2018

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer ***all*** questions from both groups

Group - A

1. Answer any ***five*** of the following in two sentences each : 2×5

   a) Food web

   b) Biosphere

   c) Abiotic components of ecosystem

   d) Classification of soil

   e) Hydrological Cycle

   f) Productivity

   g) Trophic Levels.

Group - B

2. Discuss the interrelationship between the living world and environment. 10

OR

Write notes on the following : 5+5

a) System ecology

b) Components of environment.

3. Write briefly the adaptations of plants to climatic factors like light, temperature and wind. 10

OR

Write notes on the following : 5+5

a) Precipitation

b) Soil Profiles.

4. What is a Population ? What are the characteristics ? How does a population differs from a community ? 10

OR

Write notes on the following : 5+5

a) Ecological amplitude

b) General process of Primary succession.

5. What are ecological Pyramids ? What do they signify ? Describe different types of Pyramids in pond and forest ecosystems. 10

OR

Write notes on the following : 5+5

a) Principle of energy flow in an ecosystem

b) Phosphorus Cycle.

6. Describe the Phytogeographical regions of India with local vegetation. 10

OR

Write notes on the following : 5+5

a) Continental drift

b) Biomes.

2018

Full Marks - 60

Time - 3 Hours

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Answer ***all*** questions from both groups

Group - A

1. Answer any ***five*** of the following within 2-3 sentences each : 2×5

   a) Biosystematics

   b) Botanical nomenclature

   c) Evidence from Polynology for systematics

   d) Contribution of Takhtajan

   e) Molecular data for taxonomy

   f) Monophyly

   g) Field inventory.

Group - B

2. What is a herbarium ? Write role of and precautions for herbarium. Mention major herbaria of India. 10

OR

Write notes on the following : 5+5

a) Botanical gardens of India

b) Field inventory.

3. Discuss concept of taxa, categories and taxonomic hierarchy. Define species and mention its characteristics. 10

OR

Write notes on the following : 5+5

a) Principles of botanical nomenclature

b) Limitations of Priority.

4. Discuss the system of classification proposed by Hutchinson. Point out its merits and demerits. 10

OR

Write notes on the following : 5+5

a) Evidence from cytology for classification

b) Merits and demerits in system of Bentham and Hooker.

5. Discuss cladistic analysis and cladistic method of classification. Mention concept of cladogram and phenogram. 10

OR

Write notes on the following : 5+5

a) Operational Taxonomic Units (OTUs)

b) Numerical taxonomy.

6. Write in brief the Phylogeny of Angiosperms. 10

OR

Write notes on the following : 5+5

a) Co-evolution of angiosperms and animals

b) Polyphyly.

□□

2018

Full Marks - 60

Time - 3 Hours

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Answer ***all*** questions from both groups

Group - A

1. Write short notes on any ***five*** of the following : 2×5

   a) Structure of anatropous ovule

   b) Megasporogenesis

   c) NPC system

   d) Self incompatibility

   e) MGU structure

   f) Contribution of P. Maheswari

   g) Tetrasporic megagametogenesis.

Group - B

2. Discuss microsporogenesis and microgametogenesis in angiosperms. 10

OR

Write notes on the following : 5+5

a) Structure and functions of anther wall

b) Pollen wall structure and wall proteins.

3. Describe the organization and ultrastructure of mature embryo sac. 10

OR

Write notes on the following : 5+5

a) Suspensor structure and its functions

b) Monocot embryo development.

4. Discuss the process of fertilization in angiosperms and significance of double fertilization. 10

OR

Write notes on the following : 5+5

a) Contrivances of Self pollination

b) *In vitro* pollination and *In vitro* fertilization.

5. Write the various types of endosperms, their morphological nature and their functions. 10

OR

Write notes on the following : 5+5

a) Pseudo embryo Sac

b) Cybrids.

6. Give an account of germline transformation. 10

OR

Write notes on the following : 5+5

a) Polyembryony

b) Seed dispersal mechanisms.

□□

b) Discuss and compare the electronic configuration and positions of actinides in the periodic table. 4

OR

Write notes on the following :

a) Lanthanide contraction its causes and consequences. 6

b) Magnetic properties of Lanthanides. 4

6. a) Discuss the toxicity of mercury and lead. 6

b) Functions of haemoglobin. 4

OR

Write notes on any *two* of the following : 2×5

a) Sodium / Potassium pump

b) Carbonic anhydrase

c) Carboxy Peptidase.

2018

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer ***all*** questions from both groups

Group - A

1. Answer any ***five*** of the following : 2×5

a) Name the following co-ordination compounds :

i) $[Pt(py)_4]\,[PtCl_4]$

ii) $Fe_4[Fe(CN)_6]_3$

b) $CoCl_3 5NH_3$ when dissolved in water two chloride ions are precipitated. Its molar conductivity is 3. What is the formula of Co-ordination compound ? What are primary and secondary valency of Cobalt ?

c) Write a complex compound in which Cobalt has '–1' oxidation state.

d) Anhydrous $CuSO_4$ is colourless but hydrated $CuSO_4$ is blue in colour. Explain.

e) What are the stereoisomers of the complex having formula $[M(aa)_2b_2]$ aa : bidentate and b : unidentate ligand.

f) Why is blood red in colour ?

g) Write two important ores of Mn.

h) Explain Lanthanum ion does not exist in +4 oxidation state.

Group - B

2. Write down the basic postulates of Valence bond theory. Differentiate between an inner-orbital complex and an outer-orbital complex with one example for each. 5+5

OR

What are the basic postulates of Werner's theory of Co-ordination compounds. Explain the non-ionic nature of $CoCl_3 3NH_3$ complex by Werner's theory. 7+3

3. What are Latimer and Frost diagrams ? Outline the various steps to construct Frost diagram from Latimer diagram. 2×2+6

OR

Make a comparative study between 1st and 2nd transition series referring to following three properties : $3\frac{1}{3} \times 3$

a) Complex formation

b) Variable valency

c) Catalytic property.

