| No. of workers | : | 10 | 16 | 39 | 48 | 60 | 46 |
| Income | : | 300 – 339 | 340 and above | | | | |
| No. of workers | : | 22 | 9 | | | | |

31. Use Cramer's rule to solve :

$$x + y + z = 7$$

$$2x + y + 3z = 16$$

$$3x + 3y - z = 5$$

(2 × 15 = 30 marks)

**D 71609** (Pages : 3) Name.....

Reg. No.....

# THIRD SEMESTER B.A./B.Sc. DEGREE EXAMINATION, NOVEMBER 2019

(CUCBCSS—UG)

A 11—BASIC NUMERICAL SKILLS

(2017 Admissions)

Time : Three Hours Maximum : 80 Marks

*Use of scientific / basic calculators and mathematical / statistical tables are permitted.*

## Part A

*Answer all the* **ten** *questions.*
*Each question carries* 1 *mark.*

Choose the best answer from the options given :

1. If A and B are sets and $A \cup B = A \cap B$, then :

   (a) A = Null set. (b) B = Null set.

   (c) A = B. (d) All of these.

2. Solve $x^2 - 7x + 12 = 0$ :

   (a) 3, 4. (b) 3, 1.

   (c) 1, 4. (d) 2, 3.

3. If $A = \begin{bmatrix} 2 & 4 \\ 3 & 5 \end{bmatrix}$. Find $|A|$ :

   (a) 2. (b) – 2.

   (c) 3. (d) – 3.

4. 4, 8, 12, 16, 20.....Find $48^{th}$ term of the series.

   (a) 142. (b) 172.

   (c) 192. (d) 202.

5. The data which have already been collected by someone are called :

   (a) Raw data. (b) Secondary data.

   (c) Primary data. (d) Array data.

**Turn over**

Fill in the Blanks :

6. The sum of the deviations about the mean is always ————.
7. The ———— is the transpose of the matrix of the cofactors.
8. What is the common difference of the AP 0.9, 0.6, 0.3 ————.
9. The Co-efficient of Skewness is always zero for ———— distribution.
10. The score that repeats the most often in a distribution is called the ————.

(10 × 1 = 10 marks)

## Part B (Short Answer Questions)

*Answer any* **eight** *questions.*
*Each question carries* 2 *marks.*

11. In a college, 200 students are randomly selected. 140 like tea, 120 like coffee and 80 like both tea and coffee. How many students like only one of tea or coffee ?

12. Solve $4x + 2y = 6$
$5x + y = 6$.

13. Find the inverse of matrix shown below :

$$\begin{bmatrix} 2 & 0 \\ 0 & 0 \end{bmatrix}.$$

14. Solve $2x^2 + 8x + 8 = 0$ by using quadratic formula.

15. Find the sum of first 30 positive integer multiples of 6.

16. Find the $5^{th}$ term of the G. P. : 1/7, 1/14, 1/28....

17. What is Parameter ?

18. What are the precautions to be taken while using secondary data ?

19. Given the following sample data set :

6, 12, 9, 7, 8, 4, 3, 12, 15. Compute the Mean, Median and Mode.

20. Given co-efficient of skewness = – 0.23, Mean = 47.2 and S.D. = 12. Find mode and median of the distribution.

(8 × 2 = 16 marks)

## Part C (Short Essay Questions)

*Answer any* **six** *questions.*
*Each question carries* 4 *marks.*

21. By means of Venn diagram, prove that $(A \cap B)^C = A^C \cup B^C$.

22. Solve the following simultaneous equation by using matrix
$2x - 3y = 3$
$4x - y = 11$.

23. Solve the equation $4x + \frac{10}{x} = 14$.

24. The sum of an infinite G. P. with positive terms is 48 and sum of its first two terms is 36. Find the second term.

25. Distinguish between Multiple and subdivided bar diagram.

26. Find Karl Pearson's co-efficient of skewness for the values 25, 18, 32, 20, 25, 48, 72, 24, 50, 25.

27. Index Numbers are called Economic barometers. Why ?

28. Find 3 yearly moving averages for the following series :

| Year | : | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Production | : | 17.2 | 17.3 | 17.7 | 18.9 | 19.2 | 19.3 | 18.1 | 20.2 | 25.3 | 24.9 |

(6 × 4 = 24 marks)

## Part D (Essay Questions)

*Answer any* **two** *questions.*
*Each question carries* 15 *marks.*

29. If the equations below can be represented as the matrix equation $AX = B$, where $X = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$

$5x - 6y + 4z = 15$
$7x + 4y - 3z = 19$
$2x + y + 6z = 46$

Find the value of $x, y, z$ by using $AX = B$.

30. Find standard deviation for the data on scores given below. Also find coefficient of variation.

| Score | : | 0–10 | 10–20 | 20–30 | 30–40 | 40–50 | 50–60 | 60–70 |
|---|---|---|---|---|---|---|---|---|
| No. of students | : | 10 | 15 | 25 | 25 | 10 | 10 | 5 |

31. Discuss the scope, utility and limitations of statistics.

(2 × 15 = 30 marks)

D 31755 (Pages : 3) Name.....

Reg. No.....

# THIRD SEMESTER (CBCSS—UG) DEGREE EXAMINATION NOVEMBER 2022

Common Course for B.Sc. L.R.P. (Alternate Pattern)

A 11—BASIC NUMERICAL SKILLS

(2019 Admission onwards)

Time : Two Hours and a Halrf Maximum : 80 Marks

## Section A (Short Answers)

*Answer* **all** *questions.*
*Each question carries* 2 *marks.*
*Ceiling marks for Section A is* 25.

1. State DeMorgan ' s law.
2. What is a Pie diagram ?
3. Represent the following frequency table by histogram :

| | | | | | | |
|---|---|---|---|---|---|---|
| Marks | : | 10 - 15 | 15 - 20 | 20 - 25 | 25 - 30 | 30 - 35 |
| Number of students | : | 5 | 20 | 50 | 40 | 10 |

4. Explain Kurtosis.
5. What is a power set ?
6. Find the median of the following data :

   4, 45, 60, 20, 83, 19, 26, 11, 27, 12, 52

7. If the sum of $12^{th}$ and $22^{nd}$ terms of an AP is 100, find the sum of first 33 terms.
8. Solve $x^2 - 3x - 4 = 0$ by using quadratic formula.
9. Find the value of $x$ in the equation $2x + 5/x = 7$.
10. What is an Index Number ?
11. Differentiate between discrete and continuous frequency distributions.
12. The sum of three numbers in AP is – 3 and their product is 8. Find the numbers.

Turn over

13. Find the product of first 9 terms of GP, if the 5th term is 2.

14. What is analysis of time series ?

15. Find the value of the determinant $\begin{vmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{vmatrix}$.

## Section B (Paragraphs)

*Answer* **all** *questions.*
*Each question carries* 5 *marks.*
*Ceiling of marks for* Section B *is* 35.

16. If A = {1, 2, 3} and B = {$a$, $b$, $c$}, find A × B and B × A. Are they equal ?

17. What are the different aspects to be considered in planning a statistical enquiry ?

18. Find $n$, if the sum 24 + 20 + 16 + ... to $n$ terms is 72.

19. Find the adjoint of the matrix $\begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{bmatrix}$.

20. Solve the equation $x + \sqrt{x} = 6/25$.

21. Find the central tendencies for given series :

1, 11, 9, 15, 7, 11, 12, 14

22. Find AB, where $A = \begin{bmatrix} 1 & 0 \\ 2 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 1 \\ 3 & 2 \end{bmatrix}$.

23. Give three yearly moving averages for the following series :

| Year | : | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Production (lakh tons) | : | 10.2 | 11.3 | 10.7 | 10.9 | 11.2 | 12.3 | 12.1 | 13.2 | 13.3 | 13.9 |

**Section C (Essays)**

*Answer any* **two** *questions.*
*Each question carries* 10 *marks.*

24. Find the inverse of the matrix $\begin{bmatrix} 1 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 0 & 1 \end{bmatrix}$.

25. Find the sum of the series 6 + 66 + 666 + 6666 + ...

26. Find the quartile deviation for the following data :

| *Marks* | *Frequency* |
|---|---|
| 20 - 30 | 4 |
| 30 - 40 | 12 |
| 40 - 50 | 18 |
| 50 - 60 | 28 |
| 60 - 70 | 19 |
| 70 - 80 | 14 |
| 80 - 90 | 5 |

27. Explain the scope and limitations of statistics.

(2 × 10 = 20 marks)

**D 51697** **(Pages : 3)** **Name.....**

**Reg. No.....**

# THIRD SEMESTER (CBCSS—UG) DEGREE EXAMINATION NOVEMBER 2023

Common Course [B.Sc. LRP (Alternate Pattern)]

A11—BASIC NUMERICAL SKILLS

(2019—2022 Admissions)

Time : Two Hours and a Half Maximum : 80 Marks

## Section A (Short Answer Type)

*All questions can be attended.*
*Each question carries 2 marks.*
*(Ceiling 25 marks)*

1. Using De Morgan's law write $(A \cup B)^C$.

2. If $A = \{1, 2, 3\}$, $B = \{3, 4\}$ then find $A \cup B$ and $A \cap B$.

3. If $A = \begin{bmatrix} 1 & 2 \\ 2 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 3 & -1 \\ -2 & 1 \end{bmatrix}$, then find A + B and A – B.

4. If $A = \begin{bmatrix} a & 4 \\ 3 & 4 \end{bmatrix}$ is singular then find $a$.

5. If $3x + 4y = 16$, $y = 1$ then find the value of $x$.

6. Solve $x^2 - 9 = 0$.

7. Find the common difference of the arithmetic progression 2, 10, 18, ...

8. Find the sixth term of the geometric progression $1, \frac{1}{2}, \frac{1}{2^2}, \ldots$

9. If the simple interest on Rs. 8,000 for two years is 2,000, then find the rate of interest.

**Turn over**

10. Write any *two* limitations of statistics.

11. Define Frequency.

12. Give examples of 2 diagrams which are used to represent statistical data.

13. Give examples of 2 index numbers.

14. Explain Skewness

15. Define Range.

**Section B (Paragraph/Problem Type)**

*All questions can be answered.*
*Each question carries* 5 *marks.*
*(Ceiling* 35 *marks)*

16. Find X and Y if $X + Y = \begin{bmatrix} 7 & 0 \\ 2 & 5 \end{bmatrix}$, $X - Y = \begin{bmatrix} 5 & 0 \\ 0 & 5 \end{bmatrix}$.

17. If $A = \begin{bmatrix} 1 & 1 \\ 0 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 \\ 1 & 5 \end{bmatrix}$ the find AB and BA. Are they equal ?

18. Find $2 + 5 + ..... + 182$.

19. If $A = \{a, b, d, e\}$, $B = \{b, c, e, f\}$, $C = \{d, e, f\}$, then verify whether the expression $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$ is true.

20. The marks out of 20 obtained by 20 students in a test are given below. Find the mean marks :

| | | | | | | |
|---|---|---|---|---|---|---|
| Marks | : | 20 | 15 | 18 | 10 | 12 |
| No. of Students | : | 6 | 4 | 2 | 3 | 5 |

21. Write a short note on Quartile deviation and Mean deviation.

22. Write a short note on measures of central tendency.

23. An arithmetic progression has 3 as first term. Also the sum of first 8 terms is twice the sum of first 5 terms. Find the common difference.

**Section C (Essay Type)**

*Answer any* **two** *of the following questions.*
*Each question carries* 10 *marks.*

24. Solve $3x - 4y + 8z = 26$
$6x - 3y - 5z = 1$
$-x + y + 3z = 11.$

25. Find adjoint of $A = \begin{bmatrix} 1 & -1 & 2 \\ 2 & 3 & 5 \\ -2 & 0 & 1 \end{bmatrix}$.

26. Find standard deviation from the following table :

| Wages | Number of persons |
|---|---|
| 140–160 | 12 |
| 160–180 | 18 |
| 180–200 | 35 |
| 200–220 | 42 |
| 220–240 | 50 |
| 240–260 | 45 |
| 260–280 | 20 |
| 280–300 | 8 |

27. If the sum of three numbers of an arithmetic progression is 30 and their product 990, then find the numbers.

(2 × 10 = 20 marks)

C 31124 (Pages : 4) Name.....

Reg. No.....

# THIRD SEMESTER B.Sc. (L.R.P.)/B.M.M.C. DEGREE EXAMINATION NOVEMBER 2017

(CUCBCSS—UG)

Common Course

A 11—BASIC NUMERICAL SKILLS

Time : Three Hours Maximum : 80 Marks

## Part I

*Answer* **all** *questions.*

1. Is ———.

   (a) Not a set. (b) Not a sub-set.

   (c) Sub-set of every set. (d) Not existing.

2. The solution of the equation 4 = 2/3 X is ———.

   (a) 6. (b) 12.

   (c) 8. (d) 16.

3. Variations with some degree of regularity within a period of one year is :

   (a) Seasonal variation. (b) Secular trend.

   (c) Cyclical Variation. (d) Irregular variation.

4. The perpendicular distance from a point to the $x$-axis is called :

   (a) $x$ - co-ordinate. (b) Ordinate.

   (c) $x$ - intercept. (d) None of these.

5. If À is a Symmetric Matrix, then A' = ———.

   (a) A. (b) |A|.

   (c) 0. (d) 1.

6. Sum of squares of deviation from their mean is :

   (a) Maximum. (b) Minimum.

   (c) Zero. (d) None of these.

7. What is the median value for 5, 8, 6, 9, 11, 4 :

   (a) 6. (b) 7.

   (c) 8. (d) 11.

**Turn over**

8. Common difference of sequence 5, 8, 11, 14, ..... is :

(a) 3. (b) –3.

(c) 0. (d) 1.

9. ——— is a three dimensional diagram.

(a) Simple bar diagram. (b) Cube.

(c) Multiple bar diagram. (d) Pie diagram.

10. Which *one* of these sampling methods is a probability method ?

(a) Quota. (b) Judgment.

(c) Convenience. (d) Simple random.

(10 × 1 = 10 marks)

## Part II (Short Answer Questions)

*Answer any* **eight** *questions.*

11. Why Fisher's Index Number is called Ideal Index Number ?

12. Define Statistics.

13. What is Lorenz Curve ?

14. Sate any two differences between primary and secondary data.

15. What is a scalar matrix ?

16. Find the 6th term of the G. P. : 4, 8, 16,...

17. A = B = C = verify A.

18. Solve the equation $2x^2 + 8x + 8 = 0$.

19. Find the compound interest on Rs. 8,000 for 4 years if interest is payable half yearly for the first three years at the rate of 8% p.a. and for the fourth year, the interest is payable quarterly at the rate of 6% p.a.

