NP – 802

**VI Semester B.Sc. Examination, June/July 2025**
**(NEP Scheme) (F+R)**
**CHEMISTRY (Paper – VII)**
**DSC-7 : Organic and Physical Chemistry – IV**

Time : 2½ Hours Max. Marks : 60

***Instructions*** *: 1) The question paper has* ***three*** *Parts. Answer* ***all*** *the Parts.*
*2)* ***Draw*** *diagrams and chemical equations* ***wherever*** *necessary.*

PART – A

Answer **any four (04)** out of six(06). **(4×2=8)**

1. Compare the basicity of pyrrole and pyridine.
2. What are Anomers ? Give an example.
3. Write the structure of menthol and its uses.
4. What is ILKoVIC equation ?
5. State Hook's law.
6. Write a note on effect of pH on enzyme catalysis.

PART – B

Answer **any four (04)** out of six(06). **(4×5=20)**

7. a) Write any four general characteristics of alkaloids. **3**
   b) What is Mordant ? **2**
8. a) Write a synthesis of paracetamol. **3**
   b) What is Hypsochromic effect ? **2**
9. a) What is chemical shift ? How it expressed ? **3**
   b) Why TMS used as the reference compound in NMR Spectroscopy ? **2**



P.T.O.

10. a) Write a note on transition state theory of reaction rates. 3

    b) Define steady state approximation. 2

11. a) How many fundamental vibrations in $H_2O$ ? 3

    b) What is Frank Condon principle ? 2

12. a) Define the term zero point energy. What does it signify ? 3

    b) Give any three applications of polarography. 2

## PART – C

Answer **any four (04)** out of six(06). **(4×8=32)**

13. a) Describe the Skraup's synthesis of quinoline. 4

    b) Discuss the aromaticity of pyrrole. 4

14. a) Conversion of D-Fructose to D-Glucose. 4

    b) Describe the synthesis of citral from methyl heptenone. 4

15. a) Write the synthesis of Malachite green. 4

    b) Write the synthesis of sulphanilamide. 4

16. a) Sketch the normal modes of vibrations in $CO_2$ molecule. Which of these are IR active ? 4

    b) Why does HCl exhibit rotation spectra but not $H_2$ ? 2

    c) State Born-Oppenheimer approximation. 2

17. a) Mention the differences between Raman spectra and IR spectra. 4

    b) Mention the different types of current obtained at the Dropping Mercury Electrode (DME). 4

18. a) Explain lock and key theory of enzyme catalysis. 4

    b) Write any four differences between thermochemical and photochemical reactions. 4

NP – 803

**VI Semester B.Sc. Examination, June/July 2025**
**(NEP Scheme) (F + R)**
**CHEMISTRY**
**DSC – 8 : Inorganic and Biological Chemistry – IV**

Time : 2½ Hours Max. Marks : 60

***Instructions*** : 1) *The question paper has **3** Parts. Answer **all** the Parts.*
2) ***Draw** diagrams and chemical equations **wherever** necessary.*

PART – A

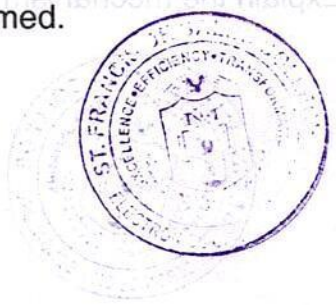
Answer **any four** questions. **Each** question carries **two** marks. **(4×2=8)**

1. What is the role of $Na^+$ in biological system ?
2. What is lanthanide contraction ?
3. What is an Ellingham diagram ?
4. Give the differences between catabolism and anabolism.
5. Name any two high energy compounds other than ATP.
6. Name the Vitamins that make up Vitamin – B complex.