4. Write two important ores of Chromium. How is it extracted from its ore. 2+8

OR

Discuss the Chemistry of +4 oxidation state of Titanium. 10

5. a) Discuss separation of Lanthanides by ion-exchange method. 6

6. Elucidate the structure of papaverine. 10

OR

Write notes on the following :

a) Medicinal importance of Hygrine quinine and morphine. 6

b) Hoffmann's exhaustive methylation. 4

□□

2018

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer ***all*** questions from both groups

Group - A

1. Answer any ***five*** of the following : 5 × 2

a) Write the reaction between nitro ethane and nitrous acid.

b) How is Chlorobenzene prepared from Benzene diazonium chloride.

c) What is Carbylamine reaction ?

d) Discuss aromaticity of pyridine.

e) How is methoxy group in an alkaloid estimated ?

f) What are Terpenoids ? Give two examples.

g) Prepare nitrobenzene from benzene diazonium salt.

h) How is 2-nitropyrrole prepared from pyrrole.

Group - B

2. a) What are primary, secondary and tertiary amines ? Distinguish them by using nitrous acid. 2+6

   b) How is primary amine prepared from acidamide. 2

OR

Write short notes on any *two* : 2 × 5

a) Reduction of nitrobenzene in acidic and alkaline medium.

b) Hoffmann's elimination reaction

c) Gabriel phthalimide reaction.

3. What is diazotisation ? Discuss its mechanism. Starting from aniline synthesise (i) Bromobenzene and (ii) Benzene nitrile. 2+4+2+2

OR

Describe Haworth synthesis of naphthalene. Discuss nitration and Friedal-craft acylation of naphthalene with mechanism. 5+2½×2

4. Discuss method of preparation of each of the following (i) Furan (ii) Thiophene and (iii) Pyrrole. Explain 5-membered heterocyclic compounds undergo substitution usually at C-2 rather than at C-3. 2½×3+2½

OR

Elucidate the structure of the following and confirm it by synthesis : 5+5

a) Quinoline

b) Isoquinoline.

5. Elucidate the structure of α-terpineol. Discuss its synthesis. 6+4

OR

Write notes on the following : 5+5

a) Classification of terpenoids and isoprene rule.

b) Structure of Vitamin C.

5. a) How ΔG, ΔH and ΔS are determined from emf measurements. 6

b) The emf of the cell $Cd \mid CdCl_2(aq) \parallel AgCl \mid Ag$ is 0.6753 V at 25° C and 0.6915 V at 0°C. Calculate ΔH, ΔG and ΔS at 25°C. 4

OR

Write notes on the following : 5×2

a) Glass electrode

b) Quinone-hydroquinone electrode.

6. a) Derive an expression for the emf of a concentration cell with transference. 7

b) What is liquid junction potential ? How it can be minimised ? 3

OR

Write notes on any *two* of the following : 5×2

a) Potentiometric redox titration

b) Magnetic susceptibility and its measurement

c) Dipole moment and its measurement.

□□

2018

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions from both groups

Group - A

1. Answer any *five* of the following : 2×5

a) Define molar conductance. Write down its unit.

b) State Kohlaursch's law of independent migration of ions.

c) Define transport number. How is it related to ionic mobility.

d) The molar conductance of 0.01m Acetic acid is 16.30×10^{-4} Sm^2 $mole^{-1}$ at 25°C. The molar ionic conductance of $H^{\oplus}$ ion and acetate ion at infinite dilution are 349.8×10^{-4} and 40.9×10^{-4} Sm^2 $mole^{-1}$ respectively. Calculate percentage of dissociation of acetic acid.

e) Explain : Zinc liberates hydrogen gas from dil. H_2SO_4 acid but silver does not. Given that standard REP of Zinc and Silver are –0.76 V and +0.80 V respectively.

f) Define magnetic susceptibility. Write one of its application.

g) $Li^{\oplus}$ ion is smaller in size than $Na^{\oplus}$ ion but transport number of $Li^{\oplus}$ ion is less than that of $Na^{\oplus}$ ion. Explain.

h) Explain specific conductance decreases with dilution but molar conductivity increases with dilution.

Group - B

2. Define conductance cell constant, specific conductance equivalent conductance and molar conductance write their units. Establish the relationship among them. $\frac{M}{100}$ solution of NaCl offers a resistance of 25 Ohms in a cell having cell constant $0.5cm^{-1}$. Calculate specific conductance and molar conductance. 1×5+3+2

OR

Write notes on any *two* of the following : 5 × 2

a) Electrophoretic effect

b) Asymmetric effect

c) Wein effect and Walden's rules.

3. How is conductance measurement utilised to determine (i) Hydrolysis constant of a salt of strong acid and weak base (ii) Conductometric titration of a mixture of strong acid and weak acid Vs. strong base. 5+5

OR

Write notes on the following : 5 × 2

a) Determination of transport number by moving boundary method.

b) Advantages and limitations of conductometric titration.

4. What is an electrochemical cell ? Explain its construction considering suitable electrodes. Write its cell reaction and representation. 2+4+2+2

OR

Write notes on the following : 5 × 2

a) Electroplating and electrorefining

b) Nernst equation.

6. a) Discuss preparation of acetaldehyde from (i) acid chloride (ii) acid nitrite. 2+2

b) How does it react with 2+2+2

i) Phenyl hydrazine

ii) a mixture of KOH and I_2 and

iii) dil. NaOH.

OR

Write notes on any ***three*** of the following : $3\frac{1}{3} \times 3$

a) Reimer-Tiemann reaction

b) Schotten-Baumann reaction

c) Cannizzaro's reaction

d) Wolf-Kishner and Clemmensen reduction.

2018

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer ***all*** questions from both groups

Group - A

1. Answer any ***five*** of the following : 2×5

a) State 3rd law of thermodynamics.

b) Differentiate between bond-energy and bond dissociation energy with one example.

c) Find out the value of K_p at 25°C and at 2 Atmospheres for the reaction $PCl_5 \rightleftharpoons PCl_3 + Cl_2$ assuming that PCl_5 is 20% dissociated.

d) Find out pH of a solution containing 5.6 grams of KOH in 1 litre of solution.

e) Explain dissociation of NH_4OH is decreased in the presence of NH_4Cl.

f) Give an example of SN^1 reaction.

g) Prepare Benzophenone from Benzene.

h) What happens when phenol is heated with dilute nitric acid.