20. From the following matrix, calculate (a) A + B and (b) A – B

$$A = \begin{matrix} 2 & 3 & 5 \\ 5 & 4 & 2 \\ 2 & 5 & 9 \end{matrix} \qquad B = \begin{matrix} 5 & -9 & 6 \\ 2 & 3 & -5 \\ 4 & -9 & 7 \end{matrix}$$

(8 × 2 = 16 marks)

## Part III (Short Essays)

*Answer any* **six** *questions.*

21. A man sells 7 horses and 8 cows at Rs.2,940 and 5 horses and 6 cows at Rs.2,150. What is the selling price of each ?

22. By means of Venn diagram, prove that.

23. From the following data, compute Karl Pearson's Co-efficient of skewness.

    25 18 32 20 25 48 72 24 50 25.

24. The marks obtained by 50 students are given below. Construct a grouped frequency distribution following the steps in constructing frequency distribution.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 31 | 13 | 46 | 31 | 30 | 45 | 38 | 42 | 30 | 9 | 30 |
| 30 | 46 | 36 | 2 | 41 | 44 | 18 | 29 | 63 | 44 | 30 |
| 19 | 5 | 44 | 15 | 7 | 25 | 12 | 30 | 6 | 22 | 24 |
| 37 | 15 | 6 | 39 | 32 | 21 | 20 | 42 | 31 | 19 | 14 |
| 23 | 28 | 17 | 53 | 22 | 21 | | | | | |

25. Compute Standard Deviation and Co-efficient of Variation from the following data :—

| Temperature | –40 to –30 | –30 to –20 | –20 to –10 | –10 to 0 | 0 to 10 | 10 - 20 | 20 - 30 |
|---|---|---|---|---|---|---|---|
| No. of Days | 10 | 28 | 30 | 42 | 65 | 180 | 10 |

26. Solve the following equation by using matrix.

    $2x - 3y = 3$ and $4x - y = 11$.

27. The first term of an A. P. is 10, the last term is 50. If the sum of all the terms is 480, find the common difference and the number of terms.

28. An enquiry into the budgets of middle class families in a city gave the following information :

| Expenses on | Food (35%) | Rent (15%) | Clothing (20%) | Fuel (10%) | Others (20%) |
|---|---|---|---|---|---|
| Price (2015) | 150 | 30 | 75 | 25 | 40 |
| Price (2016) | 145 | 30 | 65 | 23 | 45 |

Construct Cost of Living Index Number from the following.

(6 × 4 = 24 marks)

**Turn over**

## Part IV (Long Essays)

*Answer any* **two** *questions.*

29. Find the inverse of Matrix A where A = 3 5 7

2 –3 1

1 1 2

30. Compute the trend values by the method of Least Square. Also estimate the trend value in 2019 :

| Year | : | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|---|---|---|
| Value | : | 56 | 55 | 51 | 47 | 42 | 38 | 35 | 32 |

31. Calculate Mode by (a) Algebraic method ; and (b) Histogram :

| Size | : | 10-15 | 15-20 | 20-25 | 25-30 | 30-35 |
|---|---|---|---|---|---|---|
| Frequency | : | 5 | 20 | 47 | 38 | 10 |

**(2 × 15 = 30 marks)**

D 91672 (Pages : 4) Name.....

Reg. No.....

# THIRD SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION NOVEMBER 2020

Common Course

A11—BASIC NUMERICAL SKILLS

(2017 Admissions)

Time : Three Hours Maximum : 80 Marks

## Part I

*Answer* **all** *questions.*
*Each question carries* 1 *mark.*

1. The set of cubes of natural nos is ————————.

   a) Finite set. b) Infinite set.

   c) Null set. d) Equal set.

2. The number of all possible matrices of order 3 × 3 with each entry 0 or 1 is ————————.

   a) 27. b) 18

   c) 81. d) 512.

3. The system of equations $x + y = 3$ and $2x + 2y = 6$ are ————————.

   a) Consistent. b) Inconsistent.

   c) Consistent and dependent. d) Dependent.

4. The nature of roots of the equations $x^2 - 4x + 4$ is ————————.

   a) Imaginary. b) Rational.

   c) Equal and rational. d) Irrational and unequal.

5. The $9^{th}$ term of the sequence 3,6,12 ..... is :

   a) 256. b) 128.

   c) 64. d) 768.

**Turn over**

6. The simple interest on Rs. 68,000 at $16\frac{3}{2}\%$ per annum for 9 months is _____.

a) 7,500. b) 8,500.

c) 9,500 d) 8,000.

7. Statistics measures _____.

a) Certainity. b) Uncertainity.

c) Data. d) None.

8. Bar diagram is a _____ dimensional diagram.

a) Two b) Three.

c) One. d) None.

9. _____ is better suited to open end series.

a) Mean. b) Median.

c) Mode. d) None.

10. If $N = 10, \sum x = 60 \sum x^2 = 1000$ the standard deviation is _____.

a) 100. b) 6.

c) 12. d) 8.

(10 × 1 = 10 marks)

## Part II (Short Answer Questions)

*Answer any* **eight** *questions.*
*Each question carries 2 marks.*

11. Define null set and singleton set ?

12. Define square matrix and give example ?

13. Solve $x + y = 7$ and $x - y = 6$.

14. Solve $\frac{2}{x} + \frac{x}{2} = 2$.

15. Determine $k$, if $k + 2, 4k - 6, 3k - 2$ are 3 consecutive terms of AP.

16. On what sum of money will compound interest for 2 years of 5 % year amount to Rs. 164 ?

17. Limitation of Statistics.

18. What is pictogram and Cartogram ?

19. Find the geometric mean of 85, 15, 500, 250, 70, 75, 45, 8, 40, 36

20. Why Fisher index number is called ideal ?

(8 × 2 = 16 marks)

## Part III (Short Essays)

*Answer any* **six** *questions.*
*Each question carries 4 marks.*

21. For matrix $A = \begin{bmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 2 & 0 & 3 \end{bmatrix}$ prove that $A^3 - 6A^2 + 7A + 2I = 0$.

22. How many terms of the AP $-6, -\frac{11}{2}, -5 \ldots\ldots\ldots\ldots$ are needed to give the sum – 25.

23. Find the positive value of '$k$' if one root of $x^2 - kx + 243 = 0$ is thrice the other

24. Compare standard deviation and mean deviation.

25. Solve $(x+3)(x+6)+(x+6)(x+9)+(x+9)(x+3)=0$.

26. Draw ogive for the following data :

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Mid $x$ | : | 5 | 10 | 15 | 20 | 25 | 30 |
| Frequency | : | 10 | 12 | 85 | 100 | 80 | 13 |

27. What are the steps in the construction of cost of living index number ?

28. Let $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$ ; $A = \{1, 2, 3, 4,\}$ ; $B = \{2, 4, 6, 8\}$ ; and $C = \{3, 4, 5, 6\}$.

Find (i) $A'$ ; (ii) $B'$ ; (iii) $(A \cup C)'$ ; and (iv) $(A \cup B)'$.

(6 × 4 = 24 marks)

## Part IV (Long Essays)

*Answer any* **two** *questions.*
*Each question carries* 15 *marks.*

29. Solve the system of equation using matrix method $x + y + z = 6$ ; $y + 3z = 11$ ; $x + z = 2y$.

30. Find a 4 yearly moving average and the centered 4 year moving average from the following data :

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Year | : | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
| Output | : | 301 | 454 | 393 | 414 | 424 | 464 | 466 | 492 |

31. The scores of 2 batsman Lara and Sachin in 10 innings during a certain seasonare :

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Lara | : | 32 | 28 | 47 | 63 | 71 | 39 | 10 | 60 | 96 | 14 |
| Sachin | : | 19 | 31 | 48 | 33 | 67 | 90 | 10 | 62 | 40 | 80 |

Find which of the two batsman, Lara or Sachin is more consistent in scoring ?

(2 × 15 = 30 marks)

D 92910–B (Pages : 3) Name.....

Reg. No.....

# THIRD SEMESTER B.A./B.Sc. (CBCSS—UG) DEGREE EXAMINATION NOVEMBER 2020

Common Course

A11—BASIC NUMERICAL SKILLS

(2019 Admissions)

Time : Two Hours and a Half Maximum : 80 Marks

## Section A (Short Answers)

*Answer at least* **ten** *questions.*
*Each question carries* 3 *marks.*
*All questions can be attended.*
*Overall Ceiling* 30.

1. The sum of three numbers in AP is – 3 and their product is 8. Find the numbers.
2. What is an index number ?
3. Find the power set of A = {$a, b, c$}.
4. Find the value of the determinant $\begin{vmatrix} 2 & 0 & 1 \\ 0 & 1 & 1 \\ 2 & 1 & 2 \end{vmatrix}$.
5. Differentiate between discrete and continuous frequency distributions ?
6. Explain Kurtosis.
7. What do you understand by classificationof data ?
8. Find the mean of the following data :

   4, 45, 60, 20, 83, 19, 26, 11, 27, 12, 52.
9. If the $8^{th}$ term of an AP is zero, prove that its $28^{th}$ term is double the $18^{th}$ term.
10. What is analysis of time series
11. Solve $x^2 - 5x + 4 = 0$ by using quadratic formula.
12. Differentiate Geometric and Harmonic Mean.

**Turn over**

13. What is a pie diagram ?

14. Explain Skewness.

15. Represent the following frequency table by histogram.

| | | | | | |
|---|---|---|---|---|---|
| Marks: | 10 – 15 | 15 – 20 | 20 – 25 | 25 – 30 | 30 – 35 |
| Number of students : | 20 | 20 | 30 | 20 | 50 |

(10 × 3 = 30 marks)

## Section B (Paragraph)

*Answer at least* **five** *questions.*
*Each question carries* 6 *marks.*
*All questions can be attended.*
*Overall Ceiling* 30.

16. Find the sum of first 22 terms of the sequence 5, 10, 15, 20, ———.

17. Find the central tendencies for the given series :

3, 9, 3, 5, 12, 10, 18, 4, 7, 19, 21.

18. If A = {1, 2, 3} and B = {a, b}, find A × B and B × A. Are they equal ?

19. Find AB, Where $A = \begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 1 \\ 1 & 1 \end{bmatrix}$.

20. Find the adjoint of the matrix $\begin{bmatrix} 1 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 0 & 1 \end{bmatrix}$.

21. Give three yearly moving averages for the following series :

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year : | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
| Production (lakh tons) : | 17.2 | 17.3 | 17.7 | 18.9 | 19.2 | 19.3 | 18.1 | 20.2 | 25.3 | 24.9 |

22. Find the sum of first 10 terms of GP, whose $3^{rd}$ term is 12 and $8^{th}$ term is 384.

23. What are the different aspects to be considered in planning a statistical enquiry ?

(5 × 6 = 30 marks)

## Section C (Essay)

*Answer any* **two** *question.*
*Each question carries* 10 *marks.*

24. Explain :

    (a) Arithmetic, Geometric and Harmonic mean.

    (b) Scope of statistics.

25. Find the quartile deviation for the following data :

| *Marks* | | *Frequency* |
|---|---|---|
| 0 – 5 | ... | 4 |
| 5 – 10 | ... | 5 |
| 10 – 15 | ... | 6 |
| 15 – 20 | ... | 10 |
| 20 – 25 | ... | 11 |
| 25 – 30 | ... | 9 |
| 30 – 35 | ... | 4 |
| 35 – 40 | ... | 1 |

26. Find the sum of n terms of the series $5 + 55 + 555 + 5555 + \ldots$

27. Find the inverse of the matrix $\begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{bmatrix}$.

(2 × 10 = 20 marks)

**D 11983** **(Pages : 3)** **Name.....**

**Reg. No.....**

**THIRD SEMESTER (CBCSS—UG) DEGREE EXAMINATION**
**NOVEMBER 2021**

Common Course [B.Sc. LRP (Alternate Pattern)]

A11—BASIC NUMERICAL SKILLS

(2019—2020 Admissions)

Time : Two Hours and a Half Maximum : 80 Marks

**Section A**

*Answer at least* **ten** *questions.*
*Each question carries* 3 *marks.*
*All questions can be attended.*
*Overall Ceiling* 30.

1. What is power set ?
2. Find the power set of $A = \{1, 2, 3\}$.
3. what are the methods used for measuring seasonal variations ?
4. Represent the following frequency table by histogram :

| | | | | | | |
|---|---|---|---|---|---|---|
| Marks | : | 10–15 | 15–20 | 20–25 | 25–30 | 30–35 |
| Number of students | : | 5 | 20 | 50 | 40 | 10 |

5. What is analysis of time series ?
6. Find the product of first five terms of GP, if the third term is 3.
7. What do you understand by classification of data ?
8. Solve $x^2 - 7x + 6 = 0$ by using quadratic formula.
9. Explain Kurtosis.
10. Find the product of first 9 terms of GP, if the $5^{th}$ term is 2.
11. Find the mean of the following data.

    4, 40, 60, 20, 80, 10, 26, 12, 24, 12, 50

**Turn over**

12. Explain Skewness.

13. What is a pie diagram ?

14. Find the value of the determinant $\begin{vmatrix} 1 & 0 & 0 \\ 4 & 4 & 2 \\ 2 & 1 & 3 \end{vmatrix}$.

15. What is an index number ?

(10 × 3 = 30 marks)

**Section B (Paragraph)**

*Answer at least* **five** *questions.*
*Each question carries* 6 *marks.*
*All questions can be attended.*
*Overall Ceiling* 30.

16. If the fifth and the tenth terms of a G.P are 32 and 1024 respectively, find the first term and the common ratio.

17. Give 3 yearly moving averages for the following series :

| Year | : | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Production (lakh tons) | : | 12.2 | 12.3 | 13.7 | 14.9 | 13.2 | 11.3 | 15.1 | 15.2 | 15.3 | 14.9 |

18. Find the sum of first 20 terms of the sequence 3, 6, 9, 12,....

19. Find the adjoint of the matrix $\begin{bmatrix} 1 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 0 & 1 \end{bmatrix}$.

20. Find the central tendencies for given series :

28, 36, 34, 28, 48, 22, 35, 27, 19,41

21. Find AB, where $A = \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 1 \\ 3 & 1 \end{bmatrix}$.

22. If $A = \{1, 2\}$ and $B = \{a, b, c\}$, find A × B and B × A. Are they equal ?

23. What are the different aspects to be considered in planning a statistical enquiry ?

(5 × 6 = 30 marks)

## Section C (Essay)

*Answer any* **two** *questions.*
*Each question carries* 10 *marks.*

24. Find the sum of $n$ terms of the series 8 + 88 + 888 + 8888 + ...

25. Find the inverse of the matrix $\begin{bmatrix} 1 & 1 & 2 \\ 0 & 2 & 3 \\ 0 & 0 & 1 \end{bmatrix}$.

26. Solve the following by matrix method :

$$2x + 3y + 3z = 5$$
$$x - 2y + z = -4$$
$$3x - y - 2z = 3.$$

27. Find the quartile deviation for the following data :

| Marks | Frequency |
|---|---|
| 20–30 | 4 |
| 30–40 | 12 |
| 40–50 | 18 |
| 50–60 | 28 |
| 60–70 | 19 |
| 70–80 | 14 |
| 80–90 | 5 |

(2 × 10 = 20 marks)

**D 51185-B** (Pages : 3) Name.....

Reg. No.....

