४। द्वयो: संक्षिप्तटिप्पणी प्रदेया । (५ × २

(क) मध्यदेश:

(ख) धर्मस्यलक्षणम्

(ग) यज्ञियदेश:

५। आयुर्वेददृष्ट्या द्रव्याणां वर्गीकरणमेलोचयत । (१५

अथवा

फलिनी औषधिनां गुणं कार्यञ्च आलोचयत ।

६। द्वयो: संक्षिप्तमुत्तरं प्रदेयम् । (५ × २

(क) लवणानि कतिविधा ?

(ख) पित्तस्य क: गुण: ?

(ग) श्लेष्मण: क: गुण: आलोचयत ।

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

१। त्रयी विद्याया: महत्त्वम् आलोचयत । (१५

अथवा

बृद्ध संयोगस्य का आवश्यकता आलोचयत ।

२। त्रयाणां प्रश्नानां संक्षिप्तमुत्तरं प्रदेयम् । (५ × ३

(क) कथम् आन्विक्षिकी सर्वविद्या प्रधानम् ?

(ख) कथम् अमात्योत्पत्ति: भवात् ?

(ग) का वर्त्ताविद्या आलोचयत ।

(घ) कथम् इन्द्रियजय: करणीय ?

३। मनुस्मृत्यानुसारम् उपनयनसंस्कारं वर्णयत । (१५

अथवा

''वेदोखिल धर्ममूलम्'' मनुस्मृत्यानुसारं प्रतिपादयत ।

(খ) গ্রামস্য পূর্বাদিদিক্ষু বিবিধবাসবিচারং আলোচয়ত ।

(গ) ভূমেঃ জীবিতমৃতাদিলক্ষণং যথাগ্রন্থম্ আলোচয়ত ।

৪। প্রশ্নত্রয়ম্ সমাধেয়ম্ । (৫ × ৩

(ক) কঃ এব মুখ্যঃ গৃহস্থঃ ?

(খ) কা নিষিদ্ধাভূমিঃ ?

(গ) ভূমিশুদ্ধিঃ কথং কুর্যাত্ ?

(ঘ) শূদ্রাণাং কৃতে কা ভূমিঃ প্রশস্তা ?

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

১। প্রশ্নদ্বয়স্য উত্তরং প্রদেয় । (১২$\frac{১}{২}$ × ২

(ক) গ্রহাণাং জাতি-বর্ণ-প্রকৃতি-রূপ লক্ষণানি প্রতিপাদয়ত ।

(খ) রাশিবিষয়কতথ্যং যথাগ্রন্থং প্রতিপাদয়ত ।

(গ) লগ্নাদিভাবানাং সংজ্ঞাং নিরূপয়ত ।

২। প্রশ্নত্রয়ম্ সমাধেয়ম্ । (৫ × ৩

(ক) কিং তাবত্ হোরাশস্ত্রম্ ?

(খ) রবিগ্রহস্য স্বরূপং লিখত ।

(গ) মঙ্গলগ্রহস্য স্বরূপং লিখত ।

(ঘ) জাতকস্য উপরি গ্রহস্য প্রভাবং প্রতিপাদয়ত ।

৩। প্রশ্নদ্বয়স্য উত্তরং প্রদেয় । (১২$\frac{১}{২}$ × ২

(ক) গৃহ-গৃহস্থস্য মহত্ত্বং যথাগ্রন্থং প্রতিপাদয়ত ।

अथवा

अधिगतपरमार्थान् पण्डितान्मापसंस्था-
स्तृणमिव लघुलक्ष्मीनैव तान् संरुणद्धि ।
अभिनवमदलेखाश्यामगण्डस्थलानां
न भवति विसतन्तुर्वारणं वारणानाम् ।।

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

१ । चतुर्णां श्लोकानां व्याख्यां कुरुत । (८ × ४

(क) दुष्टा भार्या शठं मित्रं भृत्यश्चोत्ररदायकः ।
ससर्पे च गृहे वासो मृत्युरेव न संशयः ।।

(ख) धनिकः श्रोत्रियो राजा नदी वैद्यस्तु पञ्चमः ।
पञ्च यत्र न विद्यते न तत्र दिवसं वसेत् ।।