Group - B

2. State and explain Hess's law. Prove that it is a special case of 1st law of thermodynamics. 4+6

OR

a) Derive Law of Chemical Equilibrium thermodynamically. 6

b) Explain in the light of Le-Chatilier's principle of formation of ammonia is more at high pressure. 4

3. a) Define and explain solubility and solubility product of a partially soluble salt. Find out solubility product of silver chromate at 25°C having solubility 2×10^{-4} mole/litre. 5+3

b) Define common ion effect. 2

OR

a) What is a buffer solution ? Derive Henderson's equation for an acidic buffer. 2+5

b) Why is it necessary to saturate the solution by NH_4Cl before adding dil. NH_4OH during precipitation of Gr III A basic radicals. 3

4. a) How is primary, secondary and tertiary alcohol prepared from Grignard's reagent ? 6

b) Discuss Willamson's ether synthesis. 4

OR

a) Prepare Propyl Chloride from (i) alkene and (ii) alcohol. 2+2

b) Discuss hydrolysis of alkyl bromide with (i) aq.KOH and (ii) ethanolic KOH. 3+3

5. a) What are Friedal-Craft alkylation and acylation ? Discuss its mechanism. 3+3

b) What is Sand Meyer's reaction ? Discus its mechanism. 4

OR

Write notes on the following : 5+5

a) Benzyne mechanism

b) Galtermann reaction.

2018

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer ***all*** questions from both groups

Group - A

1. Answer any ***five*** of the following 2×5

   a) Show that the Operators Δ and E are commutative in operation with respect to constants. Show that

   $$\Delta^2 = E^2 - 2E - I.$$

   b) Find f' (1.8) for $f(x) = e^x$; with $h = 0.01$.

   c) Prove that n^{th} divided difference of a polynomial of degree less than 'n' is zero.

   d) Show that $\Delta^r y_K = \Delta^r y_{K+r}$.

e) What is the decimal equivalent 4-digit greatest binary integer ?

f) Find the inverse of the matrix :

$$\begin{pmatrix} 1 & 2 & -1 \\ 2 & 1 & 0 \\ 1 & 1 & 2 \end{pmatrix}$$

g) Using Horner's method, find P'(–1) where

$$P(x) = x^4 - 8x^3 + x^2 + 4x - 9.$$

h) A root of the equation $f(x) = x^3 + x - 4 = 0$ lies in (1, 4). Find the number of iteration necessary to obtain the approximation to the root with an error less then 10^{-3} by bisection method.

Group - B

2. a) Find the root of the equation, $x^3 + x^2 - 1 = 0$; using the fixed point iteration technique; which lies in the interval (0, 1) 5

b) Find the value of $\sqrt{3}$ to 3-significant figures by Bisection method. 5

OR

c) Solve the equation $3x - \cos x - 1 = 0$, by Newton Raphson method. 5

d) Find two iteration by secant method to obtain an approximation to a root by $x^3 - x - 1 = 0$ starting with $x_0 = 1$ and $x_1 = 2$. 5

3. a) Find the interpolating polynomial for given data by constructing Newton's divided difference table and also interpolate f(1). The given data as follows :

x	–1	0	2	5
f(x)	–11	–5	–5	55

5

b) Show that Lagrange's interpolation formula can be evolved by equating $(n+1)^{th}$ divided differences of f(x) to zero if f(x) is a polynomial of degree n. 5

OR

d) Given that $\frac{dy}{dx} = \log_{10}(x+y)$, with initial condition $y = 1$ when $x = 0$, find y for $x = 0.2$ by using Euler's modified method. 5

6. a) Solve the system of equation given by

$$2x_1 + 4x_2 + x_3 = 3,$$
$$3x_1 + 2x_2 - 2x_3 = 2,$$
$$x_1 - x_2 + x_3 = 6$$

by Gauss Elimination method. 5

b) Solve the system of linear equations by Matrix Inversion method. The system is :

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

OR

c) Solve the following system by iteration method. The system is :

$$27x + 6y - z = 85$$
$$6x + 15y + 2z = 72$$
$$x + y + 54z = 110.$$

Solve by Gauss-Jacobi iteration method. 5

d) Solve the system of equation by Gauss-Seidel iterative method : 5

$$2x_1 - x_2 = 7$$
$$-x_1 + 2x_2 - x_3 = 1$$
$$-x_2 + 2x_3 = 1.$$

□□

2018

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer ***all*** questions from both groups

Group - A

1. Answer any ***ten*** of the following : 2×10

   a) Let $f(x) = x$, $0 \leq x \leq 1$ and $P = \left\{0, \frac{1}{4}, \frac{1}{2}, \frac{3}{4}, 1\right\}$ be a partition of [0, 1], find U(P, f).

   b) Evaluate the integral and also discuss it's convergence, the given integral is

   $$\int_0^1 \frac{dx}{x^3}.$$

   c) Evaluate by Integration by parts

   $$\int x \tan^{-1} x \, dx.$$

d) Test for convergence of the following integral :

$$\int_0^{\infty} \frac{dx}{x^{4/5}}.$$

e) Obtain the lim sup and lim inf of the following sequence :

$$x_n = \frac{1}{n} + (-1)^n.$$

f) Test the convergence of the following series absolutely :

$$\frac{1}{1.2} - \frac{1}{3.4} + \frac{1}{5.6} - \frac{1}{7.8} + \ldots\ldots$$

g) Test the uniform convergence of the following series of real terms : $\Sigma\, n^3 x^n$.

h) Give an example of a function 'f' which is not integrable but $|f|$ is integrable.

i) Give an example of a function which is Reimann Integrable but not monolonic.

j) Test the given series for uniform convergence in [0, 1]. The series is $\sum \frac{(-1)^{n-1}}{n} x^n$.

k) Show that if 'n' is a non-negative integer then $T(n+1) = n!$; where $T(n)$ is the gamma function.

l) Prove that :

$$\int_0^{\infty} \frac{x^{m-1} - x^{n-1}}{(1+x)^{m+n}}\, dx = 0,\ m > 0,\ n > 0.$$

m) Show that : $\int_0^1 \frac{dx}{\sqrt{(-\log x)}} = \sqrt{\pi}$.