**THIRD SEMESTER B.Com./B.B.A. DEGREE EXAMINATION, NOVEMBER 2018**

(CUCBCSS)

A 12—GENERAL INFORMATICS

(2017 Admissions)

Time : Three Hours Maximum : 80 Marks

**Part A**

*Answer* **all** *questions.*

*Each question carries* 1 *mark.*

1. To highlight a word, position the cursor next to the word, and then :

   (a) Drag mouse while holding button down.

   (b) Click mouse once.

   (c) Roll and then click mouse.

   (d) None of these.

2. What type of memory is volatile ?

   (a) Cache. (b) RAM.

   (c) ROM. (d) Hard Drive.

3. In India, the literary work is protected until :

   (a) Lifetime of author.

   (b) 25 years after the death of author.

   (c) 40 years after the death of author.

   (d) 60 years after the death of author.

4. Any criminal activity that uses a computer either as an instrumentality, target or a means for perpetuating further crimes comes within the ambit :

   (a) Software piracy. (b) Cyber crime.

   (c) Conventional crime. (d) None of the above.

5. Which among the following is not a Linux Distro ?

   (a) Red Hat. (b) SuSE.

   (c) Mac. (d) Ubuntu.

**Turn over**

6. The strategy of allowing processes that are logically runnable to be temporarily suspended is called.
7. HTTP stands for.
8. INFLIBNET stands for.
9. MMS stands for.
10. Internet is network of ————.

(10 × 1 = 10 marks)

## Part B (Short Answer Questions)

*Answer any* **eight** *questions.*
*Each question carries 2 marks.*

11. What is Operating System ?
12. What is application software ?
13. What is Cloud computing ?
14. Distinguish between SMS and MMS.
15. Briefly explain NICENET.
16. What is bus topology ?
17. What is cyber ethics ?
18. Briefly explain any *one* of the open source office software.
19. Briefly explain any of the image manipulation software in Linux.
20. Briefly explain any of the various search engines.

(8 × 2 = 16 marks)

## Part C (Short Essay Questions)

*Answer any* **six** *questions.*
*Each question carries 4 marks.*

21. What are the features of New Generation Computers ?
22. What is DNA Computing ? What are its features ?
23. What are the health issues in using computer ?
24. What is cyber addiction ? Explain.

25. Explain the guidelines for proper usage of computers and internet.

26. Explain the usage of IT in education.

27. Discuss about the role IT in Healthcare.

28. Briefly explain open source software.

(6 × 4 = 24 marks)

## Part D (Essay Questions)

*Answer any* **two** *questions.*
*Each question carries* 15 *marks.*

29. Write a note on IT Act, 2000.

30. Explain emerging trends in IT.

31. What is a personal computer ? Explain its parts and features.

(2 × 15 = 30 marks)

D 91674 (Pages : 3) Name.....

Reg. No.....

# THIRD SEMESTER B.A./B.Sc. DEGREE EXAMINATION, NOVEMBER 2020

(CUCBCSS—UG)

Common Course

A 12—GENERAL INFORMATICS

(2017 Admissions)

Time : Three Hours Maximum : 80 Marks

## Part A

*Answer* **all** *questions.*
*Each question carries* 1 *mark.*

I. Choose the correct answer :

1 Which of the following is not one of the four major functions of computer ?

a) Output. b) Storage.

c) Processing. d) Calculation.

2 An Ethernet port is used for connecting your computer to :

a) A network. b) A printer.

c) A monitor. d) A digital camera.

3 On the keyboard, the key you press to finalize a command or entry is :

a) Enter. b) Control.

c) Escape. d) All of the above.

4 Which of the following period is the second generation of computing ?

a) 1945-55. b) 1956-63.

c) 1964-1971. d) None of the above.

5 One cannot write new data in this type of memory :

a) RAM. b) ROM.

c) CPU. d) None of these.

II. Fill in the blanks :

6 Mouse was invented by ———— in 1963.

7 CRT means ————.

8 Linux is a ———— Operating system.

9 The device that tracks movement is ————.

10 ERP means ————.

(10 × 1 = 10 marks)

## Part B

*Answer any* **eight** *questions.*
*Each question carries* 2 *marks.*

11 What is LAN ?

12 What is Star and Tree topology ?

13 What is HTML ?

14 What is UNIX ?

15 What is G2B interaction ?

16 Explain RFID.

17 Explain SMART CARD.

18 Explain Copyright.

19 Explain INFLIBNET.

20 What is Phishing ?

(8 × 2 = 16 marks)

## Part C

*Answer any* **six** *questions.*
*Each question carries* 4 *marks.*

21 What are the major features of new generation personal computers ?

22 What is internet ? What are its major uses ?

23 What are the components of information technology ?

24 Explain some of the benefits of e-governance ?

25 Explain Electronic Data Interchange. What are some of its benefits ?

26 What is e-waste and green computing ?

27 What is GNOME ?

28 Compare Spyware and Malware.

(6 × 4 = 24 marks)

## Part D

*Answer any* **two** *questions.*
*Each question carries* 15 *marks.*

29. What is Computer Network ? What are the types ? What are its components ?

30. What are the applications of IT in health care ? Explain with some examples.

31. What is LINUX ? What are its advantages ? What are its disadvantages ?

(2 × 15 = 30 marks)

D 91674 (Pages : 3) Name.....

Reg. No.....

# THIRD SEMESTER B.A./B.Sc. DEGREE EXAMINATION, NOVEMBER 2020

(CUCBCSS—UG)

Common Course

A 12—GENERAL INFORMATICS

(2017 Admissions)

Time : Three Hours Maximum : 80 Marks

## Part A

*Answer* **all** *questions.*
*Each question carries* 1 *mark.*

I. Choose the correct answer :

1 Which of the following is not one of the four major functions of computer ?

a) Output. b) Storage.

c) Processing. d) Calculation.

2 An Ethernet port is used for connecting your computer to :

a) A network. b) A printer.

c) A monitor. d) A digital camera.

3 On the keyboard, the key you press to finalize a command or entry is :

a) Enter. b) Control.

c) Escape. d) All of the above.

4 Which of the following period is the second generation of computing ?

a) 1945-55. b) 1956-63.

c) 1964-1971. d) None of the above.

5 One cannot write new data in this type of memory :

a) RAM. b) ROM.

c) CPU. d) None of these.

II. Fill in the blanks :

6 Mouse was invented by ———— in 1963.

7 CRT means ————.

8 Linux is a ———— Operating system.

9 The device that tracks movement is ————.

10 ERP means ————.

(10 × 1 = 10 marks)

## Part B

*Answer any* **eight** *questions.*
*Each question carries* 2 *marks.*

11 What is LAN ?

12 What is Star and Tree topology ?

13 What is HTML ?

14 What is UNIX ?

15 What is G2B interaction ?

16 Explain RFID.

17 Explain SMART CARD.

18 Explain Copyright.

19 Explain INFLIBNET.

20 What is Phishing ?

(8 × 2 = 16 marks)

## Part C

*Answer any* **six** *questions.*
*Each question carries* 4 *marks.*

21 What are the major features of new generation personal computers ?

22 What is internet ? What are its major uses ?

23 What are the components of information technology ?

24 Explain some of the benefits of e-governance ?

25 Explain Electronic Data Interchange. What are some of its benefits ?

26 What is e-waste and green computing ?

27 What is GNOME ?

28 Compare Spyware and Malware.

(6 × 4 = 24 marks)

## Part D

*Answer any* **two** *questions.*
*Each question carries* 15 *marks.*

29. What is Computer Network ? What are the types ? What are its components ?

30. What are the applications of IT in health care ? Explain with some examples.

31. What is LINUX ? What are its advantages ? What are its disadvantages ?

(2 × 15 = 30 marks)

D 71553 (Pages : 3) Name.....

Reg. No.....

# THIRD SEMESTER B.Com./B.B.A. DEGREE EXAMINATION, NOVEMBER 2019

(CUCBCSS—UG)

B.Com./B.B.A.

BCM 3A 12—GENERAL INFORMATICS

(2017 Admissions)

Time : Three Hours Maximum : 80 Marks

## Part I

*Answer* **all** *questions.*

*Each question carries* 1 *mark.*

I. Choose the correct answer :

1 An Ethernet port is used for connecting a computer to :

(a) A network. (b) A printer.

(c) A monitor. (d) A digital camera.

2 Unix is an :

(a) Communication system. (b) Application software.

(c) Database program. (d) Operating system.

3 Which of the following is not harmful for your computer :

(a) Malware. (b) Cookies.

(c) Virus. (d) Spyware.

4 Which topology connects all devices (nodes) to each other for redundancy and fault tolerance ?

(a) Bus topology. (b) Ring topology.

(c) Mesh topology (d) Star topology.

5 Expand the term HTML :

(a) Hindustan Tools and Machine ltd.

(b) Highly Technical Machine Language.

(c) Hyper Text Markup Language.

(d) Heavy Tools and Machine Leasing.

Turn over

II. Fill up the blanks :

6 ———— is live online communication between two users via computer.

7 ———— Programs are those programs which enable a user to create a slideshow and present his topics in the form of slides.

8 ———— is the electronic transmission and receiving of messages, information, data files, letters or documents by means of point-to-point systems or computer-based messages system.

9 ———— is a flat film having large number of images arranged in rows and columns.

10 In ———— case, an interface is created between the government and citizens who enables the citizens to benefit from efficient delivery of a large range of public services.

(10 × 1 = 10 marks)

## Part II

*Answer any* **eight** *questions.*
*Each question carries* 2 *marks.*

11 What is Interoperability ?

12 What do you mean by mobile computing ?

13 What do you mean by Cloud computing ?

14 What is data ?

15 Write a note on Knowledge management.

16 What is INFLIBNET ?

17 What is the significance of DIGITAL DIVIDE ?

18 What is Email spam ?

19 What is Information overload ?

20 Write not on Febora.

(8 × 2 = 16 marks)

## Part III (Short Essays)

*Answer any* **six** *questions.*
*Each question carries* 4 *marks.*

21 What do you mean by SOFTWARE REPOSITORIES ? Explain.

22 State the procedure Inserting Graphics.

23 Mention the main features of GNOME.

24 List the Disadvantages of Linux.

25 What do you mean by Language localization process ?

26 What do you mean by information overload ? List the demerits of this.

27 What are the Risk factors that have been identified with Internet addiction ?

28 Write a note on cyber crimes.

(6 × 4 = 24 marks)

## Part IV (Long Essays)

*Answer any* **two** *questions.*
*Each question carries* 15 *marks.*

29 What is NICENET ? What are its merits and features ?

30 Explain the term GPS ? Also mention the uses of it.

31 Elaborate the applications of IT in the field of business, commerce and resource management.

(2 × 15 = 30 marks)

**D 51701** **(Pages : 2)** **Name.....**

**Reg. No.....**

**THIRD SEMESTER (CBCSS—UG) DEGREE EXAMINATION**
**NOVEMBER 2023**

Common Course [B.Sc. LRP (Alternate Pattern)]

A12—INFORMATICS AND EMERGING TECHNOLOGIES

(2019—2022 Admissions)

Time : Two Hours and a Half Maximum : 80 Marks

**Section A (Short Answers)**

*Answer questions up to* 25 *marks.*
*Each question carries* 2 *marks.*
*Ceiling* 25 *marks.*

1. List any *four* storage devices used in modern computers.
2. Define operating systems. Name any *two* operating systems used in personal computers.
3. Identify any *two* applications of microwave LANs.
4. What is WAP ?
5. Highlight any *two* features of mobile operating systems.
6. Give two limitations of AMPS.
7. Give the basic principle of optical fibres.
8. Give any *two* applications of optical fibre.
9. How is LASER different from ordinary light ?
10. What is CIA triad ?
11. Identify any *two* E-mail security issues.
12. Differentiate HTTP and HTTPS protocols.
13. What do you mean by authentication ?
14. Give any *three* applications where finger print is used as a biometric.
15. List any *two* challenges in using face recognition as a bio-metric.

**Turn over**

**Section B (Paragraph)**

*Answer questions up to* 35 *marks.*
*Each question carries* 5 *marks*
*Ceiling* 35 *marks.*

16. Describe the properties of any two educational websites.

17. Differentiate between internet and intranet.

18. Summarize the features of GSM.

19. Describe the classification of LASER based on hazardousness.

20. Discuss any *three* online shopping frauds and approaches to prevent them.

21. List the procedures to follow to ensure secure browsing ?

22. Discuss smartcard based authentication.

23. Analyse the components of a speaker recognition system.

**Section C (Essay)**

*Answer any* **two** *questions.*
*Each question carries* 10 *marks.*

24. Give a detailed account of CDMA and PCS network.

25. Discuss in detail applications of Holography.

26. Write notes on :

    (i) Cyber forensic ; and

    (ii) Cyber crime cell.

27. Describe a multimodal biometric system involving face, iris and hand geometry.

(2 × 10 = 20 marks)

**D 92911-M** (Pages : 2) Name.....

Reg. No.....

# THIRD SEMESTER B.A./B.Sc. DEGREE EXAMINATION, NOVEMBER 2020

(CBCSS—UG)

Common Course

A 12—INFORMATICS AND EMERGING TECHNOLOGIES

(2019 Admissions)

Time : Two Hours and a Half Maximum : 80 Marks

## Section A (Short Answers)

*Answer at least* **ten** *questions.*
*Each question carries* 3 *marks.*
*All questions can be attended.*
*Overall Ceiling* 30.

1. Give the role of main memory (RAM) in a computer.
2. Give any *two* functions of an Operating system.
3. Differentiate between Digital and Analog systems.
4. Identify two applications of smart phones.
5. What is a LAN ?
6. How is a mobile operating system different from a PC/Laptop operating system ?
7. What is a secondary storage device ?
8. Give the basic principle of optical fibre.
9. Give any *one* scenario where holography is used to enhance security.
10. What is a 'social network' ?
11. Define digital signature.
12. Give the scope of cyber forensics.
13. What do you mean by biometrics ?
14. What is a smart card ?
15. Explain the term 'E-Commerce'.

(10 × 3 = 30 marks)

**Turn over**

## Section B (Paragraph)

*Answer at least* **five** *questions.*
*Each question carries* 6 *marks.*
*All questions can be attended.*
*Overall Ceiling* 30.

16. Write a note on scientific databases.
17. Give an overview of evolution of internet.
18. Compare GSM and CDMA.
19. Briefly explain Holography.
20. Discuss any two applications of optical fibre.
21. List the functions of cybercrime cell.
22. Discuss security issues in social media.
23. Write a note on multimodal biometrics.

(5 × 6 = 30 marks)

## Section C (Essays)

*Answer any* **two** *questions.*
*Each question carries* 10 *marks.*

24. Discuss the features of Microwave LAN, Radio LAN, Infrared LAN and WLL technologies.
25. Discuss in detail applications of LASER in different domain.
26. Discuss aspects of security issues in Banking, online shopping and e-mail. Suggest measures to carry out secure online shopping.
27. Discuss in detail any *four* biometric techniques used for authentication.