PART – B

Answer **any 4** questions. **(4×5=20)**

7. a) How is thorium isolated from Monazite sand ?
   b) How Tungsten powder is produced from wolframite ? **(3+2)**
8. a) What is heat treatment of steel ? Explain annealing of steel.
   b) What are actinides ? Give two examples. **(3+2)**
9. a) Explain the conduction in conducting polymers.
   b) Briefly explain the process of reverse osmosis in the purification of water. **(3+2)**
10. a) Write the reaction in urea cycle where urea is formed.
    b) What are exergonic reaction ? Give an example. **(3+2)**



**P.T.O.**

11. a) Write short notes on DNA finger printing.
    b) Write the structure of Vitamin – C. **(3+2)**

12. a) Discuss the conversion of pyruvate to ethanol.
    b) What is energy coupling ? Give an example. **(3+2)**

## PART – C

Answer **any four** questions. **Each** carries **eight** marks. **(4×8=32)**

13. a) Discuss the extraction of nickel from pentlandite.
    b) Mention the influence of adding following elements on the properties of steel.
       i) Silicon ii) Manganese
       iii) Nickel iv) Chromium **(4+4)**

14. a) Compare the d and f block elements with respect to
       i) Magnetic property
       ii) Oxidation state.
    b) Calculate the magnetic moment of $Cu^{+2}$ (z = 29).
    c) What are alloy steels ? **(4+2+2)**

15. a) What are nanomaterials ? Explain the synthesis of nanomaterials by sol-gel method.
    b) What is hardness of water ? Why it is caused ? **(4+4)**

16. a) Discuss the structural features of ATP that makes it a high energy compound.
    b) Give the sequence of reactions β-oxidation pathway of fatty acids in mitochondria. **(4+4)**

17. a) What are leading and lagging strands in DNA ?
    b) What is codon ? If a DNA strand contain the base sequence AATCGTAGCC, what will be the base sequence transcribed on to mRNA ? **(4+4)**

18. a) What are Vitamins ? Give its classification with example for each class.
    b) Explain the mechanism of vision. **(4+4)**

NP – 868

# VI Semester B.Sc. Examination, June/July 2025
## (NEP) (F+R)
## COMPUTER SCIENCE
## CS – 14 : Computer Networks

Time : 2½ Hours | Max. Marks : 60

***Instruction** : Answer **all** the Sections.*

SECTION – A

I. Answer **any four** questions. **Each** question carries **two** marks. **(4×2=8)**

1) Write the advantages of computer network.

2) What is NIC ?

3) What is full duplex transmission mode ?

4) Mention any two network device.

5) What is DNS ?

6) What is congestion control ?

SECTION – B

II. Answer **any four** questions. **Each** question carries **five** marks. **(4×5=20)**

7) Explain topology with neat diagram.

8) Explain the different types of control access protocol.

9) Write the difference between $IPV_4$ and $IPV_6$.

10) Explain the transmission media with neat diagram.

11) Explain the working of cyclic redundancy check with suitable example.

12) Explain packet switching in detail with suitable example.



P.T.O.

## SECTION – C

III. Answer **any four** questions. **Each** question carries **eight** marks. **(4×8=32)**

13) Explain OSI reference model with neat diagram.

14) Explain error detection and correction.

15) Explain the distance vector algorithm.

16) What is CSMA ? Explain the CSMA/CA with flowchart.

17) Explain sliding window method of flow control.

18) What is framing ? Explain the different types of framing.

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NP – 867

**VI Semester B.Sc. Examination, June/July 2025**
**(NEP Scheme) (F+R)**
**COMPUTER SCIENCE**
**CS 13 : Python Programming**

Time : 2½ Hours Max. Marks : 60

***Instruction** : Answer **all** the Sections.*

SECTION – A

I. Answer **any four** questions. **Each** question carries **two** marks. **(4×2=8)**

1) Define command-line arguments in Python.
2) What are the built in functions used on lists in Python ?
3) What is pickling and unpickling ?
4) What is dictionary ?
5) What is encapsulation ?
6) What is the use of matplot lib ?

SECTION – B

II. Answer **any four** questions. **Each** question carries **five** marks. **(4×5=20)**

7) Explain the basic string operations.
8) Explain the concept of indexing and slicing in tuples.
9) Explain frozenset with an example.
10) Explain about class attributes versus data attributes.
11) Explain any two types of inheritance with an example.
12) Explain about the mapping global data sets.



P.T.O.