Group - B

2. a) State and prove "Fundamental Theorem of Calculus". 6

b) Evaluate the Integral : 6

$$I = \int_1^e \frac{\log x}{\sqrt{1+\log x}}\, dx.$$

OR

c) Show that the function $f(x) = \sin x$ is integrable on $\left[0, \frac{\pi}{2}\right]$ 6

d) Evaluate :

$$I = \int_0^{\pi/2} \frac{dx}{a + b\cos x}; \; a > 0, \; b > 0. \qquad 6$$

3. a) If 'f' is R-integrable over [a, b]; then 'f^2' is also R-integrable over [a, b]. Prove. 6

b) Prove :

$$\int_0^1 \frac{\log(1+x)}{(1+x^2)} dx = \pi/8(\log 2). \qquad 6$$

OR

c) Show that the improper integral

$$I = \int_1^\infty \frac{\sin t}{t^P} \, dt$$

is convergent if $P > 0$. 6

d) Test for covergence :

$$\int_4^\infty \left(\frac{x^2 - 1}{x^2 + 1}\right) dx \qquad 6$$

4. a) Test for pointwise and uniform convergence of the series of real terms :

$$f(x) = \sum \frac{x^n}{n^2 2^n}. \qquad 6$$

b) Show that : 6

$$\lim_{n\to\infty} \left[\frac{n}{n^2+1^2} + \frac{n}{n^2+2^2} + \ldots\ldots + \frac{1}{2n}\right] = \pi/4$$

OR

c) Find $\int_1^2 x^3 dx$, using fundamental theorem of Integral Calculus. 6

d) Find the radius of convergence of the given power series :

$$f(z) = \sum_{n=0}^{\infty} \frac{n^3}{3^n} z^n. \qquad 6$$

5. a) Evaluate :

$$\int_{-\infty}^{\infty} \frac{dx}{x^2 + 2x + 2}. \qquad 6$$

b) Show that

$$\int_0^1 \frac{x^{\alpha}-1}{\log x}\,dx = \log(1-1\alpha) \qquad 6$$

OR

c) Show that the series

$$\sum_{n=1}^{\infty} \frac{1}{1+n^2x}$$

converges uniformly in $[1, \infty]$. 6

d) Test the convergency of the integral :

$$\int_0^{\infty} \frac{1-\cos x}{x^2}\,dx. \qquad 6$$

6. a) Express $\int_0^1 x^m\left(1-x^p\right)^n dx$

in terms of beta function and hence evaluate

$$\int_0^1 x^5\left(1-x^3\right)^{10} dx. \qquad 6$$

b) Prove that $\int_0^2 \left(8-x^3\right)^{-1/3} dx = \frac{2\pi}{3\sqrt{3}}$. 6

OR

c) For any positive integer n, we have

$$T\left(n+\frac{1}{2}\right)\frac{(2n)!}{2^{2n}n!}\sqrt{\pi}. \qquad 6$$

d) Evaluate $\int_0^{\infty} \cos\left(c^2x^2\right) dx$.

using gamma function. 6

□□

2018

Full Marks - 80

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Answer ***all*** questions from both groups

Group - A

1. Answer any ***ten*** of the following : 2×10

   a) Verify that the set of integers (Z) is a ring or not.

   b) Define a prime ideal of a commutative ring R and find a prime ideal of $(\mathbb{R}, +, \cdot)$.

   c) Define an integral domain and give an example.

   d) Define the characteristic of a ring.

   e) Find all nilpotents elements of Z_4.

   f) Define a subspace of a vector space V.

g) Define a linear independent set of vectors and check the linear independence of the set

$\{(1, 2, 3), (1, 1, 1)\}$

h) Define the basis of a vector space and find the basis of P_3.

i) Define Kernel of a linear map T, where $T : u \to v$ is a linear map.

j) Consider a linear map $T : V_3 \to V_3$ defined by $T(x_1, x_2, x_3) = (x_1, x_2, 0)$. Find N(T).

k) Find the inverse of the matrix

$$\begin{bmatrix} 2 & 5 \\ 1 & 3 \end{bmatrix}_{2\times 2}$$

l) Define the eigen values of a matrix and find all the eigen values of

$$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

Group - B

2. Prove that every field is an integral domain. Give example of an integral domain which is not a field. 12

OR

Answer any *two* of the following : 6×2

a) Prove that the characteristic of an integral domain is either zero or prime.

b) Prove that if R is a division ring 'R' then the centre of R i.e. $Z(R) = \{x \in R \mid xr = rx \ \forall r \in R\}$ is a field.

c) Prove that a commutative ring with unity R is an Integral domain

iff $\forall\ a, b, c \in R, a \neq 0, ab = ac \Rightarrow b = c$.

3. Let R be a commutative ring with unity and A be an ideal of R. Then prove that $\frac{R}{A}$ is an Integral domain iff A is a prime ideal of R. 12

OR

Answer any *two* of the following : 6 × 2

a) Consider R is a field then prove that (0) and R are its only ideals.

b) Let R be a ring and A be an ideal of R. Prove that $\frac{R}{A}$ is a ring.

c) If R is a commutative ring and A is an ideal of R. Then prove that $\frac{R}{A}$ is a commutative ring.

4. Prove that a subset 'S' of a vector space V is a subspace of V iff it is closed under addition and scalar multiplication defined in V. 12

OR

Answer any *two* of the following : 6 × 2

a) If S is a non empty subset of a vector space V then prove that [S] – span of S is a subspace of V.

b) Prove that Intersection of two subspace is always a subspace.

c) Is the following subset form a basis of $\mathbb{R}^4$ ($\mathbb{R}$) ?