(2 × 10 = 20 marks)

**D 11987** **(Pages : 2)** **Name.....**

**Reg. No.....**

**THIRD SEMESTER (CBCSS–UG) DEGREE EXAMINATION**
**NOVEMBER 2021**

Common Course (B.Sc. L.R.P. (Alternate Pattern))

A12—INFORMATICS AND EMERGING TECHNOLOGIES

(2019—2020 Admissions)

Time : Two Hours and a Half Maximum : 80 Marks

**Section A**

*Answer atleast* **ten** *questions.*
*Each question carries* 3 *marks.*
*All questions can be attended.*
*Overall ceiling* 30.

1. List any four educational websites.
2. Compare the role of RAM and secondary storage devices.
3. What are the different types of operating systems ?
4. What is WLL technology ?
5. Give any two key features of smart phones.
6. Give any two limitations of a mobile phone in comparison to a lap top in terms of software applications.
7. Give any two advantages of using optical fibre.
8. State the working principle of holograms.
9. Highlight any two applications of LASER in medical filed.
10. Differentiate between cyber security and cyber forensic.
11. Write any two security threats in social media.
12. Write any two desirable features of a password.
13. Define biometrics.
14. What do you mean by multimodal biometrics ?
15. Give any one situation where face recognition cannot be used for authentication.

(10 × 3 = 30 marks)

**Turn over**

## Section B

*Answer atleast* **five** *questions.*
*Each question carries* 6 *marks.*
*All questions can be attended.*
*Overall ceiling* 30.

16. Write a note on operating systems.
17. Discuss PCS networks.
18. Write a note on WLANs.
19. Discuss applications of LASER in entertainment.
20. Discuss the issues in online banking security.
21. Write a note on cyber forensic.
22. Discuss the process of recognizing a person from iris image.
23. Explain the steps in automatic signature verification.

(5 × 6 = 30 marks)

## Section C

*Answer any* **two** *questions.*
*Each question carries* 10 *marks.*

24. Compare GSM, AMPS and CDMA.
25. Discuss the applications of Holography in data storage and security.
26. Summarize the key aspects of IT act 2008.
27. Elaborate the steps in finger print verification. Identify the merits and limitations of face recognition, iris recognition, speaker identification and hand geometry based verification.

(2 × 10 = 20 marks)

**D 31759** **(Pages : 2)** **Name.....**

**Reg. No.....**

# THIRD SEMESTER (CBCSS—UG) DEGREE EXAMINATION NOVEMBER 2022

Common Course for B.Sc. LRP (Alternate Pattern)

A12—INFORMATICS AND EMERGING TECHNOLOGIES

(2019 Admission onwards)

Time : Two Hours and a Half Maximum : 80 Marks

## Section A (Short Answers)

*Answer questions up to* 25 *marks.*
*Each question carries* 2 *marks.*
*Ceiling* 25 *marks.*

1. List any four educational websites.
2. What is the role of an Operating System ?
3. What are the different types of printers ? Differentiate between a printer and a plotter.
4. List and compare any two mobile OSs.
5. Differentiate LAN and WLAN.
6. What is WLL ?
7. What is a Hologram ?
8. List applications of optical fiber.
9. Mention applications of Holography in security.
10. List any four cyber security issues.
11. Define digital signature.
12. Give any two issues you will refer to cyber crime cell.
13. Define multimodal biometrics.
14. Give any two features that make computer based face recognition difficult.
15. What is a smart card ?

**Turn over**

## Section B (Paragraph)

*Answer questions up to* 35 *marks.*
*Each question carries* 5 *marks.*
*Ceiling* 35 *marks.*

16. Write a note on memory systems.
17. Explain the working of LCD monitors.
18. Discuss working principle, merits and applications of radio LAN.
19. Discuss the features of mobile operating systems.
20. Explain Holography technology.
21. Discuss the role of cyber forensic in controlling cyber crimes.
22. Summarize security issues in social media.
23. Write a note on speaker verification.

## Section C (Essay)

*Answer any* **two** *questions.*
*Each question carries* 10 *marks.*

24. Summarize the evolution of mobile phone technology.
25. Discuss in detail applications of LASER.
26. Discuss security issues in online banking and online shopping.
27. Discuss the following biometric systems highlighting their merits and limitations.
    i) Finger print.
    ii) Hand geometry.

(2 × 10 = 20 marks)

C 31125 (Pages : 2) Name.....

Reg. No.....

# THIRD SEMESTER B.Sc. (L.R.P.)/B.M.M.C. DEGREE EXAMINATION NOVEMBER 2017

(CUCBCSS—UG)

Common Course

A 12—GENERAL INFORMATICS

Time : Three Hours Maximum : 80 Marks

## Part I

*Answer* **all** *questions.*
*Each question carries* 1 *mark.*

1. ——— Unit of CPU directs and co-ordinates all operations of a computer.
   (a) ALU. (b) RAM.
   (c) CONTROL UNIT. (d) REGISTER.
2. USB means ———.
   (a) Universal Serial Bus. (b) University Sector Bus.
   (c) Unique serial bus. (d) None of the above.
3. PDA stands for ———.
   (a) Personal Digital Assistant. (b) Personal Dairy Assistant.
   (c) Private Digital Assistant. (d) None of the above.
4. Linux is a ——— Operating System.
   (a) Open-source. (b) Windows.
   (c) Microsoft. (d) Mac.
5. In open Office.org 'Calc" is a :
   (a) Word Processor. (b) Spreadsheet.
   (c) Database. (d) None of these.
6. Who started Free Software foundation ?
7. Memory of a computer is generally expressed in terms of 'K', where 'K' stands for ———.
8. ——— knowledge are also known as formal knowledge.
9. ——— is a plastic card embedded with a computer chip that stores and transacts data between users.
10. ——— is concerned with making computers behave like humans.

(10 × 1 = 10 marks)

**Turn over**

## Part II (Short Answer Questions)

*Answer any* **eight** *questions.*
*Each question carries* 2 *marks.*

11. What is Hyperlinks.
12. What are worms ?
13. Who is a Hacker ?
14. What is INFLIBNET ?
15. What is the use of NICENET ?
16. What is Open Source Software ?
17. What is Knowledge Management ?
18. What is Topology ?
19. What is information ?
20. What is *e*-learning ?

(8 × 2 = 16 marks)

## Part III (Short Essays)

*Answer any* **six** *questions.*
*Each question carries* 4 *marks.*

21. What are the features of Knowledge Management ?
22. Explain multiple access system used in mobile phone technology.
23. What are the benefits of cloud computing ?
24. Explain any *two* Protocols.
25. Explain any *two* network topologies.
26. Explain any *two* social cyber crimes.
27. Explain the measures taken to prevent cyber threats.
28. Explain GPS and its uses.

(6 × 4 = 24 marks)

## Part IV (Long Essays)

*Answer any* **two** *questions.*
*Each question carries* 15 *marks.*

29. Explain various internet access methods.
30. Explain various components of Knowledge Management.
31. Write an Essay on Academic Websites with few examples.

(2 × 15 = 30 marks)

**D 51183-S** (Pages : 4) Name.....Amrutha.....

Reg. No..E.E.AB.BCM11G..

# THIRD SEMESTER (CUCBCSS—UG) [SPECIAL] EXAMINATION NOVEMBER 2018

Common Course

BCM 3A 11—BASIC NUMERICAL SKILLS

(2017 Admissions)

Time : Three Hours Maximum : 80 Marks

## Part A

*Answer* **all** *questions.*
*Each question carries* 1 *mark.*

I. Choose the correct answer :

1 Find four numbers in AP such that their sum is 50 and greatest of them is 4 times the least :

(a) 4,8,12,16. (b) 5,10,15,20.

(c) 6,12,18,24. (d) 7,14,21,28.

2 If $A = \begin{bmatrix} 3 & -5 & 2 \\ 7 & 0 & 8 \\ -2 & 4 & 8 \end{bmatrix}$ and $B = \begin{bmatrix} -3 & 2 & 7 \\ 2 & -9 & 7 \\ 1 & -1 & 2 \end{bmatrix}$ A + B =

(a) $\begin{bmatrix} 0 & -3 & 9 \\ 15 & -9 & 15 \\ -1 & 3 & 10 \end{bmatrix}$. (b) $\begin{bmatrix} 0 & 3 & -9 \\ -15 & 9 & -15 \\ 1 & -3 & -10 \end{bmatrix}$.

(c) $\begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$. (d) $\begin{bmatrix} 3 & -8 & 11 \\ 22 & -9 & 23 \\ -3 & 7 & 18 \end{bmatrix}$.

3 If A = {1, 3, 5, 7, 9, 11, 13, 15}, B = {5, 9, 13, 17, 21} and C = {1, 3, 9, 13, 17, 21} $A \cup B$ =

(a) {5, 9, 13}. (b) {5, 7, 9, 11}.

(c) {5, 9, 17, 21}. (d) {1, 3, 5, 7, 9, 11, 13, 15, 17, 21}.

4 Arithmetic mean of 10, 90, 85, 103, 11, 29, 84, 15, 35, 80 is :

(a) 103. (b) 11.

(c) 54-2. (d) 84.

5 Set of questions printed and sent to the respondent for data collection is called ————.

(a) Schedule. (b) Interview.

(c) Questionnaire. (d) Observation.

(5 × 1 = 5 marks)

**Turn over**

II. Fill in the blanks :

6 If $ax^2 + bx + 8 = 0$ does not have 2 distinct real roots, the minimum value of $2a + b$ = _____.

7 Fifteenth term of the AP 13, 26, 39, .... Is _____.

8 If A = {a, b, c, d, e, f} and B = {a, e, i, o, u} A ∩ B = _____.

9 Determinant of the is matrix $\begin{bmatrix} p & q \\ r & s \end{bmatrix}$ is _____.

10 A representative part of the whole population is called _____.

(5 × 1 = 5 marks)

## Part B (Short Answer Questions)

*Answer any* **eight** *questions.*
*Each question carries 2 marks.*

11 What is primary data ?

12 What is frequency curve ?

13 Find median : 17, 32, 35, 33, 15, 21, 41, 32, 11, 10, 20.

14 Calculate mean deviation from median and its coefficient for the following values :
5, 28, 33, 44, 83, 87, 96, 99, 25, 35, 82.

15 Find the harmonic mean of the following : 2, 3, 4, 5.

16 Determine trend using semi averages method

| Year | : | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|---|---|---|
| Values | : | 10 | 12 | 15 | 20 | 18 | 25 | 24 | 28 | 34 |

17 Find simple index number

| Items | Price in the base year | Price in the current year |
|---|---|---|
| 1 | 5 | 7 |
| 2 | 10 | 12 |
| 3 | 15 | 25 |
| 4 | 20 | 18 |
| 5 | 8 | 9 |

18 Represent the following using Venn diagram A ∩ B.

19 Find the sum of the series 2, 0, –2, –4, –6,..... 22 term.

20 Solve $[3/(x + 6)] + [2/(x - 1)] = 5/(x + 5)$.

(8 × 2 = 16 marks)

## Part C (Short Essay Questions)

*Answer any* **six** *questions.*
*Each question carries* 4 *marks.*

21 Distinguish between ogive and frequency polygon.

22 Discuss the importance of averages.

23 Find out mean :

| Marks | : | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 |
|---|---|---|---|---|---|---|---|---|---|
| No. of Students | : | 5 | 7 | 15 | 25 | 20 | 15 | 8 | 5 |

24 Determine Geometric Mean for the following distribution :

| $x$ | : | 135 | 231 | 352 | 430 |
|---|---|---|---|---|---|
| $f$ | : | 2 | 3 | 4 | 3 |

25 For the following data calculate standard deviation :

| Marks | : | 2 | 4 | 6 | 8 | 10 |
|---|---|---|---|---|---|---|
| Number of Students | : | 8 | 10 | 16 | 9 | 7 |

26 From the following data compute quantity index number :

| Commodities | 2001 | | 2008 | |
|---|---|---|---|---|
| | Price | Total Value | Price | Total Value |
| A | 8 | 80 | 10 | 110 |
| B | 10 | 90 | 12 | 108 |
| C | 16 | 256 | 20 | 340 |

27 Find the 15th term and the sum of the first 10 terms for the sequence 2, 10, 50....

28 Solve $2x^2 - 13x + 15 = 0$.

(6 × 4 = 24 marks)

## Part D (Essay Questions)

*Answer any* **two** *questions.*
*Each question carries* 15 *marks.*

29 The scores of two batsmen A and B during a certain match are as follows. Examine which one of the two is more consistent in scoring. Who is more efficient batsman ?

| Batsman A | : | 10 | 12 | 80 | 70 | 60 | 100 | 0 | 4 |
|---|---|---|---|---|---|---|---|---|---|
| Batsman B | : | 8 | 9 | 7 | 10 | 5 | 9 | 10 | 8 |

**Turn over**

30 From the following data find Fisher's index number and show that the Time and Factor Reversal tests are satisfied by it :

| | Base year | | Current year | |
|---|---|---|---|---|
| | Price | Expenditure | Price | Expenditure |
| A | 8 | 80 | 10 | 120 |
| B | 10 | 120 | 12 | 96 |
| C | 5 | 40 | 5 | 50 |
| D | 4 | 56 | 3 | 60 |
| E | 20 | 100 | 25 | 150 |

31 Define Statistics. What are its important functions ?

(2 × 15 = 30 marks)

**D 31573** **(Pages : 3)** **Name.....**

**Reg. No.....**

**THIRD SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION**
**NOVEMBER 2022**

Chemistry

CHE 3B 03—PHYSICAL CHEMISTRY—I

(2017—2018 Admissions)

Time : Three Hours Maximum : 80 Marks

## Section A

*Answer* **all** *questions.*
*Each question carries* 1 *mark.*

1. Write the equation for calculating RMS velocity.
2. What is Boyle temperature of gas ?
3. Which among the following is an intensive property; temperature, volume, heat capacity ?
4. Give the mathematical statement of First law of thermodynamics.
5. State Kirchhoff equation.
6. Enthalpy of neutralization of any strong acid by a strong base will be a constant. Why ?
7. What is the unit of surface tension ?
8. Define specific refractivity.
9. State the relation between Kp and Kx.
10. At 300°C, the equilibrium constant for the synthesis of HI is 20. What is the equilibrium constant value for the decomposition of HI ?

(10 × 1 = 10 marks)

## Section B

*Answer any* **ten** *questions.*
*Each question carries* 2 *marks.*

11. Define collision frequency and mean free path.
12. Calculate the temperature at which the average velocity of oxygen equals that of hydrogen at –253°C.

**Turn over**

13. Comment on the effect of temperature on Maxwell's distribution of velocities.

14. Calculate the critical constant values of a gas where, van der Waal's constants are : a = 0.751 $dm^6$ atmosphere $mol^{-2}$ and b = 0.0226 $dm^3$ $mol^{-1}$.