## SECTION – C

III. Answer **any four** questions. **Each** question carries **eight** marks. **(4×8=32)**

13) Explain control flow statements with an example in Python. **8**

14) a) Explain about string slicing and joining. **4**

b) Explain the steps reading and writing CSV files in Python. **4**

15) a) What are the relations between tuples and lists ? **4**

b) Explain about SET, SET methods. **4**

16) a) What are the different types of files in Python ? **4**

b) Explain Seek( ) and Tell( ) functions. **4**

17) a) Explain the steps to create classes and objects in Python. **4**

b) Explain polymorphism with an example. **4**

18) a) Explain data visualization with necessary tools in Python. **4**

b) Write a short note on API's. **4**

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NP – 817

**VI Semester B.Sc. Examination, June/July 2025**
**(NEP Scheme) (F+R)**
**MATHEMATICS (Major)**
**DSC 6.1 : Rings, Fields and Linear Algebra**

Time : 2½ Hours Max. Marks : 60

***Instruction** : Answer **all** Parts.*

PART – A

I. Answer **any ten** questions. **(10×2=20)**

1) Define a ring and give an example.

2) Show that the set $M = \left\{ \begin{bmatrix} a & 0 \\ b & 0 \end{bmatrix}; a, b \in R \right\}$ is a subring of the ring R of all $2 \times 2$ matrices over the field of real numbers.

3) Define maximal ideal of a ring R and give an example.

4) Prove that in any vector space V over a field F, $a\alpha = 0 \Rightarrow a = 0$ or $\alpha = 0$ $\forall\ a \in F$ and $\forall\ \alpha \in V$.

5) Show that $W = \{(x, y, z)/2x + 3y + z = 0\}$ is a subspace of $V_3(R)$.

6) Express the vector (3, 5, 2) as a linear combination of (1, 1, 0), (2, 3, 0), (0, 0, 1).

7) If $T : V_2(R) \to V_2(R)$ defined by $T(x, y) = (x + y, y)$, then show that T is a linear transformation.

8) For a matrix $A = \begin{bmatrix} 1 & -1 & 2 \\ 3 & 1 & 0 \end{bmatrix}$, find the linear transformation corresponding to standard bases.

9) Find the range space of the linear transformation $T : R^2 \to R^2$ defined by $T(x, y) = (x + y, x)$.

10) Define isomorphism of a transformation.



P.T.O.

11) Find the eigen values of a linear transformation $T : V_2(R) \to V_2(R)$ defined by $T(1, 0) = (1, 2)$, $T(0, 1) = (4, 3)$.

12) Define Diagonalizable matrix.

PART – B

II. Answer **any two** questions. **(2×5=10)**

13) Prove that the set $R = \{0, 1, 2, 3, 4\}$ is a commutative ring with unity w.r.t $+_5$ and $\times_5$ as the two ring compositions.

14) Prove that the intersection of any two subrings is a subring. Is the union is also a subring. Justify your answer.

15) Prove that the ring $(Z_n, +_n, \times_n)$ is an integral domain if and only if n is a prime number.

16) State and prove fundamental theorem of homomorphism on rings.

PART – C

III. Answer **any two** questions. **(2×5=10)**

17) Show that $V = \{a + b\sqrt{2} / a, b \in Q\}$ is a vector space over Q, where Q is the set of rationals.

18) Show that the vectors (1, –2, 5) is a linear combination of the vectors (1, 1, 1), (1, 2, 3) and (2, –1, 1).

19) Prove that a set of non-zero vectors $\alpha_1, \alpha_2 \ldots \alpha_n$ of a vector space V(F) is linearly dependent if and only if some one of those vectors say $\alpha_k$ $(2 \le k \le n)$ is expressed as a linear combination of its preceding ones.

20) Show that the vectors (2, 1, 4), (1, –1, 2), (3, 1, –2) form a basis of $R^3$.

PART – D

IV. Answer **any two** questions. **(2×5=10)**

21) Define linear transformation. If $T : U \to V$ be a linear transformation, then prove that

i) $T(0) = 0'$ where 0 and 0′ are zero vectors of U and V respectively.

ii) $T(-\alpha) = -T(\alpha)$ $\forall$ $\alpha \in U$.

22) Find a linear transformation $T : R^2 \rightarrow R^3$ such that $T(-1, 1) = (-1, 0, 2)$, $T(2, 1) = (1, 2, 1)$.

23) Find a matrix of linear transformation $T : V_3(R) \rightarrow V_2(R)$ defined by $T(x_1, x_2, x_3) = (x_1 + x_2, x_2 + x_3)$ w.r.t the bases $B_1 = \{(1, 1, 0), (1, 0, 1), (1, 1, -1)\}$ and $B_2 = \{(2, -3), (1, 4)\}$.

24) State and prove rank-nullity theorem.