{(1, 2, 3, 0), (1, 1, 1, 0), (1, 0, 1, 0), (0, 0, 0, 5)}

5. State and prove Rank-Nullity theorem. 12

OR

Answer any *two* of the following : 6 × 2

a) Consider $T : U \to V$ be a linear map. Show that N(T) is a subspace of U.

b) Let $T : U \to V$ be a linear map. Show that R(T) is a subspace of V.

c) Consider a linear map

$T : P_3(R) \to P_3(R)$ defined by

$T(P(X)) = P(x + 1)$

Determine the matrix $(T : B_1, B_2)$ where

$B_1 = \{1, x, x^2, x^3\}$

$B_2 = \{1, x, x^2, x^3\}$

6. Find the eigen values, corresponding eigen vectors, characteristic equation, Algebraic multiplicity of each eigen values of the following matrix : 12

$$\begin{bmatrix} 1 & 2 & 3 \\ 0 & 1 & 0 \\ 0 & 5 & -1 \end{bmatrix}$$

OR

Answer any *two* of the following : 6×2

a) Find Rank and Nullity of the matrix A, where

$$A = \begin{bmatrix} 1 & 0 & 1 \\ 1 & 2 & 3 \\ -1 & 1 & 0 \end{bmatrix}$$

b) Show that the following matrix is nonsingular and then find its inverse :

$$\begin{bmatrix} 1 & -1 & 2 \\ 3 & 0 & 1 \\ 0 & 1 & -1 \end{bmatrix}$$

c) Find rank of the following matrix by reducing it to row-reduced echelon form :

$$\begin{bmatrix} -1 & 1 & 1 \\ 3 & 1 & -1 \\ 2 & 2 & 1 \end{bmatrix}$$

□□

2018

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer ***all*** questions from both groups

Group - A

1. Answer any ***ten*** of the following : 2×10

   a) Define the dimension of a vector space V and find the dimension of P_2.

   b) Define the linearly dependent set of vectors.

   c) Consider $W = \{(x_1, x_2, ... x_n) \mid x_1 = 0\}$. Prove that W is a subspace of $\mathbb{R}^n(\mathbb{R})$.

   d) Check $T : V_3 \to V_2$ defined by $T(x, y, z) = (x, y)$ is a linear map or not.

   e) Define the nullity of a linear map T where $T : U \to V$.

f) Show that the matrix $\begin{bmatrix} 4 & 9 \\ -8 & 2 \end{bmatrix}$ is a non singular matrix.

g) Find inverse of the matrix

$$\begin{bmatrix} 8 & 7 \\ 1 & 2 \end{bmatrix}$$

h) If G is a group then prove that :

$(a \cdot b)^{-1} = b^{-1} \cdot a^{-1}$.

i) Define a quotient group.

j) R be a ring . a, b, c $\in$ R then prove that

$a(-b) = -(ab)$.

k) Find all the idempotent elements of Z_4.

l) Define an ideal of a ring R.

Group - B

2. If S is a non empty subset of vectorspace V, prove that [S] – the span of S is the smallest subspace of V containing S. 12

OR

Answer any *two* of the following : 2 × 6

a) A non empty subset S of a vector space V is a subspace of V if $a\alpha + \beta \in S$ for $\alpha, \beta \in S$ and 'a' is a scalar.

b) If U and W are two subspaces of a vectorspace V, then prove that $U \cap W$ is a subspace of V.

c) In a vector space V, if $\{v_1, v_2, \ldots\ldots v_n\}$ generates V and if $\{w_1, w_2 \ldots\ldots, w_m\}$ is linearly independent then $m \leq n$.

3. Consider $T : U \to V$ be a linear map then prove that

i) If T is one-one and $u_1, u_2, \ldots\ldots u_n$ are LI vectors of U then $T(u_1), T(u_2), \ldots\ldots T(u_n)$ are LI.

ii) If $v_1, v_2, \ldots\ldots v_n$ are LI vectors of R(T) and $u_1, u_2, \ldots\ldots u_n$ are vectors of U s.t. $T(u_1) = v_1$, $T(u_2) = v_2$, $\ldots\ldots$ $T(n_n) = v_n$ then $u_1, u_2, \ldots\ldots u_n$ are LI. 12

OR

Answer any *two* of the following : 2×6

a) $T : U \to V$ is a linear map then T is one-one iff N(T) is the zero space, $\{O_u\}$ of U.

b) Let $T : U \to V$ be a non singular linear map then prove that $T^{-1} : V \to U$ is a linear, one-one and onto map.

c) Consider $T : V_2 \to V_2$ defined by $T(x_1, x_2) = (x_1, -x_2)$. Find R(T), N(T) and check whether T is one-one and onto map.

4. Find the eigen values, eigen vectors corresponds to each eigen value of the following matrix :

$$\begin{bmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ 3 & 2 & 0 \end{bmatrix}$$ 12

OR

Answer any *two* of the following : 2×6

a) Determine the matrix $(T : B_1, B_2)$ for the linear map T defined by $T : V_3 \to V_3$ where

$$T(x_1, x_2, x_3) = (x_1 + x_2, x_2 + x_3, x_3 + x_1)$$

and $B_1 = \{e_1, e_2, e_3\}$

$B_2 = \{e_1, e_2, e_3\}$, the standard basis.

b) Determine the Rank of the following matrix :

$$\begin{bmatrix} 2 & 1 & -1 \\ 1 & 2 & 0 \\ 1 & -1 & -1 \end{bmatrix}$$

c) Solve the following system of linear equation by using the row reduction method :

$$x - y + z = 0$$

$$2x + y - 3z = 1$$

$$-x + y + 2z = -1.$$

5. If G is a finite group and H is a subgroup of G then prove that $O(H) \mid O(G)$. 12

OR

Answer any *two* of the following : 2×6

a) If every element is its own inverse in a group G then show that G is abelian.

b) If N is a normal subgroup of G then show that $gNg^{-1} = N \; \forall \; g \in G$.

c) If ϕ is a homomorphism, $\phi : G \to \overline{G}$ then show that

i) $\phi(e) = \overline{e}$

ii) $\phi\left(a^{-1}\right) = (\phi(a))^{-1}$

6. Prove that A non empty subset S of a ring R is a subring of R iff S is closed under substraction and S is closed under multiplication. 12

OR

Answer any *two* of the following : 2×6

a) If U is an ideal of ring R, and $1 \in U$ then prove that $U = R$.

b) If unity element exist in a ring R then prove that it is unique.

c) Prove that every ideal of a ring R is a subring of R.