15. Distinguish between state and path functions.

16. Formulate the relation between Cp and Cv.

17. What is inversion temperature ?

18. How will you determine molecular mass from viscosity measurements ?

19. What is Stirling's approximation?

20. Calculate the molar refraction of acetic acid when density = 1,046g/cc and refractive index is 1.3715.

21. Comment on the uniqueness of water as a solvent.

22. How can we prove that chemical equilibrium is dynamic?

(10 × 2 = 20 marks)

## Section C

*Answer any* **five** *questions.*
*Each question carries* 6 *marks.*

23. Derive van der Waal's equation of state.

24. Explain the concept of entropy and compare the entropy change in the case of reversible and irreversible processes.

25. What is chemical potential ? Derive expression for the variation of chemical potential with temperature.

26. Explain mathematically the work done in a reversible isothermal expansion and that in a reversible adiabatic expansion of an ideal gas.

27. Derive the expression for Joule Thompson coefficient.

28. What is residual entropy ? Calculate the residual entropy of CO.

29. Explain parachor. Establish the Kekule's structure of benzene based on parachor values (parachor values of C, H, double bond and six membered ring are 4.78, 17.1, 23.1 and 6.1 respectively ; the experimental parachor value is 206.7).

30. Provide the thermodynamic derivation of law of chemical equilibrium.

(5 × 6 = 30 marks)

## Section D

*Answer any* **two** *questions.*
*Each question carries* 10 *marks.*

31. Postulate the kinetic theory of gases. Derive the Kinetic gas equation.

32. Derive Clausius Clapeyron equation and discuss its applications.

33. (a) Explain Nernst Heat theorem.

    (b) Describe Hess's law with suitable examples.

34. Discuss the Le Chatelier's principle with suitable examples.

(2 × 10 = 20 marks)

**D 12003** **(Pages : 2)** **Name.....**

**Reg. No.....**

**THIRD SEMESTER (CBCSS–UG) DEGREE EXAMINATION**
**NOVEMBER 2021**

Chemistry/Industrial Chemistry/Polymer Chemistry

CHE 3B 03—PHYSICAL CHEMISTRY—I

(2019—2020 Admissions)

Time : Two Hours Maximum : 60 Marks

**Section A**

*Answer atleast* **eight** *questions.*
*Each question carries* 3 *marks.*
*All questions can be attended.*
*Overall ceiling* 24.

1. Calculate RMS velocity of $O_2$ at : (a) STP ; and (b) at 288 K.
2. Calculate number of collisions per second per molecule of $O_2$ at 25°C and at 1 atm pressure. Collision diameter of oxygen is 361 pm.
3. Distinguish extensive and intensive properties with example.
4. State Carnot's theorem and second law of thermodynamics.
5. What is meant by chemical potential ? What is its significance ?
6. What is entropy ? Give its unit.
7. Why chemical equilibrium is termed dynamic ?
8. What is reaction quotient ?
9. Define order of a group. Give example.
10. Define principal axis.
11. Name point group to which water belongs. Write down its symmetry elements.
12. What is meant by plane of symmetry ? Illustrate with an example.

(8 × 3 = 24 marks)

**Turn over**

## Section B

*Answer atleast* **five** *questions.*
*Each question carries* 5 *marks.*
*All questions can be attended.*
*Overall ceiling* 25.

13. Derive expressions for critical constants in terms of Vander Waals constant.
14. Derive RMS and average velocity from Maxwell Boltzmann equation.
15. Six moles of an ideal gas expands isothermally and reversibly from a volume of 1dm3 to volume of 10dm3 at 27°C. What is the maximum work done ?
16. Derive an expression for relation between entropy and probability.
17. Explain Nernst heat theorem. How does it lead to third law of thermodynamics ?
18. Derive Gibbs-Helmholtz equation. What is its significance ?
19. Give group multiplication table of symmetry operations of $H_2O$ molecule.

(5 × 5 = 25 marks)

## Section C

*Answer any* **one** *question.*
*Each question carries* 11 *marks.*

20. (a) What is meant by efficiency of heat engine ? Derive an expression.

    (b) What do you understand by heat capacity of a system ? Show from thermodynamic consideration that $Cp - Cv = R$.

21. Derive relation between $Kp$ and $Kc$.

(1 × 11 = 11 marks)

D 71620 (Pages : 3) Name.....

Reg. No.....

# THIRD SEMESTER B.A./B.Sc. DEGREE EXAMINATION NOVEMBER 2019

(CUCBCSS—UG)

Chemistry

CHE 3B 03—PHYSICAL CHEMISTRY—I

Time : Three Hours Maximum : 60 Marks

## Section A (One Word)

*Answer* **all** *questions.*

*Each question carries* 1 *marks*

1. Write Vander waals equation for *n* moles of a real gas and explain terms.
2. At critical temperature V – Vc = ————.
3. Write an example of intensive property.
4. For a cyclic process $\Delta E$ = ————.
5. Efficiency of a Carnot engine working between temperature $T_1$ and $T_2$ is ————.
6. The unit of surface tension is ————.
7. Molar refraction $R_M$ = ————.
8. At ———— $r_f = r_b$.
9. The relation between K*p* and K*x* is ————.
10. Entropy is a measure of ———— of the system.

(10 × 1 = 10 marks)

## Section B (Short Answers)

*Answer an* **ten** *questions.*

*Each question carries* 2 *marks.*

11. Define collision number and collision frequency.
12. Calculate RMS velocity of $O_2$ at 25°C.
13. Explain why internal energy is a state function while work not.
14. Define ensemble.

**Turn over**

15. Define vapour pressure ot a liquid. How does it depend on temperature.
16. State and illustrate Hess's law.
17. Discuss and explain third law of thermodynamics.
18. Define co-efficient of viscosity.
19. Define parachor.
20. State and explain Le Chateleirs principle.
21. Why is Chemical equilibrium referred as dynamic equilibrium ?
22. What is optical exaltation ?

(10 × 2 = 20 marks)

## Section C (Paragraph)

*Answer any* **five** *questions.*
*Each question carries* 6 *marks.*

23. Explain the reasons for deviation of real gases from ideal behavior.
24. What is the effect of temperature and pressure on equilibrium $2SO_2 + O_2 \rightleftharpoons 2SO_3 + \text{heat}$.
25. For the formation of $NH_3$ the equilibrium constant at 673 K and 773 K are $1.58 \times 10^{-4}$ and $1.39 \times 10^{-5}$ respectively. Calculate the heat of reaction.
26. Explain Joule Thomson effect. How is it useful for liquefaction of gases by any *one* method.
27. (a) How are molar refraction measurements useful in the structural elucidation of molecules.
    (b) Calculate the refractive index of a liquid having molar refraction 12.85 $cm^3\ mol^{-1}$. the molecular mass is 60 $gmol^{-1}$ and density is 1.046 $gcm^{-3}$.
28. Define term heat of formation and bond energy. Given the bond enthalpies of N – H, H – H and N = N bonds are 389.435 and 945.4 kJ $mol^{-1}$ respectively, calculate the heat of formation of ammonia.
29. Derive an expression for relation between entropy and probability.
30. Derive expression for critical constants in terms of Vander-waals constant.

(5 × 6 = 30 marks)

## Section D (Essays)

*Answer any* **two** *questions.*
*Each question carries* 10 *marks.*

31. (a) Derive Gibbs-Helmholtz equation in terms of free energy and enthalpy at constant pressure.

    (b) What is Chemical potential ? Describe Variation of chemical potential with respect to temperature.

32. Calculate the most probable velocity, average velocity and root mean square velocity for carbon monoxide at 298K.

33. What is Kirchoff's equation ? The enthalpy of reaction $N_2 + 3H_2 \rightleftharpoons 2\,NH_3$ at 300 K was found to be – 91.97 KJ. What will be the enthalpy of reaction at 323 K ? The molar heat capacities at constant pressure and 300 K for nitrogen, hydrogen and ammonia are 28.46, 28.33 and 37.08 $JK^{-1}\,mol^{-1}$ respectively.

34. Derive Van't Hoff equation and show Variation of equilibrium constant with temperature.

(2 × 10 = 20 marks)

D 92249 (Pages : 3) Name.....

Reg. No.....

# THIRD SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2015

(CUCBCSS–UG)

Core Course—Chemistry

CHE 3B 03—PHYSICAL CHEMISTRY – I

Time : Three Hours Maximum : 80 Marks

## Section A (One word)

*Answer* **all** *questions.*

*Each question carries* 1 *mark.*

1. The temperature above which a gas cannot be liquefied by applying pressure is called ————.
2. ———— systems can exchange both energy and matter with the surroundings.
3. The entropy change of the system during an adiabatic process is ————.
4. For an isothermal process, the work done is at the expense of ————.
5. The standard enthalpy of a pure element is taken as ————.
6. According to ———— law, thermochemical equations can be added or multiplied.
7. The heat of neutralisation of a strong acid by a strong base is always ————.
8. At the normal B.P. of a liquid its vapour pressure will become equal to ————.
9. The S.I. unit of surface tension is ————.
10. Chemical equilibrium is ———— in nature.

(10 × 1 = 10 marks)

## Section B (Short answer)

*Answer any* **ten** *questions.*

*Each question carries* 2 *marks.*

11. Calculate the r.m.s. velocity of $H_2$ molecule at 27°C.
12. Write the vander Waals' equation for '*n*' moles of a gas and explain the terms.
13. Differentiate between extensive and intensive properties.
14. Calculate the work done during the isothermal reversible expansion of 10 moles of an ideal gas from 10 $dm^3$ to 20 $dm^3$ at 27°C.
15. The vander Waals' constants '*a*' and '*b*' for a gas are $1.40 \times 10^{-1}$ $Nm^4$ $mol^{-2}$ and $3.9 \times 10^{-5} m^3$ $mol^{-1}$, respectively at 27°C. Calculate the inversion temperature of the gas.

16. The standard enthalpy of a compound is the same as its standard heat of formation. Illustrate with an example.

17. The heat of formation of $CO_2$ and CO are - 393.5 kJ and – 110.5 kJ respectively. Calculate the heat of combustion of CO.

18. What is meant by residual entropy ? Explain with example.

19. Write any *four* factors that affect the viscosity of a liquid.

20. The viscosity of an oil of density 0.97 $gcm^{-3}$ is $5 \times 10^{-2}$ $Nm^{-2}$ at 27°C. Calculate the time required for a given volume of the oil to flow through a viscometer, if the same volume of water takes 50 seconds to flow through the viscometer. The coefficient of viscosity and density of water respectively are $8.9 \times 10^{-4}$ $Nm^{-2}$ and 1 $gcm^{-3}$.

21. What are heterogeneous equilibria ? Give example.

22. For the reaction $2\,NO_{(g)} + Cl_{2(g)} \rightleftharpoons 2NOCl_{(g)}$, the value of Kp is $2 \times 10^3$ a.t.m. at 27°C. Calculate the value of Kc.

(10 × 2 = 20 marks)

## Section C (Paragraph)

*Answer any five questions.*
*Each question carries 6 marks.*

23. What are the features of Maxwell's distribution of molecular velocities ? Explain the effect of temperature in the distribution.

24. What is meant by compressibility factor of a gas ? Explain its significance.

25. State and formulate the first law of thermodynamics. Mention the important limitations of the law. How could the second law of thermodynamics overcome these limitations ?

26. Derive the Clausius-Clapeyron equation for the liquid $\rightleftharpoons$ vapour equilibrium. Give any *two* applications of the law.

27. What is meant by thermodynamic probability ? Deduce the relation between entropy and probability of a system.

28. What is parachor ? How is it used to elucidate the structure of compounds ? Illustrate with an example.

29. State and explain Le-Chatelier principle. Discuss the effect of temperature and pressure in the equilibrium $2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$ ; $\Delta H = -192.5$ kJ.

30. Derive the equilibrium constant Kc for the reaction $aA + bB \rightleftharpoons cC + dD$. How is the value of Kc related to Kp ?

(5 × 6 = 30 marks)

## Section D (Essay)

*Answer any* **two** *questions.*
*Each question carries* 10 *marks.*

31. (i) What are critical constants ? How are they related to vander Waals' constants ? (6 marks)

(ii) Explain the determination of critical volume of a gas. (4 marks)

32. (i) Describe the different strokes in the Carnot cycle and show that the efficiency of a heat engine depends only on the temperatures of the source and the sink.

(6 marks)

(ii) Derive the Gibb's–Duhem equation. (4 marks)

33. (i) What is Joule-Thompson coefficient ? Derive an equation for the Joule Thomson coefficient of a gas.

(6 marks)

(ii) The free energy change of a reaction at 27°C and 37°C are – 85.77 kJ and – 83.68 kJ respectively. Calculate the enthalpy change of the reaction at 32°C.

(4 marks)

34. (i) The enthalpy of formation of $NH_3$ is – 46 kJ at 300 K. Calculate the enthalpy of formation at 325 K. The molar heat capacities at constant pressure of $N_2$, $H_2$ and $NH_3$ are 28.4, 28.3 and 37 $JK^{-1}$ $mol^{-1}$ respectively.

(4 marks)

(ii) Derive an equation for the variation of equilibrium constant of a reaction with temperature.

(6 marks)

[2 × 10 = 20 marks]

C 31128 (Pages : 3) Name.....

Reg. No.....

# THIRD SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2017

(CUCBCSS—UG)

Chemistry

CHE 3B 03—PHYSICAL CHEMISTRY—I

Time : Three Hours Maximum : 80 Marks

## Section A (One Word)

*Answer* **all** *questions.*

*Each question carries* 1 *mark.*

1. The critical temperature Tc is related to van der Waals constants by the relation ———.
2. The temperature at which a real gas shows ideal behavior, over a wide range of pressure is called ———.
3. Give one example for an intensive property.
4. For an isothermal reversible expansion of an ideal gas, $\Delta H$ will be ———.
5. Joule Thomson coefficient $\mu_{JT}$ = ———.
6. In N! = ———.
7. Give one example for a path function.
8. With decrease in temperature, viscosity of a liquid will ———.
9. For the reaction $N_2O_4(g) \rightarrow 2NO_2(g)$, Kc and Kp are related as ———.
10. The equilibrium constant is related to the standard free energy change of a reaction as ———.

(10 × 1 = 10 marks)

## Section B (Short Answers)

*Answer any* **ten** *questions.*

*Each question carries* 2 *marks.*

11. Calculate the RMS velocity of $H_2$ molecule at 27°C.
12. What is compressibility factor ?
13. Define mean freepath.
14. Define inversion temperature.

**Turn over**

15. State and explain I law of thermodynamics.

16. Distinguish between a thermodynamic closed and isolated system.

17. What is meant by residual entropy ?

18. How is molar refraction of a liquid related to its refractive index and density ?

19. What is meant by heterogenous equilibria ? Give one example.

20. Enthalpy of neutralization of strong acid by a strong base is always constant. Explain.

21. One mole of an ideal gas expands isothermally at 300 K from a volume of 10 $dm^3$ to 20 $dm^3$ against a constant external pressure of 1 atmosphere. Calculate the work done by the system.