## PART – E

V. Answer **any two** questions. **(2×5=10)**

25) Show that the correspondence $(x, y, z) \rightarrow (-x, y, z)$ is an automorphism of the vector space $V_3(R)$ and find its order.

26) State and prove fundamental theorem of homomorphism of a transformation.

27) Find the eigen values and eigen vectors of a linear transformation $T : V_2(R) \rightarrow V_2(R)$ defined by $T(x, y) = (3x + y, 6x + 2y)$.

28) Show that the matrix $A = \begin{bmatrix} 4 & -3 \\ 2 & 1 \end{bmatrix}$ is diagonalizable.

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NP – 818

# VI Semester B.Sc. Examination, June/July 2025
## (NEP Scheme) (F + R)
## MATHEMATICS
## DSC 6.2 : Numerical Analysis

Time : 2½ Hours Max. Marks : 60

***Instruction :*** *Answer* ***all*** *the Parts.*

PART – A

I. Answer **any ten** questions. **(10×2=20)**

1) Find a positive real root of $x^3 - 2x + 5 = 0$ which lies between 2 and 3 using bisection method in two approximations.

2) Write Regular-Falsi method formula to find the real root of the equation $f(x) = 0$.

3) Define absolute error and percentage error.

4) Apply Gauss-elimination method to solve the system of equation $x + 2y = 3$; $2x + 3y = 5$.

5) Explain Gauss-Seidel method briefly.

6) Discuss SOR method.

7) Prove that $E = (1 - \nabla)^{-1}$.

8) Write the Newton's Gregory forward interpolation formula.

9) Construct difference table for the following data.

| x | 30° | 35° | 40° | 45° |
|---|---|---|---|---|
| y = sinx | 0.5000 | 0.5736 | 0.6428 | 0.7071 |

10) State Newton's formula to find f'(x) and f''(x) using forward differences.

11) Write Trapexoidal formula.

12) Write the general quadrature formula.



P.T.O.

## PART – B

II. Answer **any two** questions. **(2×5=10)**

13) Using Taylor's series method to find y at x = 1.1 considering terms upto third degree given that $\frac{dy}{dx} = x + y$ and y(1) = 0.

14) Find the real root of the equation $f(x) = x^3 - 4x + 1 = 0$ by Regular-Falsi method upto 4 decimal places.

15) Find a real root of the equation $xe^x - 2 = 0$ correct to three decimal places using Newton – Raphson method.

16) Use secant method to find a real root of the equation $x^3 - x + 5 = 0$ correct to the four decimal places.

## PART – C

III. Answer **any two** questions. **(2×5=10)**

17) Solve by Gauss-elimination method $2x + y + z = 10$; $3x + 2y + 3z = 18$; $x + 4y + 9z = 16$.

18) Solve by Jacobi iteration method $5x - y = 9$; $-x + 5y - z = 4$; $y - 5z = 6$.

19) Using Gauss – Seidal iteration method. Solve the system of equation $27x + 6y - z = 85$; $6x + 15y + 2z = 72$; $x + y + 54z = 110$.

20) Solve the following system of equation by LU decomposition method $2x_1 + x_2 + 4x_3 = 12$; $4x_1 + 11x_2 - x_3 = 33$; $8x_1 - 3x_2 + 2x_3 = 20$.

## PART – D

IV. Answer **any two** questions. **(2×5=10)**

21) Evaluate $y = e^{2x}$ for x = 0.05 from the following table.

| x | 0.00 | 0.10 | 0.20 | 0.30 | 0.40 |
|---|---|---|---|---|---|
| $y = e^{2x}$ | 1.0000 | 1.2214 | 1.4918 | 1.8221 | 2.2550 |

22) Using Lagrange's formula of interpolation to find f(6) from the following data.

| x | 3 | 7 | 9 | 10 |
|---|---|---|---|---|
| f(x) | 168 | 120 | 72 | 63 |

23) Find f(8) by using Newton's divided difference formula for the following data.

| x | 4 | 5 | 7 | 10 | 11 | 13 |
|---|---|---|---|---|---|---|
| f(x) | 48 | 100 | 294 | 900 | 1260 | 2028 |

24) Find the polynomial which satisfies the following data.

| x | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| f(x) | 3 | 6 | 11 | 18 | 27 |

PART – E

V. Answer **any two** questions. **(2×5=10)**

25) From the table of values below, compute $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at x = 1.