(ग) जानीयात् प्रेषमे भृत्यान् बान्धवमान् व्यसनेगमे ।
मित्रं चापत्तिकालेउ भार्यां च विभक्षिये ।।

(घ) नखीनाञ्च नदीनीञ्च शृङ्गीणां शस्त्रपाणीकाम् ।
विश्वासो नैव कर्त्तव्यः स्त्रीषु राजकुलेषु ।।

(ङ) ते पुत्रो ये पितुर्भक्ताः स पिता यस्तु पोषाकः ।
तन्मित्रं यस्य विश्वासः सा भार्या यत्र निर्वृतिः ।।

(च) कष्टं च खलु मूर्खत्वं कष्टं च खलु यौवनम् ।
कष्टात्कष्टतरं चैव परगेहनिवेसनम् ।।

२। चतुर्णां श्लोकानां व्याख्यां कुरुत । (८ × ४

(क) लभते सिकतासु तैलमपि यन्ततः पीड़नम् ।
पिवेच्च मृगतृष्णिकासु सलिलं पिपासार्दितः ।
कदाचिदपि पर्यटन्शराविषाणमासादयेत् ।
न तु प्रतिनिविष्टमूखर्चित्तमाराधयेत् ।।

(ख) स्वायत्तमेकान्तगुणं विधात्रा
विनिर्मितं छादनज्ञतायाः ।
विशेषतः सर्वविदां समाजे
विभूषणं मौनमपण्डितानाम् ।।

(ग) साहित्यसंगीत कलाविहीने
साक्षात्पशुः पुच्छविषाणहीनः ।
तृणं न खादन्नपि जीवमान
स्तद्भागधेयं परमं पशूनाम् ।।

(घ) येषां न विद्या न तपो न दानं
ज्ञानं न शीलं न गुणा न धर्मः ।
ते भर्त्यलोके भूवि सारभूता
मनुष्यरूपेण मृगाश्चरन्ति ।।

(ङ) अमभोंजिनीवननिवासविलासमेव
हंसस्य हन्ति नितरां कुपितो विधाता ।
न स्वस्य दुग्धजलभेदविधौ प्रसिद्धां
वैदग्ध्यकीर्त्तिमपहर्त्तुमसौ समर्थः ।।

(च) जाड्यं धियो हरति सिञ्चति वाचि सत्यं
मानोन्नतिं दिशति पापमपाकरोति ।
चेतः प्रसादयति दिक्षु: तनोति कीर्त्तिं
सत्संगतिः कथय किं न करोति पुंसाम् ।।

३। उत्कलभाषया आङ्गलोभाषया वा अनुवादः कार्यः । (८ × ८

(क) आपदर्थे धनं रक्षेच्छ्रीमता कुत आपदः ।
कदाचिच्चलिता लक्ष्मीः सञ्चिताऽपि विनश्यति ।

अथवा

स्त्रीणां द्विगुणमाहारो बुद्धिस्तासां चतुर्गुणाः ।
साहासः षड्गुणश्चैव कामश्चाष्टगुणः स्मृतः ।।

(ख) यां चिन्तयामि सततं मयि सा विरक्ता
साऽण्यन्यमिच्छति जनं स जनोऽन्यसक्तः ।
अस्मत् कृते च परिशुष्यति काचिदन्या
धिक् तां च तं च मदनं च इमां च मां च ।।

2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.
Draw labelled diagrams wherever necessary.