22. The equilibrium constant of a reaction is $7.5 \times 10^{-5}$ at 300 K. Calculate the value of $\Delta G^0$.

(10 × 2 = 20 marks)

## Section C ( Paragraphs)

*Answer any* **five** *questions.*
*Each question carries* 6 *marks.*

23. State Le Chateliers principle. What is the effect of increase of pressure and temperature in the reaction $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$ $\Delta H = -92.38$ KJ. Explain.

24. Derive van der Waals equation for *n* moles of a gas.

25. Show that Joule-Thomson expansion is an isenthalpic process.

26. Derive Gibbs Helmholtz equation.

27. Define critical constants. Explain the determination of critical temperature and critical pressure of a gas.

28. The standard enthalpy of formation of gaseous water at 298 K is –241.82 KJ/mol. Estimate its value at 373 K. Given the following value of Cp (Molar) :

    (i) $H_2O(g) = 33.58$ $JK^{-1}$ $mol^{-1}$.

    (ii) $H_2(g) = 28.84$ $JK^{-1}$ $mol^{-1}$ and

    (iii) $O_2(g) = 29.37$ $JK^{-1}$ $mol^{-1}$.

    Assume that Cp are independent of temperature.

29. State and explain Nernst heat Theorem. What is its significance ?

30. Obtain the thermodynamic derivation of Law of Chemical equilibrium.

(5 × 6 = 30 marks)

## Section D (Essays)

*Answer any* **two** *questions.*
*Each question carries* 10 *marks.*

31. (a) Derive kinetic gas equation. (7 marks)

(b) Calculate the mean free path for a gas at STP. Collision diameter $\sigma = 2 \times 10^{-10}$m. (3 marks)

32. (a) Derive Clausius- Clapeyron equation and discuss its application in liquid- vapour equilibria. (7 marks)

(b) Calculate the efficiency of heat engine working between a source at 480 K and sink at 200K. (3 marks)

33. (a) Derive an equation relating change in entropy of an ideal gas with respect to a change in temperature and pressure. (7 marks)

(b) For the reaction $CaCO_3(s) \rightarrow CaO(S) + CO_2(g)$ $\Delta H = 170.85$ KJ and $\Delta S = 0.15 KJ.K^{-1}$ at 300 K. Predict whether the reaction is spontaneous or not at 300 K. Explain. (3 marks)

34. (a) Derive vant Hoffs equation. (7 marks)

(b) Express the value of equilibrium constant in terms of concentration of reactants and products for a hypothetical reaction $aA + bB \rightarrow cC + d\,D$. How is the value related to Kp ? (3 marks)

[2 × 10 = 20 marks]

D 92923 (Pages : 2) Name.....

Reg. No.....

# THIRD SEMESTER (CBCSS-UG) DEGREE EXAMINATION, NOVEMBER 2020

Chemistry/Industrial Chemistry/Polymer Chemistry

CHE 3B 03—PHYSICAL CHEMISTRY – I

Time : Two Hours Maximum : 60 Marks

## Section A (Short Answers)

*Answer at least* **eight** *questions.*
*Each question carries* 3 *marks.*
*All questions can be attended.*
*Overall Ceiling* 24.

1. The density of $O_2$ at 298K and 1 atm is 1.429 $gdm^{-3}$ Calculate the RMS velocity of $O_2$ at 275K.
2. For $O_2$ at 25°C calculate mean free path at l atm given $d$ = 361 pm.
3. Define Cp and Cv of an ideal gas. How are they related ?
4. Calculate change in internal energy for conversionof 1 mol of $H_2O$ at 100°C to steam at 1 atm. The heat absorbed and work done by system are 40.7 kJ and 3.1 kJ respectively.
5. How is entropy related to thermodynamic probability ?
6. What is meant by partition function ?
7. State Le chatliers principle.
8. Give relation between Kp and Kc and explain the terms.
9. Name point group to which $NH_3$ belongs. Write down its symmetry elements.
10. What is an identity operation ?
11. What is meant by axis of symmetry ? Illustrate with an example.
12. What are the symmetry elements ?

(8 × 3 = 24marks)

## Section B (Paragraph)

*Answer at least* **five** *questions.*
*Each question carries* 5 *marks.*
*All questions can be attended.*
*Overall Ceiling* 25.

13. Why Vander waals equation is applicable to real gases? Define compressibility factor and Boyle Temperature.
14. Give a brief account of Maxwell's distribution law of velocities.

**Turn over**

15. Derive Kirchoffs equation showing variation of heat of reaction with temperature.

16. 10 moles of an ideal gas is expanded reversibly and isothermally from pressure 10 atm to 2 atm at 300K. Calculate maximum work done.

17. Discuss apllications of third law of thermodynamics.

18. Derive Gibbs-Duem equation.

19. Identify symmetry elements in (a) $BF_3$ (b) $C_6H_6$ ; (c) benzene ; (d) acetylene. Name point group of these molecules.

(5 × 5 = 25 marks)

## Section C (Essay)

*Answer any* **one** *question.*
*The question carries* 11 *marks.*

20. (a) What is Joule-Thomson effect ?

    (b) Describe Lindes and Claudes method for liquefaction of gases.

21. (a) State and explain the terms law of mass action and chemical equilibrium.

    (b) Apply Lechatelier principle to predict effect of (a) change of temperature (b) change of pressure on $PCl_5 \rightleftharpoons PCl_3 + Cl_2$ $\Delta H = 92.05$ KJ.

(1 × 11 = 11 marks)

**D 14111** **(Pages : 2)** **Name.....**

**Reg. No.....**

# THIRD SEMESTER B.Sc. DEGREE (SUPPLEMENTARY) EXAMINATION NOVEMBER 2016

Chemistry

CH 3B 05—PHYSICAL CHEMISTRY—I

Time : Three Hours Maximum : 30 Weightage

## Section A

*Answer* **all** *questions.*
*Each question carries ¼ weight.*

Fill in the blanks :

1. The average speed of a certain gas at 27°C is 400 m $s^{-1}$. The temperature at which the speed will be 800 m $s^{-1}$ is ————
2. ———— microstates are associated with the tossing of 3 coins.
3. In an adiabatic process ———— is zero.
4. ———— statistics deals with distinguishable particles.

State whether true or false :

5. Coefficient of gas viscosity is directly proportional to square root of temperature in absolute scale.
6. Use of thermometers for temperature measurement is based on the Zeroth law of thermodynamics.
7. Equilibrium constant is independent of temperature.
8. Pressure has no effect on the boiling point of water.

Answer in a word or sentence :

9. Define surface tension.
10. What is the effect of pressure on viscosity of a gas ?
11. State van der Waals equation for n moles of a gas.
12. When is the parachor of a liquid equal to its molar volume ?

(12 × ¼ = 3 weightage)

## Section B

*Answer* **all** *questions.*
*Each question carries* 1 *weight.*

13. State the virial equation of state.
14. What is molar refraction ?
15. Give two examples each for state function and path function.

**Turn over**

16. Write down the expression for work in an isothermal reversible expansion of an ideal gas.
17. State Clauisius-Clapeyron equation.
18. What is optical exaltation ?
19. State Nernst heat theorem.
20. Is it possible for a reaction with a negative entropy change to be spontaneous ? Explain.
21. Predict the effect of increase of pressure and temperature on the following equilibrium.
$N_2\,(g) + 3H_2\,(g) \rightleftharpoons 2NH_3\,(g)$; $\Delta H = -92\,3$ KJ $mol^{-1}$.

(9 × 1 = 9 weightage)

## Section C

*Answer any* **five** *questions.*
*Each question carries* 2 *weight.*

22. Describe the limiting density method for molecular mass determination.
23. Draw the Maxwell distribution curve of molecular velocities and mark the most probable, average and rms velocities.
24. Calculate viscosity of a gas having an average velocity 1260 m $s^{-1}$ at 300 K and1 atm pressure if the mean free path is $10^{-7}$ m.
25. Calculate the translational partition function of benzene ( molar mass 78 g $mol^{-1}$) in a volume of i $m^3$ at 298 K.
26. Derive the Gibbs-Helmholtz equation.
27. Derive the expression for the entropy of mixing of two non-reacting gases.
28. The equilibrium constant for a reaction is 0.86 at 40°C and 0.35 at 60°C. Calculate $\Delta H^0$

(5 × 2 = 10 weightage)

## Section D

*Answer any* **two** *questions.*
*Each question carries* 4 *weight.*

29. (a) Explain the kinetic molecular theory of gases.

    (b) Derive the kinetic gas equation.
30. (a) What are Maxwell relations ?

    (b) Derive Gibbs-Duhem equation.
31. How is equilibrium constant related to the standard free energy change of the reaction ? Derive the relations between Kp, Kc and Kx.

(2 × 4 = 8 weightage)

**D 51727** **(Pages : 2)** **Name.....**

**Reg. No.....**

# THIRD SEMESTER (CBCSS—UG) DEGREE EXAMINATION NOVEMBER 2023

Chemistry/Industrial Chemistry/Polymer Chemistry

CHE 3B 03—PHYSICAL CHEMISTRY—I

(2019—2022 Admissions)

Time : Two Hours Maximum : 60 Marks

## Section A (Short Answers)

*Answer questions up to* 20 *marks.*
*Each question carries* 2 *marks.*

1. Define RMS velocity and give its mathematical expression.
2. Calculate the mean free path of $O_2$ molecule at 25°C and 1 atm pressure. The collision diameter of $O_2$ molecule is 273 pm.
3. What are extensive properties ? Give an example.
4. State and explain Nernst heat theorem.
5. Define heat capacity. Write down the relation between heat capacity at constant volume and at constant pressure.
6. Calculate the maximum work done when five moles of an ideal gas expand isothermally and reversibly from a volume of 1 litre to 10 litre at 27°C.
7. Write down the Gibbs Helmholtz equation and explain the terms.
8. Write down the relation between entropy and probability.
9. What is meant by heterogeneous equilibria ? Give an example.
10. State and explain the law of mass action.
11. Identify the point group and write down the symmetry elements present in $H_2O$.
12. What is meant by centre of symmetry ? Explain with an example.

(Ceiling of marks : 20)

**Turn over**

## Section B (Paragraph)

*Answer questions up to* 30 *marks.*
*Each question carries* 5 *marks.*

13. Explain why real gases deviate from ideal behaviour and derive the van der waals equation of state.

14. Define bond dissociation energy. How will you determine the resonance energy of benzene from thermochemical data.

15. Derive the maxwell relations.

16. What is chemical potential ? Briefly describe the variation of chemical potential with temperature and pressure.

17. State and explain Le Chatelier principle taking any *one* reaction as an example.

18. Write and explain the rules for a set of elements to form a mathematical group.

19. What are point groups ? Depict the group multiplication table of $C_2v$ point group.

(Ceiling of marks : 30)

## Section C (Essay)

*Answer any* **one** *question.*
*The question carries* 10 *marks.*

20. Explain Carnot cycle and derive an expression for efficiency of heat engine.

21. What are critical constants ? Derive the expression for critical constants of a van der Waals gas.

(1 × 10 = 10 marks)

D 14090 (Pages : 3) Name.....

Reg. No.....

# THIRD SEMESTER B.Sc./B.Com./B.B.A. DEGREE (SUPPLEMENTARY) EXAMINATION, NOVEMBER 2016

(UG—CCSS)

Common Course

A12—GENERAL INFORMATICS

Time : Three Hours Maximum : 30 Weightage

## Part A

*This part consists of* **three** *bunches carrying equal weightage of* 1.
*Each bunch consists of* **four** *objective type questions.*
*Answer* **all** *questions.*

Choose the correct answer :

1 All of the following are examples of input devices except a :

(a) Scanner. (b) Mouse.

(c) Printer. (d) Keyboard.

2 IT Act came to effect on :

(a) May 17th 2000. (b) October 17th 2000.

(c) May 17th 2008. (d) October 17th 2008.

3 'Blue tooth' technology allows :

(a) Satellite communication.

(b) Wireless communication between equipment's.

(c) Signal transmission on mobile phones only.

(d) Landline phone to mobile phone communication.

4 Opera is a :

(a) Search engine. (b) Web browser.

(c) Website. (d) Web index.

II. Fill in the blanks :

5 TDIL stands for ————————.

6 The high speed memory placed between CPU and main memory is called ————————.

7 BRNET means ————————.

8 ———————— is a software which acts as an interface between user and hardware.

III. State whether True *or* False :

9 The ALU is the "brains" of every microcomputer.

10 HTML is a browser.

11 UNIX is the operating system used mostly in desk top computers.

12 The screen size of a CRT is measured in diagonally.

(12 × ¼ = 3 weightage)

## Part B (Short Answer Type Questions)

*Answer all* **nine** *questions.*

*Each question carries a weightage of* 1.

13 What is intranet ?

14 Explain the meaning of information overload.

15 What do you mean by URL ?

16 What is phishing ?

17 Explain INFLIBNET.

18 State the meaning of Green computing.

19 What do you mean by Knowledge management ?

20 What do you mean by Linux distributions ?

21 State the meaning of software repositories.

(9 × 1 = 9 weightage)

## Part C

*Answer any* **five** *questions.*
*Each question carries a weightage of* 2.

22 Explain various types of networks.

23 State the demerits of mobile computing.

24 Discuss the various security threats in internet.

25 Discuss the IT tools in education.

26 Explain the features of NICENET.

27 State the importance of E-governance.

28 Explain the free and open source office Suite available in Linux.

(5 × 2 = 10 weightage)

## Part D

*Answer any* **two** *questions.*
*Each question carries a weightage of* 4.

29 State the meaning of topology. Explain the various types of topologies.

30 Discuss the components of Information and Technology.

31 What is Linux ? State the merits and demerits of Linux.

(2 × 4 = 8 weightage)

**D 51242-B** (Pages : 2) Name.....

Reg. No.....

# THIRD SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2018

(CUCBCSS—UG)

LRP Pattern

A 12—GENERAL INFORMATICS

(2017 Admissions)

Time : Three Hours Maximum : 80 Marks

## Part A

*Answer* **all** *questions.*
*Each question carries* 1 *mark.*

I. 1 Which of the following is an example of an optical disk ?

(a) Memory disk. (b) Magnetic disk.

(c) Hard disk. (d) Digital versatile disk.

2. Address book contains :

(a) Email address. (b) Phone numbers.

(c) People Names. (d) All of the above.

3. Intellectual Property Rights (IPR) protect the use of information and ideas that are of :

(a) Ethical value. (b) Moral value.

(c) Social value. (d) Commercial value.

4. World Computer Security Day is :

(a) October 30. (b) November 30.

(c) December 30. (d) January 30.

5. If the displayed system time and date is wrong, you can reset it using :

(a) Write. (b) Calendar.

(c) Write file. (d) Control panel.