| x | 1 | 1.1 | 1.2 | 1.3 | 1.4 | 1.5 | 1.6 |
|---|---|---|---|---|---|---|---|
| y | 7.989 | 8.403 | 8.781 | 9.129 | 9.451 | 9.750 | 10.031 |

26) The population of a certain town is given below. Find the rate of growth of population in 1976.

| x Year | 1931 | 1941 | 1951 | 1961 | 1971 |
|---|---|---|---|---|---|
| y Population in thousand | 40.62 | 60.80 | 79.95 | 103.56 | 132.65 |

27) Evaluate $\int_0^6 \frac{1}{1+x^2}\,dx$ by using

i) Simpson's 1/3rd rule and

ii) Simpson's 3/8th rule.

Correct to four decimal places by dividing [0, 6] into 6 equal parts.

28) Find the approximate value of $\int_0^{\pi/2} \sqrt{\cos\theta}\,d\theta$ by Weddle's rule by dividing [0, π/2] into 6 equal parts.

NP – 796

# VI Semester B.Sc. Examination, June/July 2025
## (NEP Scheme) (F+R)
## PHYSICS
## DSC – 7 : Elements of Condensed Matter and Nuclear Physics

Time : 2½ Hours Max. Marks : 60

***Instructions*** : *1) Answer **any four** questions from **each** Part.*
*2) **Use** of non-programmable scientific calculator is **permitted**.*

### PART – A

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

1. Draw the following planes in a cubic unit cell, (a) (100) (b) (111).
2. State Curie's law.
3. What is Meisner's effect ?
4. Define charge density of a nucleus.
5. What is compton scattering ?
6. What is pair production ?

### PART – B

Answer **any four** questions. **Each** question carries **5** marks. **(4×5=20)**

7. Find the Miller indices of a set of parallel planes which makes intercepts in the ratio 3a, 2b on the X and Y-axes and parallel to Z-axis.
8. A paramagnetic material has a magnetic field intensity of $10^4$ $Am^{-1}$. If the susceptibility of the material at room temperature is $3.7 \times 10^{-3}$, calculate the magnetization and flux density of the material.
9. The atomic weight and density of sulphur are 32 and 2.08 $gm/cm^3$ respectively. The electronic polarizability of the atom is $3.28 \times 10^{-40}$ $F\text{-}m^2$. If sulphur solid has cubical symmetry, what will be its relative dielectric constant ?
10. 1g of a radioactive substance takes 50s to lose one centigram. Find its half-life period.
11. When a gamma-ray Photon of wavelength 2010 Å collides with an electron, it gets scattered with a longer wavelength of 2030 Å. Determine the angle of scattering. (Given : $h = 6.63 \times 10^{-34}$ Js, $M_e = 9.1 \times 10^{-3}$ kg, $c = 3 \times 10^8$ $ms^{-1}$)
12. The work function of a substance is 4.0 ev. Determine the longest-wavelength of gamma radiation that can cause photoelectron emission from this substance.

P.T.O.

## PART – C

Answer **any four** questions. **Each** question caries **8** marks.

13. a) State and derive the Bragg's law of X-ray diffraction.
    b) Obtain the expression for thermal conductivity of a metal based on classical free electron theory. **(4+4)**

14. a) Distinguish between primitive cell and non-primitive cell.
    b) Obtain the expression for electrical conductivity of a metal based on classical free electron theory. **(2+6)**

15. Obtain the expression for Clasius-Mossotti equation. **8**

16. a) Obtain the expression for mean life of radioactive element.
    b) Show the relation between Half-life and Mean-life. **(6+2)**

17. a) Draw the binding energy versus mass number curve and mention its salient features.
    b) What is β-decay ? Explain the types of β-decay. **(4+4)**

18. Explain the construction and working of G.M. Counter. **8**

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NP – 797

# VI Semester B.Sc. Examination, June/July 2025
## (NEP) (F+R)
## PHYSICS
## DSC – 8 : Electronic Instrumentation and Sensors

Time : 2½ Hours Max. Marks : 60

***Instructions :*** *i) Answer **any four** questions from **each** Part.*
*ii) **Use** of non-programmable scientific calculator is **permitted**.*

### PART – A

I. Answer **any four** of the following. **Each** question carries **two** marks. **(4×2=8)**

1) Mention two difference between AC and DC current.
2) How can the range of DC voltmeter be extended ?
3) Mention the advantages of active filter over passive filters.
4) Why are Germanium and Silicon not used in making LED's ?
5) What is Pulse Time Modulation ? Explain.
6) What is photo diode ?