GROUP - A

1. Write short notes on any five of following in two to five sentences each. [2 × 5

   (a) Chlorophull

   (b) Allosteric enzymes

   (c) Triglycerides

   (d) Photolysis of water

   (e) Transamination

   (f) Anaerobic respiration

   (g) NAD

GROUP - B

*Answer **ALL** questions.*

2. What do you mean by metabolism ? Describe anabolic, catabolic pathways and their regulation. [10

OR

Write notes on any <u>two</u> of the following. [5 × 2

(a) Isoenzymes

(b) Synthesis of starch

(c) Sucrose degradation

3. Write Crassulacean acid metabolism and discuss its significance. [10

OR

Write notes on any <u>two</u> of the following. [5 × 2

(a) Cyclic photophosphorylation

(b) Factors of CO_2 reduction

(c) C_4 pathway

4. Discuss the process of aerobic oxidation of Pyruvic acid. [10

OR

Write notes on any <u>two</u> of the following. [5 × 2

(a) Pay off phase of glycolysis

(b) Oxidative phosphorylation

(c) Boyer's confomational model

5. Describeglyoxyolate cycle and discuss its significance. [10

OR

Write notes on any <u>two</u> of the following. [5 × 2

(a) β-oxidation

(b) Biosynthesis of fatty acids

(c) Gluconeogenesis

6. Write in brief the biological nitrogen fixation in non-Legumes. [10

OR

Write notes on any <u>two</u> of the following. [5 × 2

(a) Process of nodule formation in Legumes

(b) Signal transduction pathway

(c) Nitrate assimilation

2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.
Draw labelled diagrams wherever necessary.

GROUP - A

1. Write short notes on any five of following within two sentences each. [2 × 5

   (a) Androgenesis

   (b) Cryopreservation

   (c) Cosmid

   (d) Gene cloning

   (e) PCR

   (f) Bt genes

   (g) Hunulin

GROUP - B

*Answer **ALL** questions.*

2. Write about the historical perspective of tissue culture. [10

OR

Write notes on : [5 × 2

(a) Aseptic tissue culture technique

(b) Nutrients requirements of medium

3. Explain the process of protoplast fusion and its role. [10

OR

Write notes on : [5 × 2

(a) Somatic embryogenesis

(b) Germplasm conservation

4. Describe the various steps of gene cloning. [10

OR

Write notes on : [5 × 2

(a) Nomenclature of restrtiction enzyme

(b) Cloning vectors

5. Give an account of gene transfer by electroporation and micro-projectile bombardment method. [10

OR

Write notes on : [5 × 2

(a) Gene Construct

(b) Selection of transgenics

6. Explain the application of biotechnology with suitable examples. [10

OR

Write notes on : [5 × 2

(a) Edible vaccines

(b) Pests resident crops

2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.
Draw labelled diagrams wherever necessary.

GROUP - A

1. Write short notes on any five of following within two sentences each. [2 × 5

   (a) Variable

   (b) Random sample

   (c) Mean deviation

   (d) Degrees of freedom

   (e) Meaning of correlation

   (f) Linear regression

   (g) Mode

GROUP - B

*Answer **ALL** questions.*

2. Define biostatistics and write down its important functions. [10

OR

Write notes on : [5 × 2

(a) Statistical methods

(b) Variable measurements

3. Write a note on different basis of classification of data. [10

OR

Write notes on : [5 × 2

(a) Classification of data

(b) Presentation of data

4. Calculate the standard deviation of the following data obtained from the garden. [10

No. of flowers/plant	Frequency
3	1
4	3
5	2
6	8
7	2
8	8
9	1

OR

Write notes on : [5 × 2

(a) Median

(b) Coefficient of variation

5. Give an account of types of correlation and the methods of studying it. [10

OR

Write notes on : [5 × 2

(a) Comparison of correlation and regression

(b) Utility of correlation

6. In a monohybrid test, it was observed that out of 320 rice plants, 230 awned seed plant and 90 awnless seed plants. Test the hypothesis through Chi-square test. ($\chi^2 = 3.84$) [10

OR

Write notes on : [5 × 2

(a) Goodness of fit for Chi-square test

(b) Test of hypothesis

2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.
Draw labelled diagrams wherever necessary.

GROUP - A

1. Answer any five. [2 × 5

   (a) What are antigens ?

   (b) What is avidity ?

   (c) What are interferons ?

   (d) Explain opsonisation.

   (e) Write the functions of lymph nodes.

   (f) What are super antigens ?

   (g) What are DNA vaccines ?

   (h) Explain inflammation.

   (i) What are chimeric antibodies ?

   (j) Explain immunoelectrophoresis.

   (k) What is ELISA ?