□□

6. State and prove (i) Linearity property (ii) Shifting property of Fourier Transform. 5+5

OR

Apply Fourier Transform to solve one dimensional wave equation

$$\frac{\partial^2 u}{\partial t^2} = c^2 \frac{\partial^2 u}{\partial x^2}$$

for a string at rest at $t = 0$, but has displacement $f(x)$ for $-\infty < x < \infty$. 10

❑❑

2018

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions from both groups

Group - A

1. Answer any ***five*** of the following : 2×5

   a) If w is a cube root of uniy then prove that

   $$(1 - w)^6 = -27.$$

   b) If $u = x^2 - y^2$, find the corresponding analytic function.

   c) Find Taylor Expansion of $f(z) = e^z$ about $z = a$.

   d) Find Fourier sine transform of e^{-ax}.

   e) Find Laplace Transform of cos at.

   f) Find the Inverse Laplace Transform of

   $$\frac{s^2 + 3s + 4}{s^3}$$

g) Prove the change of scale property of Fourier Transform.

Group - B

2. State and prove De Moivre's theorem. Use it to solve $x^4 + i = 0$. 2+4+4

OR

Answer any *two* of the following : 2×5

a) Show that the function $e^x(\cos y + i \sin y)$ is analytic function. Find its derivative.

b) Find the Modulus and principal argument of complex number $1 + \cos\theta + i \sin\theta$.

c) Discuss the analyticity of $f(z) = z\bar{z}$

3. State and prove Cauchy's Residue Theorem. Evaluate

$$\int_0^{2\pi} \frac{d\theta}{(5-3\cos\theta)}$$

using Residue theorem. 6+4

OR

Obtain Laurent's expansion of Complex Function f(z). 10

4. State and prove Fourier Integral Theorem. 10

OR

Find Fourier Transform of the function

$$f(t) = \begin{cases} 2, & -1 < t < 1 \\ 1, & -2 < t < -1 \\ 1, & 1 < t < 2 \end{cases}$$ 10

5. a) Find Laplace Transform of Dirac-Delta Function. 4

b) Find Laplace Transform of $te^{-t}\sin 2t$. 4

c) State the linearity property of Laplace Transform. 2

OR

State and prove Convolution Theorem for Laplace Transform. Find Inverse Laplace Transform of $\frac{1}{s(s^2 + a^2)}$ using convolution theorem. 6+4

2018

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer ***all*** questions from both groups

Group - A

1. Answer any ***five*** of the following : 2×5

   a) State Bohr's correspondence principle.

   b) Write the expression for Compton Wavelength. What is its value.

   c) What is Heisenberg's Uncertainty relation of position and momentum.

   d) State characteristics of Nuclear force.

   e) Define Half life. How is it related to mean life ?

   f) What are Magic Numbers ? Why are they called so ?

   g) Find the De-Broglie Wavelength of an electron of energy.

Group - B

2. State the postulates of Bohr's Atomic Model. Derive the expression for radius and energy of electron in n^{th} orbit of Hydrogen atom. 2+4+4

OR

Write short notes on the following : 5+5

i) Alpha particle scattering experiment

ii) Ritz Rydberg combination principle.

3. Describe Davisson Germer Experiment which confirmed Wave Nature of electron. 10

OR

What is photoelectric effect. State the laws of photoelectric effect. Discuss Einstein's theory of photoelectric effect. 1+3+6

4. Derive the position Momentum Uncertainty Relation using diffraction of electron through a slit. Explain why electron is not constituent of Nucleus. 6+4

OR

Write short notes on the following : 4+6

i) Wave particle duality

ii) Estimation of Ground state Energy of Hydrogen Atom.

5. Discuss the essential features of Nuclear Shell model. How was it successful in explaining magic numbers. 4+6

OR

Write short notes on the following : 5+5

i) Liquid drop model

ii) Binding Energy.

6. Discuss the law of successive disintegration in radioactivity. Hence find the conditions for secular equilibrium and transient equilibrium. 6+2+2

OR

Write short notes on the following : 5+5

i) Nuclear Fission

ii) Neutrino and its properties.

□□

Discuss the use of operational amplifier (OP-AMP) as (i) Inverting and Non inverting amplifiers (ii) Adder (iii) Subtractor (iv) Differentiator. 2+2+2+2+2

2018

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer ***all*** questions from both groups

Group - A

1. Answer any ***five*** of the following : 2×5

   a) What do you mean by depletion layer in a P-N Junction ?

   b) Draw a neat circuit diagram of Full Wave Bridge Rectifier.

   c) Find the relation between α and β in case of a transistor.

   d) What is meany by Gain in Amplifiers with feedback ?

   e) Give the characteristics of an ideal operational amplifier.

   f) What is a solar cell ? How does it work ?

g) In a CE transistor connection, find amplification factor if I_C - 1mA and $I_B = 10\ \mu A$.

Group - B

2. What is a P-N junction ? Discuss the formation of Barrier in PN junction diode and explain current flow mechanism in forward and reversed Biasing of the P-N Junction. 2+3+5

OR

What do you mean by N and P type semiconductors ? How are they formed ? Draw their Energy level diagram and discuss about their conductivity and mobility. 2+2+2+4

3. What is a Rectifier ? Obtain the expression for Ripple Factor and Rectification Efficiency of a Full Wave Rectifier. 10

OR

Write short notes on any *two* : 5+5

i) Zenor Diode

ii) LED

iii) Half Wave Rectifier.

4. With a neat circuit diagram draw different characteristics of NPN Transistor in CB Mode. 2+4+4

OR

Discuss the DC load line Analysis of Transistor and hence explain Q-point. 10

5. With a neat h-parameter Equivalent Circuit, obtain expressions for input and output impedance, current and voltage gain of single stage CE amplifier. 2+2+2+2+2

OR

With a neat circuit diagram describe the construction and working of two stage RC Coupled Amplifier. 2+3+5

6. Obtain Barkhausen's criteria for sustained Oscillations. Describe the working of Colpitts Oscillator with the help of a neat circuit diagram. 3+2+5

OR

2018

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer ***all*** questions from both groups

Group - A

1. Answer any ***five*** of the following : 2×5

   a) At what temperature, the RMS speed of hydrogen will be double its value at 0^0C ?

   b) State any two properties of Black Body Radiation.

   c) What do you mean by Ordinary and Extra Ordinary Rays.

   d) State Heisenberg's Uncertainty Principle.

   e) Show that $\beta = \frac{\alpha}{1-\alpha}$ in case of Transistor.

   f) State the principle of equipartition of energy.

   g) Define Ionisation and Excitation potential.