### PART – B

II. Answer **any four** of the following. **Each** question carries **five** marks. **(4×5=20)**

7) The DC voltage supply provides 40 V when its output is unloaded when connected to maximum load the output voltage drops to 32 V. Calculate the value of voltage regulation.
8) A bridge rectifier with capacitor filter is fed with AC source. The rectified output is measured across the load resistance of 100 Ω and capacitor value 400 μF. Calculate its ripple factor.
9) Calculate the value of resistance of a low pass filter circuit given $\omega_0$ = 20000 radians $s^{-1}$ and capacitance = 0.01 μF.

P.T.O.

10) In the variable resistor method digital to analog converter circuit $R_f = 1.5\ K\Omega$ and $R = 10\ K\Omega$ for a binary input 1010. Find the equivalent analog output. [Given binary input I = 5 V].

11) A 4-bit R-2R ladder network circuit has $R = 10\ K\Omega$ and $R_f = 2R$. Determine the analog output voltage for the input 1111.

[Given binary input I = 5 V].

12) A capacitive transducer has plates whose area is $5 \times 10^{-3}\ m^2$ and whose distance between plates is $1 \times 10^{-3}$ m. Calculate its capacitance.

## PART – C

III. Answer **any four** of the following questions. **Each** question carries **eight** marks. **(4×8=32)**

13) a) What is the need for DC power supply ? What are its characteristics ? **4**

b) Explain the working of L-section filter. **4**

14) Discuss the working of a square wave generator and represent the output waveform graphically. **8**

15) a) Define active and passive filters. **2**

b) Explain the frequency response of an active high pass filter with a neat circuit diagram. **6**

16) Discuss the construction and working of LED and mention any two applications. **8**

17) With a neat diagram explain the construction and working of platinum resistance thermometer. **8**

18) a) What is a transducer ? Discuss its types. **5**

b) What is strain gauge ? Mention its types. **3**

NP – 890

# VI Semester B.Sc. Examination, June/July 2025
## (NEP) (F+R)
## ELECTRONICS
## EL 602 : Control Systems and Robotics

Time : 2½ Hours | Max. Marks : 60

***Instruction** : Answer **any four** questions from **each** Part.*

PART – A

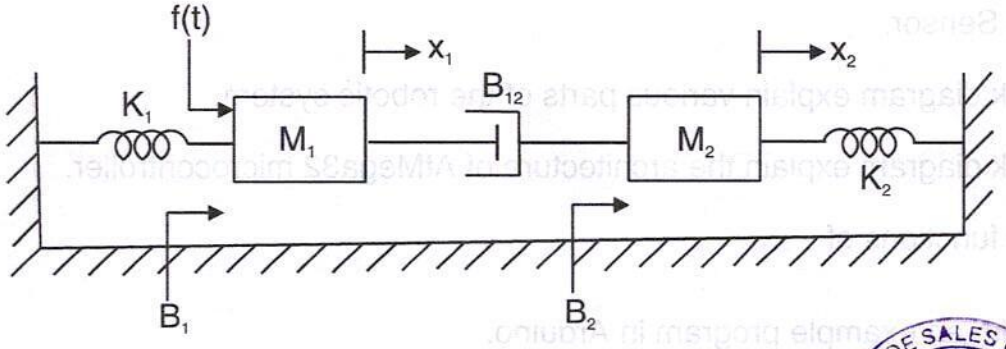
Answer **any four** questions. **(4×2=8)**

1. Write the advantages of closed loop system.
2. Write the analogous elements in force-voltage analogy for dashpot and mass.
3. Define rise time and peak time with respect to control system.
4. What is a robot ? Mention any two applications of robots.
5. What is the function of Analog pins on Arduino board ?
6. What is the function of millis() ?

PART – B

Answer **any four** questions. **(4×5=20)**

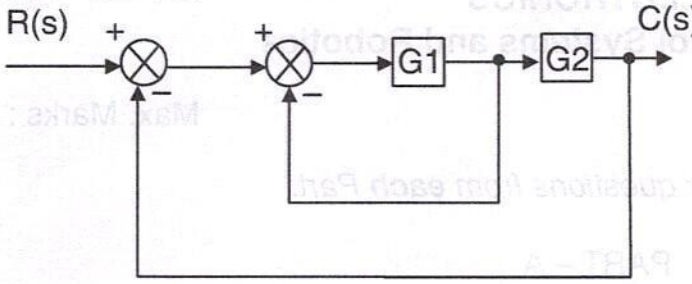
7. Write the differential equation governing the mechanical system in the given figure and determine the transfer function.