GROUP - B

*Answer **ALL** questions.*

2. What is innate immunity ? Discuss about different types of elements in innate immunity. [10

OR

Write notes on any two of the following. [5 × 2

(a) Cells of immune system

(b) Adaptive immunity

(c) Active and passive immunity

3. How immunogenicity is different from antigenecity ? Discuss the requirements for immunogenicity. [10

OR

Write notes on any two of the following. [5 × 2

(a) Features of B-cells

(b) Features of T-cells

(c) Adjuvants and Haptens

4. Discuss briefly the structure and functions of different classes of immunoglobulins. [10

OR

Write notes on any two of the following. [5 × 2

(a) Monoclonal antibodies

(b) RIA

(c) Immunodiffusion

5. Discuss both endogenous and exogenous pathway of antigen presentation. [10

OR

Write notes on any two of the following. [5 × 2

(a) MHC molecules

(b) Complement System

(c) Pathways of complement activation

6. What is hypersensitivity ? Describe in brief about various types of hypersensitivities. [10

OR

Write notes on any two of the following. [5 × 2

(a) Therapeutical values of Cytokines

(b) Cytokines produced by macrophages

(c) Recombinant vector vaccines

2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.
Draw labelled diagrams wherever necessary.

GROUP - A

1. Answer any five questions. [2 × 5

   (a) What are coacervates ?

   (b) Explain survival of the fittest.

   (c) Explain hybrid sterility.

   (d) What are sibling species ?

   (e) What is Baldwin's effect ?

   (f) Explain convergent evolution.

   (g) What is sexual selection ?

   (h) What are altered fossils ?

   (i) What are corporites ?

   (j) Write about the place of origin of horses.

(k) Explain struggle for existence.

(l) Explain somatic variation with example.

GROUP - B

*Answer **ALL** questions.*

2. Write an essay on Neo-Darwinism. [10

OR

Write notes on any two of the following. [5 × 2

(a) Lamarckism

(b) Chemogeny

(c) Extinction

3. Give an account of evolution of man. [10

OR

Write notes on any two of the following. [5 × 2

(a) Eocene horses

(b) Trends od evolution of horse

(c) Dating of fossils

4. Discuss briefly the various causes of variation and add a note on its significance. [10

OR

Write notes on any two of the following. [5 × 2

(a) Pre-zygotic isolating mechanisms

(b) Industrial melanism

(c) Types of natural selection

5. Discuss Hardy-Weinberg's law of equilibrium. [10

OR

Write notes on any two of the following. [5 × 2

(a) Gene frequencies

(b) Genetic drift

(c) Gene pool

6. What is speciation ? Discuss different modes of speciation. [10

OR

Write notes on any two of the following. [5 × 2

(a) Biological species concept

(b) Darwin's finches

(c) Parallel evolution

2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.
Draw labelled diagrams wherever necessary.

GROUP - A

1. Answer any five. [2 × 5

   (a) Write some characteristics of archaea.

   (b) Write some characteristics of Cyanobacteria.

   (c) Write some characteristics of Protista.

   (d) Viral genome

   (e) Viroids

   (f) Prions

   (g) Mycoplasmas

   (h) Amoeebiasis

   (i) Tuberculosis

   (j) Halobacteria

(k) Asexual spores of fungi

(l) Satellite viruses

(m) Adsorption

GROUP - B

*Answer **ALL** questions.*

2. Discuss the most commonly used characteristics in the identification and classification of microorganisms. [10

OR

Write notes on any two of the following. [5 × 2

(a) Eubacteria

(b) Fungi

(c) Viruses

3. Give an account of general morphology and economic importance of bacteria. [10

OR

Write notes on any two of the following. [5 × 2

(a) Myxobacteria

(b) Spheroplasts

(c) Gram-positive bacteria

4. Characterise and classify fungi. [10

OR

Write notes on any two of the following. [5 × 2

(a) General morphology of fungi

(b) Economic importance of fungi

(c) Asexual reproduction in fungi

5. Discuss the replication cycle of bacteriophage. [10

OR

Write notes on any two of the following. [5 × 2

(a) Mycophages

(b) TMV

(c) Oncogenic viruses

6. Discuss the role of microbes in the field of industry and environment. [10

OR

Write notes on any two of the following. [5 × 2

(a) Antibiotics

(b) Chemotherapeutic agents

(c) Role of microbes in food production

2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer any five of following questions. [2 × 5

   (a) Show dimensionally that the Poynting vector represents power density.