II. 6. The shortcut key to open task manager is ————.

7. ISDN stands for ————.

8. Full form of INFLIBNET is ————.

**Turn over**

9. GPS stands for ————.
10. Ubuntu is an example of ———— licence

(10 × 1 = 10 marks)

## Part B (Short Answer Questions)

*Answer any* **eight** *questions.*
*Each question carries* 2 *marks.*

11. What is WAN ?
12. List out common output devices of a computer.
13. What is Electronic Data Interchange ?
14. Define information.
15. Define Intellectual property.
16. What is digital divide ?
17. What is green computing ?
18. Briefly explain Linux as operating system.
19. Briefly explain Desktop publishing in Linux.
20. Briefly explain BRNET.

(8 × 2 = 16 marks)

## Part C (Short Essay Questions)

*Answer any* **six** *questions.*
*Each question carries* 4 *marks.*

21. What are the features of New Generation Computers ?
22. Briefly explain the role of IT in Health Care.
23. What are the advantages of technology for students ?
24. What is cyber crime ? Explain.
25. Briefly explain open source software.
26. Briefly explain the history of Linux.
27. What is the object of intellectual property law ?
28. What are the uses of internet ?

(6 × 4 = 24 marks)

## Part D (Essay Questions)

*Answer any* **two** *questions.*
*Each question carries* 15 *marks.*

29. What are the advantages of open source software ?
30. Discuss the strengths, weaknesses, opportunities and threats of IT industry.
31. Discuss about recent trends in IT.

(2 × 15 = 30 marks)

D 51242 (Pages : 2) Name.....

Reg. No.....

# THIRD SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2018

(CUCBCSS—UG)

LRP Pattern

A 12—GENERAL INFORMATICS

(2014 Admissions)

Time : Three Hours Maximum : 80 Marks

## Part I

*Answer* **all** *questions.*
*Each question carries* 1 *mark.*

1. ———— is the non -proprietary operating system.
   (a) DOS. (b) Windows 7.
   (c) Windows 95. (d) Linux.
2. SMS stands for ————.
   (a) Sharpe Message Service. (b) Short Message Service.
   (c) Simple Message Service. (d) None of these.
3. ———— is a virtual university.
   (a) www.keralavu.org. (b) www.mguvu.org.
   (c) www.tamilvu.org. (d) www.kannurvu.org.
4. The following is not a type of hacker :
   (a) White hat (b) Grey hat.
   (c) Black hat. (d) Green hat.
5. GUI stands for :
   (a) General User Interface (b) Graphic User Information
   (c) Graphic User Interface (d) Graphic User Interaction
6. ———— software is an open source.
7. ———— is the delivery of computing and storage capacity as a service to a community of end-recipients.
8. ———— is a prototype portal site for biological information.
9. The father of free software movement is ————.
10. ———— is open source an operating system that evolved from a kernel created by Linux Torvalds.

(10 × 1 = 10 marks)

**Turn over**

## Part II (Short Answer Questions)

*Answer any* **eight** *questions.*
*Each question carries* 2 *marks.*

11. What is internet ?
12. What is software licence ?
13. What is EDI ?
14. What is Blue tooth ?
15. What is copyright ?
16. What do you mean by scholarly journal ?
17. What is BRNET ?
18. How to help a child from an internet addiction ?
19. What is main objective of cyber law ?
20. What are the disadvantages of Linux ?

(8 × 2 = 16 marks)

## Part III (Short Essays)

*Answer any* **six** *questions.*
*Each question carries* 4 *marks.*

21. What are the features of new personal computers ?
22. What are the categories of software ?
23. Discuss the types of integration in E-Governance.
24. What are the uses of GPS ?
25. Explain the primary objectives of INFLEBNET.
26. Discuss the advantages and features of NICENET.
27. Explain the main health issues of computer professionals.
28. Discuss the main features of GNOME.

(6 × 4 = 24 marks)

## Part IV (Long Essays)

*Answer any* **two** *questions.*
*Each question carries* 15 *marks.*

29. What are the topologies used in computers ? Explain
30. Discuss the components of Information Technology.
31. Discuss the guideline for proper usage of computer and internet.

(2 × 15 = 30 marks)

D 51241-B (Pages : 4) Name.....

Reg. No.....

# THIRD SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2018

(CUCBCSS—UG)

LRP Pattern

A11—BASIC NUMERICAL SKILLS

(2017 Admissions)

Time : Three Hours Maximum : 80 Marks

*Use of Scientific / Basic Calculators and Mathematical / Statistical tables are permitted.*

## Part A

*This part consist of* **two** *bunches of questions.*
*Each bunch has* **five** *questions. Each question carries* 1 *mark.*
*Answer all the* **ten** *questions.*

(A) Choose the best answer from the options given:

1 The sets of {MARCH} and {CHARM} are———— sets.

(a) Singleton set. (b) Equal.

(c) Equivalent. (d) None of these.

2 ———— data are in the shape of raw material.

(a) Primary or secondary. (b) Primary.

(c) Secondary. (d) None.

3 An appropriate method for working out consumer price index is ———— .

(a) Simple aggregate Expenditure method.

(b) Family budget method.

(c) Simple average relative method.

(d) None.

4 The measure of dispersion based on all the observations of the series is :

(a) Q.D. (b) Range.

(c) S.D. (d) All.

**Turn over**

5 One nth term of a G.P. is ————.

(a) $arn$. (b) $arn - 1$.

(c) $anr$. (d) $an - 1r$.

(B) Fill in the Blanks :

6 The value exactly at the middle of a class interval is ————.

7 A matrix with equal number of rows and columns is called ———— matrix.

8 When $Q_1 = 20, Q_3 = 30$, QD = ————.

9 ———— index is known as the 'ideal' index.

10 One expression $b - 4ac$ is called———— of the quadratic equation.

(10 × 1 = 10 marks)

## Part B (Short Answer Questions)

*Answer any* **eight** *questions.*
*Each question carries 2 marks.*

11 If $a + b ; a - b = 5 : 2$ ; find the value of $b : a$.

12 2 shops have the stock of large, medium and small sixes of toothpaste. The number of each size stocked is given by the matrix 'A' ; where :

| | Large | Medium | Small | |
|---|---|---|---|---|
| A = | 150 | 240 | 120 | Shop No. I |
| | 90 | 300 | 210 | Shop No. II |

The cost matrix, B of different size of the toothpaste is given by

| | | |
|---|---|---|
| B = | 14 | Large |
| | 10 | Medium |
| | 6 | Small |

Compare the Investments in Toothpaste by each shop.

13 Find the mean of variables X and Y; given the following :

Regression of Y on X : $2Y - X - 50 = 0$

Regression of X on Y : $3Y - 2X - 10 = 0$

14 A cyclist pedals from his house to college at a speed of 8 Kms/hr. and back from the college to his house at 12 Kms/ hr. Find the Average Speed.

15 Represent $(A \cap B) \cup (A \cap C)$ by using a Venn diagram.

16 If the Arithmetic Mean of two observations is 25 and their Harmonic mean is 9, find their Geometric Mean.

17 Calculate the time in which a sum of money doubles at 10% per annum.

18 What is an Index Number ?

19 From the following data, calculate the Coefficient of Variation :

Karl Pearson's Coefficient of Skewness = 0.42 ; Arithmetic Mean = 86 and Median = 80.

20 The parabolic trend equation for the sales (in 1000s of Rs.) of a Company is given as $Y = 15.6 - 0.4X + 0.9X^2$ (Origin : 1995 : X Unit = 1 year ; Y Unit = Yearly Sales.) Shift the origin to 2000.

(8 × 2 = 16 marks)

## Part C (Short Essay Questions)

*Answer any* **six** *questions.*
*Each question carries* 4 *marks.*

21 Show that the value of the determinant :

$$\begin{vmatrix} 1 & a & b+c \\ 1 & b & c+a \\ 1 & c & a+b \end{vmatrix} = 0.$$

22 The first 4 moments of a distribution about $X = 2$ are $-2, 12, -20$ and 100. Calculate the moment about mean and $\beta_2$. Show if the distribution is leptokurtic or platykurtic ?

23 Distinguish between primary and secondary data.

24 Solve $x^{10} - 33x^5 + 32 = 0$.

25 The following frequency table presents the income in 100s earned by 57 families in a town and draw a Lorenz Curve :

| Income | : | 0–10 | 10–50 | 50–200 | 200–500 | 500–1000 |
|---|---|---|---|---|---|---|
| No. of Families | : | 22 | 78 | 124 | 24 | 9 |

26 An Index is 100 in 2001, it rises 4% in 2002 ; falls by 6% in 2003, falls 4% in 2004 ; and rises 3% in 2005. Calculate the Index Numbers for the five years with 2003 as base.

27 If Mean of a Normal Distribution is 45 and SD is 15. Find the values of $Q_1$ and $Q_3$.

28 Shares of two companies have the following information :

| | Mean of Share values | SD of Share values |
|---|---|---|
| Company A | 15 | 5 |
| Company B | 20 | 8 |

Examine :

(i) Which Company's shares are better ? (2 marks)

(ii) Which Company's shares have greater variability ? (2 marks)

[6 × 4 = 24 marks]

## Part D (Essay Questions)

*Answer any* **two** *questions from three.*
*Each question carries* 15 *marks.*

29 If $\alpha$ and $\beta$ be the roots of the Quadratic equation ; $x^2 + mx + 12 = 0$ and $\alpha - \beta = 1$. Find the values of '$m$', $\alpha$ and $\beta$.

30 What is Time Series Analysis ? What are its objectives ? Discuss its components in detail.

31 The daily expenditures of 100 families is given below :

| Daily Expenditures | : | 0–20 | 20–40 | 40–60 | 60–80 | 80–100 |
|---|---|---|---|---|---|---|
| No. of families | : | 13 | ? | 27 | ? | 16. |

If the mode of the distribution is 44, then calculate the Karl Pearson's Coefficient of Skewness.

(2 × 15 = 30 marks)

D 51241 (Pages : 4) Name.....

Reg. No.....

# THIRD SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2018

(CUCBCSS–UG)

LRP Pattern

A 11—BASIC NUMERICAL SKILLS

(2014 Admissions)

Time : Three Hours Maximum : 80 Marks

## Part I

*Answer* **all** *questions.*
*Each question carries* **1** *mark.*

1. $A = \{x : x \in N, 3 \leq x \leq 50\}$ is a ———— set.
   (a) Finite Set. (b) Infinite Set.
   (c) Null set. (d) Singleton set.

2. Value of the determinant of $\begin{vmatrix} 2 & 4 \\ 8 & 2 \end{vmatrix}$ is ————.
   (a) 56. (b) 28.
   (c) – 56. (d) – 28.

3. $7x - 21 - 3x + 13 = 7 + 6x - 19$, Value of $x$ is ————.
   (a) 1. (b) 2.
   (c) 3. (d) 4.

4. $ax^2 + c = 0$ is a ————.
   (a) Simple linear equation. (b) Simultaneous equations.
   (c) Quadratic equations. (d) Differential equation.

5. How many terms are there in 20, 25, 30,————, 140 ?
   (a) 22. (b) 23.
   (c) 24. (d) 25.

6. Find the $15^{th}$ terms of the sequence 20, 15, 10 ————.
   (a) – 45. (b) – 50.
   (c) – 55. (d) 0.

Turn over

7. The middle value of an ordered array of numbers is the :

   (a) Mean. (b) Median.

   (c) Mode. (d) Range.

8. Prosperity, Recession and depression in a business is an example of :

   (a) Irregular trend. (b) Seasonal trend.

   (c) Cyclical trend. (d) Secular trend.

9. A complete enumeration of all the items in the population is known as ————————.

   (a) Census Enquiry. (b) Sampling study.

   (c) Investigation. (d) None of these.

10. ———————— is a one dimensional diagram.

    (a) Bar Diagram. (b) Line Diagrams.

    (c) Both (a) and (b). (d) None of the above.

(10 × 1 = 10 marks)

## Part II (Short Answer Questions)

*Answer any* **eight** *questions.*
*Each question carries 2 marks.*

11. What is Venn diagram ?

12. If $= \begin{pmatrix} 6 & 0 & 7 \\ 7 & -2 & 3 \end{pmatrix}$. Find 3A.

13. Solve $x^2 - 6x + 8 = 0$.

14. What is geometric progression ?

15. Represent $A = \{2, 4, 6, 8, 10, \ldots\}$ in set builder method.

16. For what value of K, will K + 9, $2k$—1, and $2k + 7$ are the consecutive terms of an AP ?

17. Find the rate of interest per annum if the simple interest on a principal of Rs. 5,000 is 800 for 4 years.

18. Calculate geometric mean from the following figures :

    57.5, 87.75, 53.5, 73.5, 81.75.

19. Draw a Pie diagram to represent distribution a certain blood group 'O' among Gypsies, Indians and Hungarians :

| Blood Group | Gypsies | Indians | Hungarian |
|---|---|---|---|
| 'O' | 360 | 180 | 90 |

20. What do you mean by Index Number ?

(8 × 2 = 16 marks)

## Part III (Short Essays)

*Answer any* **six** *questions.*
*Each question carries 4 marks.*

21. Using the following sets, verify that $A \cup (B \cup C) = (A \cup B) \cup C$ :

$A = \{1, 2, 3\}$ ; $B = \{2, 4, 6\}$ ; $C = \{3, 4, 5\}$.

22. Solve the following equation by using matrices :

$2x - 3y = 3$

$4x - y = 11$

23. Prove that $A \cap (A \cup B) = A \cup (A \cap B)$ by means of Venn diagram.

24. In an arithmetic progression the sum of the first 10 terms is 400 and the sum of the next ten terms is 1000. Find the common difference and the first term.

25. If the mean of the following distribution is 9, find the value of $p$.

| X | 4 | 6 | $p + 7$ | 10 | 15 |
|---|---|---|---|---|---|
| $f$ | 5 | 10 | 10 | 7 | 8 |

26. If $A = \begin{pmatrix} 1 & 3 & 2 \\ 0 & 2 & 1 \\ 0 & 5 & 3 \end{pmatrix}$ ; $B = \begin{pmatrix} 3 & 1 & 2 \\ 4 & 2 & 3 \\ 4 & -1 & 1 \end{pmatrix}$.

Find the product of A and B.

27. Explain different types of diagrams used for the presentation of data.

28. Find the compound interest for Rs. 7,000 for 4 years if interest is payable half yearly at 6% per annum.

(6 × 4 = 24 marks)

**Turn over**

## Part IV (Long Essays)

*Answer any* **two** *questions.*
*Each question carries* 15 *marks.*

29. Find the sum of each of the geometric series $-2, \frac{1}{2}, -\frac{1}{8}, \ldots, -\frac{1}{37268}$.

30. An enquiry into the budgets of middle class families in Kannur city gave the following information :

| Expenses on | Food | Rent | Clothing | Fuel | Misc. |
|---|---|---|---|---|---|
| Price (2006) | 150 | 30 | 75 | 25 | 40 |
| Price (2008) | 145 | 30 | 65 | 23 | 45 |

Following weights were used Food 35, Rent 15, Clothing 20, Fuel 10, and Misc. 20.