Group - B

2. Write Maxwell-Boltzmann's formula for distribution of molecular speed and hence discuss average, RMS and most probable speed. 2½+2½+2½+2½

OR

Derive Claussius-Clapeyron's equation and discuss the result. 7+3

3. Derive Planck's law of Blackbody Radiation. Hence obtain Wien's law and Rayleigh-Jeans law from Planck's law. 6+2+2

OR

Write short notes on the following : 5+5

i) Ingen-Hausz experiment

ii) Kirchhoff's law.

4. What is Nicol prism ? Discuss it's construction, working and its use as analyzer and polarizer. 2+2+3+3

OR

Write short notes on any *two* of the following : 5+5

i) Circularly and elliptically polarised light

ii) Properties of Electromagnetic Waves

iii) Linear Accelerator.

5. What is Compton Effect ? Derive an expression for the Compton shift and find the value of Compton wavelength. 2+7+1

OR

What do you mean by Wave Function ? Derive Time dependent Schrodinger's equation in one dimension. Extend it to three dimension. 2+6+2

6. What is a Rectifier ? Find the expression for efficiency and ripple factor of Full Wave Rectifier. 2+8

OR

Solve Schrodinger's one dimensional time Independent Equation for potential step when $E < V_0$ and find expression for Reflection and Transmission Coefficients. 10

□□

Write short notes on any *two* : 5 × 2

a) Induced-fit theory of Enzyme action

b) Iso Enzymes

c) Enzyme Inhibition.

2018

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions from both groups

Group - A

1. Answer any *five* of the following : 2 × 5

a) Oxidative deamination

b) Competitive inhibition of Enzymatic activity

c) Struture and Properties of Polysaccharides

d) Hexose Monophosphate Shunt

e) Active sites of Enzyme

f) Glycogenesis

g) Utilization of Ketone bodies inside body tissue.

Group - B

2. Describe the principles of Chromatography. What are the techniques and application of paper Chromatography. 10

OR

Write short notes on any *two* : 5 × 2

a) Centrifugation

b) Structure of amino acids

c) Steroids.

3. Briefly discuss the various steps of T.C.A. cycle. Give the Energy budget of the cycle. 10

OR

Write short notes on any *two* : 5 × 2

a) Uronic Acid Pathway

b) Glucogenesis

c) Glycolysis.

4. Give the process and regulation of Ketogenesis. 10

OR

Write short notes on any *two* : 5 × 2

a) β-oxidation of Fatty Acid

b) Synthesis of Palmitic Acid

c) Synthesis of triacyl glycerols.

5. Give the outlines of Urea cycle and its regulation. Add a note on the metabolic disorder of the cylce. 10

OR

Write short notes on any *two* : 5 × 2

a) Trans-amination of amino acids

b) Phenyl Keto Urea (PKU)

c) Glucogenic amino acids.

6. Give the factors that affect Enzymatic activity. Derive an expression for Michaelis-Menten Equation. 10

OR

2018

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer ***all*** questions from both groups

Group - A

1. Answer any ***five*** of the following : 2×5

   a) Mycoplasma

   b) Metastasis

   c) Gap junctions

   d) Lysosomes

   e) Types of Cell Receptors

   f) Structure of Nucleus

   g) Rough Endoplasmic Reticulum.

Group - B

2. Give an illustrative account of a generalised Animal Cell with the functions of it's subcellular organelles. 10

OR

Describe some important models of Plasma Membrane. 10

3. Enumerate the structure and functions of Endoplasmic Reticulum (ER). 10

OR

Give the E.M. structure of Mitochondria with it's functions. 10

4. Give the ultra structure of Nucleolus and add a note on it's functions. 10

OR

Give the structure and function of Microtubules. 10

5. What is cell signalling ? Give the mechanism of intracellular signalling. 10

OR

Give an account of the Cell cycle and its regulatory mechanism. 10

6. Give the mechanism of Extrinsic pathway during Apoptosis. 10

OR

Write down the characteristic features of a Cancer cell. 10

□□

2018

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer ***all*** questions from both groups

Group - A

1. Write short notes on any ***five*** : 2×5

   a) Sex limited characters

   b) Complete linkage

   c) Translocation

   d) Chromosomal Maps

   e) Co-dominance

   f) Maternal effects

   g) Multiple allels

Group - B

2. What is Interaction of genes ? Give the different types of gene interactions with suitable examples. 10

OR

Give the Mendel's principles of Inheritance.

3. What is Crossing Over ? Give the Molecular Mechanism of Crossing Over. 10

OR

What is Linkage Map in Chromosomal Map ? How the sequence of linked genes in determined from the study of test cross.

4. What is Aneuploidy ? Give the aneuploid variations in human beings along with the Morphological and Genetic Effects. 10

OR

What are Mutagens ? Give different classes of Mutagens with their Biological Effects.

5. Give the Chromosomal Mechanisms of Sex determination in Animals. 10

OR

What is Sex Linkage ? Describe χ-linked inheritance of the Eye colour in Drosophila.

6. Define extrachromosomal inheritance. Discuss the effects of plasmagenes in the inheritance of Streptomycin resistance in Chlamydomonas. 10

OR

Give the Mitochondrial Mutation and their effects on the causative factor of human diseases.

□□

2018

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer ***all*** questions from both groups

Group - A

1. What do you mean by the following : 10 × 2

(Answer any ***ten***)

a) Input tax credit

b) Small service provider

c) Reverse tax mechanism

d) Negative list of service

e) CENVAT

f) Best judgement assessment

g) Countervailing duty

h) Turnover tax

i) Mega exemption notification

j) Composition Scheme

k) Antidumping duty

l) e-payment under excise.