   (b) Write down the Maxwell's equation in free space.

   (c) Distinguish between uniaxial and biaxial crystals.

   (d) Explai the term optic axis.

   (e) Compare a single mode and a multi mode step index fibre.

   (f) What is double refraction ?

   (g) Write Integral form of Maxwell equation div **D** = ρ.

GROUP - B

*Answer **ALL** questions.*

2. (a) Write the Maxwell's equations. Explain the physical significance of each equation. [7

(b) Using Maxwell equation curl **H** = **J** + $\frac{\partial \mathbf{D}}{\partial t}$, show that div **D** = ρ. [3

OR

Deduce theoretically Poynting theorem for the flow of energy in an electromagnetic field. [10

3. State Maxwell equation and solve them to obtain the velocity of electromagnetic wave in a homogeneous Isotropic dielectric medium. [2 + 8

OR

Discuss the propagation of plane electromagnetic wave in a conducting medium and obtain phase velocity and refractive index of medium. [6 + 2 + 2

4. Determine the boundary conditions sarisfied by **B**, **H**, **E** and **D** at the interface between two media of different permeability and dielectric constant. [10

OR

Establish the laws of reflection and refraction at the boundary of two dielectric media for a plane wave propagation of an oblique incidence. [10

5. Describe the construction of a Nicol prism. How it can be used as an analyser ? [4 + 6

OR

Discuss the process of production of plane polarized light by reflection. [10

6. Describe how quarter wave and half waves are made. Explain their uses in the study of different types of polarization. [4 + 6

OR

What is specific rotation in optical activity ? On what factors does it depend ? [7 + 3

2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer any five questions. [2 × 5

   (a) Define phase space.

   (b) Show that for diatomic gas at room temperature $\frac{C_P}{C_V} = \frac{7}{5}$.

   (c) Define the term ensemble with example.

   (d) What is ultraviolet catasrophe ?

   (e) What is basic difference between classical and quantum statistics.

   (f) Define Fermi energy.

   (g) Why a gas has two specific heats whereas a solid and a liquid has only one specific heat ?

GROUP - B

*Answer **ALL** questions.*

2. State and prove the law of equipartition of energy. [2 + 8

OR

(a) Derive Sacker tetrode equation. [6

(b) Explain phase space and its division into cells. [4

3. State Stefan's law of radiation and prove it from thermodynamic consideration. [2 + 8

OR

State and derive Rayleigh Jean's law. Compare its results with that of theoretical results obtained from the distribution of energy density. [1 + 7 + 2

4. Derive Planck's formula of energy distribution in black body radiation at an absolute temperature (T). Show that Rayleigh Jean's formula is a particular case of thei law. [7 + 3

OR

Deduce an expression for the rate of flow of heat under steady state in radial direction per unit length of an annular conducting cylinder heated uniformly along the axis. [10

5. Derive an expression for the most probable distribution of particles for a system obeying Bose-Einstein statistics. [10

OR

Starting from basic assumptions derive Fermi Dirac distribution law. [10

6. Discuss Bose-Einstein condensation. How ir differs from ordinary condensation ? [8 + 2

OR

Show that Fermi energy depends upon energy concentration and is independent of size of conductor. [10

2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Write short notes on any five. [2 × 5

   (a) Variable

   (b) Structure

   (c) Arrays

   (d) Algorithm

   (e) Function

   (f) Keyword

   (g) Distinction between executable and non-executable statement

GROUP - B

*Answer **ALL** questions.*

2. Draw a flow chart for root of quadratic equation. [10

OR

Write a program to find the sum of elements on diagonal of a square matrix. [10

3. Write a FORTAN program to find the area of a triangle. [10

OR

What is the difference between internal and external commands of LINUX. Discuss some commands with example. [5 + 5

4. What is I/O statement ? Discuss both the list directed input and output statement with example. [3 + 7

OR

Write a program to enter a number and identify input number is an even or odd number. [10

5. What is control statement ? Discuss about branching statements with example. [3 + 7

OR

Write a program to find all prime numbers between 1 and 100. [10

6. (a) What are GOTO statements ? What is its purpose ? [6

(b) Why is the GOTO statement considered harmful ? [4

OR

(a) Write the difference between function and subroutine. [3

(b) Why are subroutines used ? [2

(c) Write a subroutine to find the sum of two given positive integers. [5

2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

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

   (a) What is Phosgene ? Give its importance.