What changes in the cost of living of 2008 as compared with 2006 are seen?

31. Find the standard deviation and co-efficient from the following data :

| Size | Frequency |
|---|---|
| 0–2 | 2 |
| 2–4 | 4 |
| 4–6 | 6 |
| 6–8 | 4 |
| 8–10 | 2 |
| 10–12 | 6 |

(2 × 15 = 30 marks)

D 51183 (Pages : 4) Name.....

Reg. No.....

# THIRD SEMESTER B.Com./B.B.A. DEGREE EXAMINATION NOVEMBER 2018

(CUCBCSS—UG)

BCM 3A 11—BASIC NUMERIC SKILLS

(2017 Admissions)

Time : Three Hours Maximum : 80 Marks

*Use of Scientific / Basic Calculators and Mathematical / Statistical tables are permitted.*

## Part A

*This part consist of* **two** *bunches of questions.*
*Each bunch has* **five** *questions.*
*Each question carries* 1 *mark.*
*Answer* **all** *the ten questions.*

A. Choose the best answer from the options given :

1 $x^{a-b}\,x^{b-c}\,x^{c-a}$ is ———.

(a) $x$. (b) 1.

(c) 0. (d) $x^{2a+2b+2c}$.

2 A matrix in which every element is zero is called ——— matrix.

(a) Unit. (b) Diagonal.

(c) Scalar. (d) Null.

3 If each value is multiplied by 10, the C.V. will be increased by :

(a) 10 %. (b) 5 %.

(c) 15 %. (d) 0 %.

4 ——— is called positional measure.

(a) Mean. (b) Median.

(c) Mode. (d) H.M.

5 In a positively skewed distribution :

(a) Mean < median < mode. (b) Mean > median > mode.

(c) Both. (d) None.

Turn over

B. Fill in the blanks :

6 In De Morgan's Law $(A \cap B)^1$ = ———.

7 Simple interest for the sum of 3,000 at 7 % p.a. for 3 years is ———.

8 One quadratic equation $ax^2 + bx + c = 0$ has equal roots if ———.

9 If the sum of two numbers is 8 and their product is 15, numbers are ———.

10 When a frequency curve is more flat topped than the normal curve, it is called ———.

(10 × 1 = 10 marks)

## Part B (Short Answer Questions)

*Answer any* **eight** *questions.*
*Each question carries 2 marks.*

11 Define the term 'Rank' of the matrix.

12 Determine the A.P. whose 3rd term is 5 and the 6th term is 8.

13 Name some secondary data collection sources.

14 If P = 4/5 Q and Q = 2 ½ R, then compute P : R.

15 For a Normal Distribution, Mean is 60 and S.D. is 8. Find Median and QD.

16 Prove that for two numbers 2 and 4, AM × HM = $GM^2$.

17 Find the Range and its Coefficient :

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Weight | : | 5 | 8 | 10 | 12 | 25 | 30 | 38 |
| No. of Children | : | 2 | 3 | 8 | 10 | 9 | 3 | 2 |

18 If the arithmetic mean for an observation is assumed to be 39 and its mode is 52. Its SD is 20. Calculate Karl Pearson's Coefficient of Skewness. To what extent is it skewed ?

19 Solve $3^{x+3} = 9^{2x+1}$.

20 What is an Ideal Index Number ?

(8 × 2 = 16 marks)

## Part C (Short Essay Questions)

*Answer any* **six** *questions.*
*Each question carries* 4 *marks.*

21 Among 60 people, 35 can speak in English, 40 in Malayalam and 20 can speak in both the languages. Find the number of people who can speak in at least one of the language. How many can't speak in any of these languages ?

22 Solve $\sqrt{6+\sqrt{6+\sqrt{6+\ldots\infty}}}$.

23 Draw a Pie diagram to represent the expenditure during a year in a state as given below :

| *Particulars* | | *Amount (in Crores)* |
|---|---|---|
| Industries | ... | 100.00 |
| Irrigation | ... | 92.50 |
| Agriculture | ... | 127.50 |
| Transport and Roads | ... | 92.50 |
| Education | ... | 68.00 |

24 Ages of 2 people are in the ratio of 3 : 4. After 10 years, their ages would be in the ratio of 4 : 5. Find their present ages.

25 If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$, show that $A^2 - 4A - 5I = 0$.

26 "Index Numbers are also Economic Barometers". Why ?

27 Mean and SD of 100 items are calculated by a student as 40 and 5. While calculating, items were taken as 40 and 50 instead of 60 and 30. Find the correct mean and variance.

28 What are the components of Time Series ? Explain.

(6 × 4 = 24 marks)

## Part D (Essay Questions)

*Answer any* **two** *questions from three.*
*Each question carries* 15 *marks.*

29 If the roots of the equation $x^2 + ax - b = 0$ differ by unity. Prove that $a^2 + 4b - 1 = 0$.

**Turn over**

30 Calculate the Fisher's Ideal Index from the following data. Prove if it satisfies the Time Reversal and Factor Reversal tests :

| *Commodity* | 2016 | | 2017 | |
|---|---|---|---|---|
| | *Price* ($P_0$) | *Quantity* ($Q_0$) | *Price* ($P_1$) | *Quantity* ($Q_1$) |
| A | 6 | 50 | 10 | 56 |
| B | 2 | 100 | 2 | 10 |
| C | 4 | 60 | 6 | 60 |
| D | 10 | 30 | 12 | 24 |
| E | 8 | 40 | 12 | 36 |

31 Define Statistics. Discuss its functions and limitations in the field of business and commerce.

(2 + 7 + 6 = marks)

[2 × 15 = 30 marks]

D 51245

(Pages : 3)

Name.....

Reg. No.....

# THIRD SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2018

(CUCBCSS—UG)

Core Course

CHE 3B 03—PHYSICAL CHEMISTRY-I

Time : Three Hours

Maximum : 80 Marks

## Section A (One Word)

*Answer* **all** *questions.*

*Each question carries* 1 *mark.*

1. The critical pressure Pc is related to Vander Waals constants by the relation ————.
2. The value of mean free path of a gas ———— with increasing pressure.
3. Give one example for an extensive property.
4. For Joule- Thomson expansion of a real gas, ΔH will be ————.
5. Adiabatic expansion is accompanied by ———— in entropy.
6. In N!. = ————.
7. Give one example for a State function.
8. With decrease in temperature, viscosity of a liquid will ————.
9. For the reaction $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$, Kc and Kp are related as ————.
10. The equilibrium constant is related to the standard free energy change of a reaction as ————

(10 × 1 = 10 marks)

## Section B (Short Answers)

*Answer any* **ten** *questions.*

*Each question carries* 2 *marks.*

11. Calculate the most probable velocity of $H_2$ molecule at 27°C.
12. Sketch the PV isotherms of $CH_4$ gas and He gas.
13. Write Vander Waals equation for *n* moles of real gas.
14. Define critical temperature.
15. State zeroth law of thermodynamics.
16. Distinguish between a thermodynamic open and isolated system.

Turn over

17. What is meant by chemical potential ?

18. What is the effect of temperature on the surface tension of a liquid.

19. What is meant by heterogenous equilibria ? Give one example.

20. Enthalpy of neutralization of strong acid by a strong base is always constant. Explain.

21. One mole of an ideal gas expands isothermally and reversibly at 300 K from a volume of 10 $dm^3$ to 20 $dm^3$. Calculate the work done by the system.

22. The equilibrium constant of a reaction is $1.5 \times 10^{-5}$ at 300 K. Calcualte the value of $\Delta G^\circ$.

(10 × 2 = 20 marks)

## Section C ( Paragraphs)

*Answer any* **five** *questions.*

*Each question carries* 6 *marks.*

23. State Le Chateliers principle. What is the effect of pressure and temperature in the reaction $N_2O_4\ (g) \rightarrow 2NO_2\ (g)\ \Delta H = +\ 59.0$ kJ. Explain.

24 Derive Vander Waals equation for *n* moles of a gas.

25. Derive the expression for Joule-Thomson coefficient and also show that its value is zero for an ideal gas.

26. Derive Clausius-Clapeyron equation and discuss its application in liquid-vapour equilibria.

27. Define critical constants. Explain the determination of critical temperature and critical pressure of a gas.

28. Calculate the enthalpy of formation of methane. Give that the standard enthalpy of formation of liquid water, carbondioxide gas are – 285.9 KJ/mol, – 393.5 kJ/mol respectively. Enthalpy of combustion of methane is – 890.3 kJ/mol.

29. What is meant by Parachor ? How is it helpful in the elucidation of molecular structure ?

30. Derive the relation between equilibrium constants Kp and Kc.

(5 × 6 = 30 marks)

## Section D (Essays)

*Answer any* **two** *questions.*
*Each question carries* 10 *marks.*

31. (a) Explain Maxwell's distribution of molecular velocities. Illustrate the effect of temperature on this distribution.

(7 marks)

(b) Calculate the temperature at which root mean square velocity of Hydrogen gas becomes equal to that Oxygen gas.

(3 marks)

32. (a) Derive Gibbs Helmholtz equation. (7 marks)

(b) The enthalpy of formation of ethane at 298 K and at constant pressure is - 89.90 kJ. Calculate the enthalpy of formation at constant volume at this temperature ?

(3 marks)

33. (a) Derive Kirchhoff equation. (7 marks)

(b) For the reaction $NH_4Cl$ (s) $\rightarrow$ $NH_3$ (g) + HCl (g) $\Delta H$ = 170.85 KJ and $\Delta S$ = 0.15 $KJ.K^{-1}$ at 300 K. Predict whether the reaction is spontaneous or not at 300 K. Explain.

(3 marks)

34. (a) Derive Van't Hoff equation. (7 marks)

(b) The equilibrium constant of a reaction doubles on raising the temperature from 298 K to 308 K. Calculate the standard enthalpy of the reaction.

(3 marks)

(2 × 10 = 20 marks)

C 25576 (Pages : 4) Name.....

Reg. No.....

# FOURTH SEMESTER B.Com./B.B.A./B.Sc. DEGREE (SUPPLEMENTARY) EXAMINATION, APRIL 2017

(UG—CCSS)

Common Course

A 13—BASIC NUMERICAL SKILLS

Time : Three Hours Maximum : 30 Weightage

I. Objective Type Questions. Answer all *twelve* questions. Each question carries ¼ weightage :

Choose the correct answer :

1 If the sum of N observations is 630 and their mean is 42 , then the value of N is :

(a) 21. (b) 30.

(c) 15. (d) 20.

2 Mean deviation is minimum when deviations are taken from :

(a) Mean. (b) Median.

(c) Mode. (d) Zero.

3 If $n$ = P, then the order of the matric $7x - 5z$ is :

(a) P × 2. (b) 2 × $n$.

(c) $n$ × 3. (d) $p \times n$.

4 If A and B are any *two* non-empty sets then $(A - B) \cup (A \cap B) =$

(a) A. (b) B.

(c) $A^1$. (d) $B^1$.

Fill in the blanks :

5 The arithmetic mean of $n$ natural numbers from 1 to $n$ is ————.

6 Coefficient of variation is usually expressed in ————.

7 The distance of the point (3, 2) from the origin is ————.

8 The general equation if a straight line is ————.

Answer the following :

9 Find the mean of the data 6, 8, 10, 12, 14, 16, 18, 20, 22, 24.

10 Find four solutions of the equation $3x + 3y = 0$.

11 State De Morgan's laws for two sets A and B.

12 Find the roots of the equation $x^2 + 5x + 6 = 0$.

(12 × ¼ = 3 weightage)

II. Short Answer Questions. Answer all *nine* questions. Each question carries 1 weightage :

13 Find the mean deviation about the mean for the data :

6, 7, 10, 12, 13, 4, 8, 12.

14 Find the sum of all three digit numbers which are multiples of 9 ?

15 Prove that the points (1, 4) (4, 1) and $\left(\frac{5}{2}, \frac{5}{2}\right)$ lie on the same line.

16 Solve the equation $9x^2 + 12x + 4 = 0$.

17 If $A = \{3, 5, 7, 9, 11\}$, $B = \{7, 9, 11, 13\}$, $C = \{11, 13, 15\}$.

Find $(A \cap B) \cap (B \cup C)$ ?

18 Solve $x + 2y = -1$

$2x - 3y = 12$.

19 Write down the measure of dispersion.

20 Find the inverse of the matrix $\begin{bmatrix} -1 & 5 \\ -3 & 2 \end{bmatrix}$.

21 The 5th term of a G.P $5, -\frac{5}{2}, \frac{5}{4}, -\frac{5}{8}, \ldots\ldots$ is $\frac{5}{1024}$ find the value of $n$.

(9 × 1 = 9 weightage)

III. Short essay *or* paragraph questions. Answer any *five* questions from seven. Each question carries 2 weightage :

22 Compute the inverse of the matrix :

$$A = \begin{bmatrix} 1 & 3 & 3 \\ 1 & 4 & 3 \\ 1 & 3 & 4 \end{bmatrix}.$$

23 Consider $f(x) = x^2 - 5x + 6$ and

Let $A = \begin{bmatrix} 2 & 0 & 1 \\ 2 & 1 & 3 \\ 1 & -1 & 0 \end{bmatrix}$, find the value of $f(A)$ ?

24 Find the $12^{th}$ term of a G. P. whose $8^{th}$ term is 192 and common ratio is 2.

25 Find the mean deviation about the median for the data.

| $x$ | 15 | 21 | 27 | 30 | 35 |
|---|---|---|---|---|---|
| $f$ | 3 | 5 | 6 | 7 | 8 |

26 If $A = \{1, 2, 3, 4, 5\}$, $B = \{1, 3, 5, 8\}$, $C = \{2, 5, 7, 8\}$ verify that $A - (B \cup C) = (A - B) \cap (A - C)$.

27 The income of a person is Rs. 3,00,000 in the first year and he receives an increase of Rs. 10,000 to his income per year for the next 19 years. Find the total amount he received in 20 years.

28 Let $A = \begin{bmatrix} 2 & 4 \\ 1 & -3 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -1 & 5 \\ 0 & 2 & 6 \end{bmatrix}$.

Find (i) AB.

(ii) Is BA defined ? Justify your answer.

(5 × 2 = 10 weightage)

IV. Essay questions. Answer any *two* questions from three. Each question carries 4 weightage :

29 Draw a frequency polygon for the following data :

| Class | : | 0 – 9 | 10 – 19 | 20 – 29 | 30 – 39 | 40 – 49 | 50 – 59 | 60 – 69 |
|---|---|---|---|---|---|---|---|---|
| Frequency | : | 5 | 15 | 20 | 25 | 17 | 11 | 9 |

30 How many multiples of 4 lie between 10 and 250.

31 Solve the system of Equations :

$x + 2y + 5z = 10$

$x - y - z = -2$

$2x + 3y - z = -11.$

(2 × 4 = 8 weightage)