P.T.O.

8. Refer the block diagram shown in the figure. Using the block diagram reduction techniques, find the overall transfer functions C(s)/R(s) where G1 = 1/s and G2 = 1/s + 5.




9. Explain the working of Embedded System with block diagram.

10. Discuss on applications of robots.

11. Write a sketch to fade a LED using arduino.

12. Draw a block diagram of arduino UNO and explain the function of each block.

## PART – C

Answer **any four** questions. **(4×8=32)**

13. Derive an expression for the response of a closed loop first order system for unit step input.

14. a) Mention the various graphical techniques available for frequency response analysis.

    b) Draw the Bode plot for derivative factor. **(5+3)**

15. Write a note on :

    a) PIR Sensor

    b) Position Sensor.

16. With a block diagram explain various parts of the robotic system.

17. With a block diagram explain the architecture of AtMega32 microcontroller.

18. Explain the functions of

    a) setup()

    b) loop() with an example program in Arduino.

NP – 889

# VI Semester B.Sc. Examination, June/July 2025
## (NEP) (F+R)
## ELECTRONICS
## EL 601 : IoT and Instrumentation

Time : 2½ Hours | Max. Marks : 60

***Instruction :*** *Answer* ***any four*** *questions from* ***each*** *Part.*

### PART – A

Answer **any four** questions. **(4×2=8)**

1. Define IoT.
2. Draw the basic block diagram of IoT system.
3. What is LoRaWAN and how does it benefit for IoT applications ?
4. Draw the block diagram of a general measurement system.
5. Classify the transducer and mention the basic requirements of transducer.
6. What is resting and action potential ?

### PART – B

Answer **any four** questions. **(4×5=20)**

7. What are sensor fusion techniques and how do they improve IoT applications ?
8. Explain the wireless communication technologies used in IoT.
9. Describe the different IoT network topologies and their application.
10. What do you mean by signal conditioning ? Explain the various signal conditioning techniques used in instrumentation.



P.T.O.

11. In a certain voltage measurement, the voltage to be measured is 80V, whereas the measurement yields a voltage of 79V.

    Calculate the

    i) Absolute error

    ii) Percentage error

    iii) Relative accuracy

    iv) Percentage accuracy

12. Draw the block diagram of EMG.

## PART – C

Answer **any four** questions. **(4×8=32)**

13. Explain :

    a) IoT communication protocols.

    b) Different types of sensors in IoT.

14. With an example explain the design and implementation process of an IoT application.

15. Discuss the privacy and ethical considerations in IoT.

16. Explain the construction and application of any four transducers.

17. Explain the EEG with a block diagram.

18. Explain chopper amplifier with a block diagram.

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NP – 783

# VI Semester B.A./B.Sc. Examination, June/July 2025
## (NEP) (F+ R)
## PSYCHOLOGY
## DSC 16 : Human Resource Management

Time : 2½ Hours | Max. Marks : 60

***Instructions :*** *1)* ***All three*** *Parts are* ***compulsory.***

*2) Answer must be written* ***completely*** *either in* ***Kannada*** *or in* ***English.***

PART – A

ಭಾಗ – ಎ

I. Answer **any four** of the following. **Each** answer carries **2** marks. **(4×2=8)**

ಯಾವುದಾದರೂ **ನಾಲ್ಕು** ಪ್ರಶ್ನೆಗಳಿಗೆ ಉತ್ತರಿಸಿ. **ಪ್ರತಿ** ಉತ್ತರಕ್ಕೆ **2** ಅಂಕಗಳು.

1) Expand HRM.
HRM ಅನ್ನು ವಿಸ್ತರಿಸಿ.

2) What is role playing ?
ಪಾತ್ರ ನಿರ್ವಹಣೆ ಎಂದರೇನು ?

3) What is interview ?
ಸಂದರ್ಶನ ಎಂದರೇನು ?

4) Define training.
ತರಬೇತಿಯನ್ನು ವ್ಯಾಖ್ಯಾನಿಸಿ.