   (b) How can you distinguish between hydrochloric acid and sulphuric acid by using chemical tests ?

   (c) What is semiconductor ? Give an example.

   (d) What is photochemical smog ?

   (e) Why are enzymes known as biocatalysts ?

   (f) Give two adverse environmental impacts of tidal power generation.

   (g) What is the hydrological cycle and how does it work ?

GROUP - B

*Answer **ALL** questions.*

2. Discuss about the large scale production, uses, storage and hazards in handling of acetylene. [10

OR

(a) Discuss the large scale production of chlorine and sulphur dioxide. [6

(b) Discuss the uses of Argon and Fluorine. [4

3. Discuss about the manufacture, application and hazards in handling bleaching powder and Potassium dichromate. [10

OR

How can you prepare ultrapure metals and how these are used for semiconductor technology ? [10

4. Discuss about air pollution and air pollutants. What are the effects of air pollution on living organisms and vegetation. [10

OR

Write notes on : [5 + 5

(a) Green house effect and global warming

(b) Biological cycle of Carbon

5. Discuss the techniques for measuring water pollution and impacts of water pollution on hydrological and ecosystems. [10

OR

Write notes on : [5 + 5

(a) Industrial effluents and their treatment

(b) Water treatment and purification

6. Discuss about the sources of energy with suitable examples. [10

OR

Write notes on : [5 + 5

(a) Nuclear disaster and its management

(b) Importance of green chemistry

2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

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

   (a) Define Commutative operator.

   (b) Calculate bond orger and state magnetic character of H_2^+ ion by using molecular orbital theory.

   (c) Calculate degree of freedom of –

      (i) Benzene

      (ii) Carbon monoxide

   (d) Define degree of polymerization.

   (e) State Grothus-Droper law.

   (f) Calculate the value of Einstein in KJ/mole of radiation having wavelength 2000 Å.

   (g) What is Rust ? Give its composition.

GROUP - B

*Answer **ALL** questions.*

2. Discuss about particle in a three dimensional box and calculate its energy. [10

OR

What is hybridization ? Calculate the MO coefficients of sp^3-hybrid orbitals. [2 + 8

3. Write notes on : [5 + 5

(a) Born-Oppenheimer approximation

(b) Selection rule

OR

(a) Discuss about vibrational-rotational spectra of diatomic molecule. [5

(b) Discuss anharmonicity and Morse potential. [5

4. Discuss about the mechanism and kinetics of cationic and anionic polymerisation. [10

OR

Write notes on : [5 + 5

(a) Polydispersity Index or PDI

(b) Mechanism and kinetics of co-polymerisation

5. Discuss about fluorescence and phosphorescence with suitable example and diagram. [10

OR

Write notes on : [5 + 5

(a) Quantum yield

(b) Thermal and photochemical processes

6. What is corrosion ? Discuss about chemical corrosion, electrochemical corrosion and concentration corrosion. [1 + 9

OR

What is corrosive agent ? Discuss the different methods of prevention of corrosion. [1 + 9

2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

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

   (a) What is meant by hypsochromic shift ?

   (b) Explain the term 'Auxochrome'.

   (c) State and explain Hooke's law.

   (d) How can you distinguish between $CH_3–CH_3–CHO$ and $CH_3–CO–CH_3$ using IR data ?

   (e) What is the effect of hydrogen bonding on the chemical shift ?

   (f) What do you mean by the base peak ?

   (g) What are the advantages of chromatography over other techniques ?