Group - B

2. Discuss the rules regarding place of taxation under service rules. 12

OR

State the provisions relating to registration of person who is liable to pay service tax. 12

3. Discuss the provisions for valuation of taxable service. 12

OR

Explain the rules regarding payment of service tax and filling of return. 12

4. Explain the different methods of computation of value added tax with suitable examples. 12

OR

What is input tax credit ? What are it's features. What are the conditions for claiming input tax credit ? 2+5+5

5. What is Excise duty ? Who are liable to pay Excise duty ? Discuss the merits and demerits of Excise duty. 2+4+6

OR

What do you mean by CENVAT ? What are it's special features ? Explain the advantages of CENVAT. 2+4+6

6. What is custom duty ? Discuss the different types of custom duty. 3+9

OR

Discuss the provisions of custom act relating to Baggage. 12

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2018

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer ***all*** questions from both groups

Group - A

1. Answer any ***ten*** of the following : 2×10

   a) Give any two objectives of Cost Account.

   b) What is variable cost ?

   c) What do you mean by Store Ledger ?

   d) What is re-ordering level ?

   e) What do you mean by fringe benefit ?

   f) Define job costing.

   g) What is apportionment of overheads ?

   h) What do you mean by by-product ?

   i) What is flexible budget ?

j) Define standard cost.

k) What is P/V ratio.

l) What do you mean by under-absorption of overheads.

Group - B

2. Mr. Gopal furnishes the following data relating to the manufacture of a product during the month of April 2017 :

Raw material consumed	Rs.15,000
Direct labour charge	Rs.9,000
Machine hours worked	900
Machine hour rate	Rs.5
Administrative overhead	20% on works cost
Selling overheads	Re.0.50 per unit
Unit produced	17100 unit
Unit sold	16000 at the rate of Rs.4/unit

You are required to prepare a cost sheet from the above showing (a) cost of production per unit (b) profit per unit sold. 12

OR

What do you mean by valuing of material issue. Give a comparative study of FIFO and LIFO methods to valuing material issue. 4+8

3. What do you mean by labour turn over ? What are it's causes ? What are the effects of labour turnover ? 2+5+5

OR

In a factory, there are two service departments S_1 and S_2 and three production departments P_1, P_2 and P_3. In April 2017 the department expenses were as follows :

Department	P_1	P_2	P_3	S_1	S_2
Rs.	6,50,000	6,00,000	5,00,000	1,20,000	1,00,000

The service department expenses were allocated on perentage basis as follows :

Service department	Production department			Service department	
	P_1	P_2	P_3	S_1	S_2
S_1	30	40	15	--	15
S_2	40	30	25	5	--

Prepare a statement showing the distribution of the two service department's expenses to the three production department. 12

4. Why it is necessary to reconcile the profit shown by the Cost Account and Financial Account. Explain the reasons of disagreement in profit in financial account and cost account. 3+9

OR

In a factory the product passes through two processes A and B. A loss of 5% is allowed in Process A and 2% in Process B, nothing being realised by the disposal of wastage.

During March 2016, 10,000 units of material costing Rs.6 per unit were introduced in Process A. The other costs are :

	Process A (Rs.)	*Process B* (Rs.)
Material	--	6,140
Labour	10,000	6,000
Overheads	6,000	4,600

The output was 9,300 units in Process A and 9,200 units in Process B, which were transfered to the warehouse. 8000 units of finished product were sold @ Rs.15 per unit. The selling and distribution expenses were Rs.2 per unit.

Prepare (i) Process Accounts, (ii) A statement of Profit and Loss for March 2016, assuming there were no opening stocks of any type. 12

5. For production of 10,000 Electrical Irons, following are budgeted expenses :

	Per unit (Rs.)
Direct material	60
Direct labour	30

Variable overheads	25
Fixed overhead (1,50,000)	15
Variable expense (Direct)	5
Selling Expenses (10% fixed)	15
Administrative expenses (Rs.50,000 fixed for all level of production)	5
Distribution expense (20% fixed)	5
Total cost of sale	160

Prepare a budget for production of 6,000 and 8,000 irons. 12

OR

What do you mean by variance analysis. Explain material cost variance with suitable example. 3+9

6. What do you mean by Break even point ? How it is calculated ? 4+8

OR

Go-fact Co. Ltd. furnishes the following informations relating one of its product :

	Rs.
Selling price per unit	100
Variable cost per unit	50
Total fixed cost	1,00,000

Calculate :

a) Break even points

b) P/V ratio

c) Sales required to earn a profit of Rs.50,000

d) New selling price when the selling price is reduced by 10%. 12

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3015K031

IV-UG-Com-GE-B_2

2018

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer ***all*** questions from both groups

Group - A

1. Answer any ***ten*** of the following in one or two sentences each : 2×10

   a) Human Development Index

   b) Import Substitution

   c) Liberalisation

   d) Global Warming

   e) NITI Aayog

   f) National Income

   g) Service Sector

   h) Dualistic Economy

   i) Sex composition

j) NABARD

k) Poverty

l) Special Economic Zones.

Group - B

2. What do you mean by Under development ? Explain basic features of an under-developed econom 12

OR

What is Economic Development ? Explain various obstacles or constraints on Economic Development.

3. Discuss Economic Conditions of india at the time of Independence. 12

OR

Explain the forms of Colonial exploitation in India and its consequences.

4. Discuss various achievements and failure of Indian Planning. 12

OR

Discuss various policy measures of New Economic Reforms and its impact on Indian Economy.

5. Discuss various causes of unemployment in India. Explain remedial measures undertaken by Government of India. 12

OR

Discuss various demographic features of India's Population.

6. Discuss various factors influencing productivity and growth in Indian Agriculture along with remedial measures taken by Government. 12

OR

Write notes on the any *two* of the following :

a) Public Sector in India

b) Composition and direction of India's Export

c) Role of Foreign Trade in India.

□□

OKC

IV-UG-[illegible] (SEC)-II (Arts/Sc/Com)

2018

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer ***all*** questions from both groups

Group - A

1. Write short notes on any ***ten*** of the following within two sentences each : 2×10

   a) CPU

   b) RAM

   c) Application Software

   d) Software

   e) LAN

   f) Topology

   g) Hardware

   h) WWW

   i) Downloading

j) Web Browser

k) Website

l) E-mail.

Group - B

2. Explain the basic organisation of Computer with Block Diagram. 12

OR

Discuss different Input and Output devices.

3. What are the different types of software. 12

OR

What is an Operating System. Discuss its different functions.

4. What is Programming Language. Discuss different types of languages. 12

OR

What is service on utility software. Explain the difference between Interpreter and Compiler.

5. What is Topology and discuss different types of Topology. 12

OR

What is ISP and discuss its role.

6. What is E-mail and discuss its different features. 12

OR

What is Internet. Explain its different features in Today's Technology.