5) Expand MBO.
MBO ಅನ್ನು ವಿಸ್ತರಿಸಿ.

6) What is E-HRM ?
ಇ-ಮಾನವ ಸಂಪನ್ಮೂಲ ನಿರ್ವಹಣೆ ಎಂದರೇನು ?



P.T.O.

## PART – B

## ಭಾಗ – ಬಿ

II. Answer **any four** of the following. **Each** answer carries **5** marks. **(4×5=20)**

ಯಾವುದಾದರೂ **ನಾಲ್ಕು** ಪ್ರಶ್ನೆಗಳಿಗೆ ಉತ್ತರಿಸಿ. **ಪ್ರತಿ** ಉತ್ತರಕ್ಕೆ **5** ಅಂಕಗಳು.

1) Define HRM. Describe nature of HRM.
ಮಾನವ ಸಂಪನ್ಮೂಲ ನಿರ್ವಹಣೆಯನ್ನು ವ್ಯಾಖ್ಯಾನಿಸಿ. ಮಾನವ ಸಂಪನ್ಮೂಲ ನಿರ್ವಹಣೆಯ ಸ್ವಭಾವವನ್ನು ವರ್ಣಿಸಿ.

2) Explain difference between personal management and human resource management.
ವೈಯಕ್ತಿಕ ನಿರ್ವಹಣೆ ಮತ್ತು ಮಾನವ ಸಂಪನ್ಮೂಲ ನಿರ್ವಹಣೆಯ ವ್ಯತ್ಯಾಸವನ್ನು ವಿವರಿಸಿ.

3) Explain purpose and benefits of training.
ತರಬೇತಿಯ ಉದ್ದೇಶ ಮತ್ತು ಉಪಯೋಗಗಳನ್ನು ವಿವರಿಸಿ.

4) Explain benefits and limitations of performance appraisal.
ಕಾರ್ಯ ಮೌಲ್ಯಮಾಪನದ ಲಾಭ ಮತ್ತು ಮಿತಿಗಳನ್ನು ವಿವರಿಸಿ.

5) Explain nature and growth of I-HRM.
I-HRM ನ ಸ್ವರೂಪ ಮತ್ತು ಬೆಳವಣಿಗೆಯನ್ನು ವಿವರಿಸಿ.

6) Explain principles of TQM.
ಸಂಪೂರ್ಣ ಗುಣಮಟ್ಟ ನಿರ್ವಹಣೆಯ ತತ್ವಗಳನ್ನು ವಿವರಿಸಿ.

## PART – C

## ಭಾಗ – ಸಿ

III. Answer **any four** of the following. **Each** answer carries **8** marks. **(4×8=32)**

ಯಾವುದಾದರೂ **ನಾಲ್ಕು** ಪ್ರಶ್ನೆಗಳಿಗೆ ಉತ್ತರಿಸಿ. **ಪ್ರತಿ** ಉತ್ತರಕ್ಕೆ **8** ಅಂಕಗಳು.

1) Explain functions of human resource management.
ಮಾನವ ಸಂಪನ್ಮೂಲ ನಿರ್ವಹಣೆಯ ಕಾರ್ಯಗಳನ್ನು ವಿವರಿಸಿ.

2) What is selection ? Explain nature and characteristics of selection.
ಆಯ್ಕೆ ಎಂದರೇನು ? ಆಯ್ಕೆಯ ಸ್ವರೂಪ ಮತ್ತು ಗುಣಲಕ್ಷಣಗಳನ್ನು ವಿವರಿಸಿ.

3) Explain training methods.

ತರಬೇತಿಯ ವಿಧಾನಗಳನ್ನು ವಿವರಿಸಿ.

4) Explain modern methods of performance appraisal.

ಕಾರ್ಯ ನಿರ್ವಹಣಾ ಮೌಲ್ಯ ನಿರ್ಧಾರಣೆಯ ಆಧುನಿಕ ವಿಧಾನವನ್ನು ವಿವರಿಸಿ.

5) Explain recruitment and selection of E-HRM.

E-HRM ನಲ್ಲಿ ನೇಮಕಾತಿ ಮತ್ತು ಆಯ್ಕೆಯನ್ನು ವಿವರಿಸಿ.

6) Explain the tools of quality management.

ಗುಣಮಟ್ಟ ಸುಧಾರಣೆಯ ಸಾಧನಗಳನ್ನು ವಿವರಿಸಿ.

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