GROUP - B

*Answer **ALL** questions.*

2. (a) Discuss about the instrumentation of ultraviolet spectroscopy. [6

   (b) Calculate the energy associated with a radiation having wavelength 4000 Å. [4

OR

Write notes on : [5 + 5

(a) Absorption law

(b) Electronic transitions

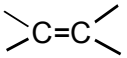
3. (a) Discuss about the basic principles of infrared apectroscopy. [8

   (b) Why is methanol a good solvent for UV but not for IR ? [2

OR

(a) Using IR data, how can you identify the following groups.

(i) –C≡C– [6

(ii) 

(iii) Free –OH group

(iv) Hydrogen bonded –OH group

(v) –CO–

(vi) –CHO

(b) Write notes on vibrational frequency. [4

4. (a) Discuss about NMR spectrum of 1,3-dichloro propane. [6

   (b) Write a note on spin-spin coupling. [4

OR

(a) Discuss the NMR spectrum of ethyl alcohol. [6

(b) Write a note on Shielding mechanism. [4

5. (a) Discuss about parent ion peak and metastable peaks. [6

   (b) Write a note on Mc. Lafferty's rearrangement. [4

OR

(a) The fragmentation of benzene produces peaks at m/e 78, 77, 51 and 39. Identify the base peak and give explanation for the above peaks. [5

(b) 1-butanol gives peaks at m/e 74. 56, 43 and 31. Give explanation in support of these peaks. [5

6. Discuss about paper chromatography and its applications. [10

OR

Write notes on : [5 + 5

(a) Thin layer chromatography

(b) Column chromatography

(d) Evaluate $\int_C \frac{1}{\pi z - 1}$ [6

where C is | z | = 1 described in contour clockwise direction.

6. (a) Expand $\frac{z}{z-3}$ as Taylor's series about z = 1 as centre. [6

(b) By using Maclaurin's series show that [6

$$\sin z = z - \frac{z^3}{3!} + \frac{z^5}{5!} - \ldots\ldots\ldots + (-1)^{n-1} \frac{z^{2n-1}}{(2n-1)!} + \ldots\ldots\ldots$$

where | z | = ∞.

OR

(c) Find the radius of convergence of the series [6

$$\sum_{n=0}^{\infty} \frac{2^{20n}}{n!} (z-3)^n.$$

(d) Develop $f(z) = \frac{2z - 3i}{z^2 - 3iz - 2}$ in a Laurent series which is valid for | z | > 2. [6

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.
The symbols used have their usual meaning.

GROUP - A

1. Answer any ten questions. [2 × 10

(a) Prove that every Cauchy sequence in R is bounded.

(b) Show that arbitrary union of open sets in X is open.

(c) Define Dense sets with an example.

(d) Define the subspace of a Metric space with an example.

(e) Let (X, d) be a metric space and A $\subset$ X. Then $\bar{A}$ is a closed set. Prove.

(f) Using the definition of limit, show that

$$\lim_{z \to 2} \left(\frac{z^2 - 4}{z + 2} \right) = -4.$$

(g) Show that each of these functions is nowhere analytic, $f(z) = e^y e^{ix}$.

(h) Show that $\log(-1 + \sqrt{3}i) = \ln 2 + 2\left(n + \frac{1}{3}\right)\pi i$,

$n = 0, \pm 1, \pm 2, ...$

(i) Show that $\int_{C_0} \frac{dz}{z - z_0} = 2\pi i$.

(j) State MC-inequality.

(k) State Cauchy Integral Theorem.

(l) Sketch the closure of the following sets $|\operatorname{Re} z| < |z|$.

GROUP - B

*Answer **ALL** questions.*

2. (a) Let (X, d) is a metric space and $G \subset X$. Then prove that G is an open set iff it is the union of open spheres. [6

(b) Show that every open sphere in a metric space (X, d) is an open set. [6

OR

(c) State and prove Cantor's Intersection Theorem. [12

3. (a) If (X, d) and (Y, d) be metric spaces and $f : X \to Y$ be a function. Then prove that f is continuous iff $f(\bar{A}) \subset \overline{f(A)}$ for every subset A of X. [6

(b) Let (X, d) be a compact metric space and $T : X \to X$ a contractive map. Then T has a unique fixed point in X. [6

OR

(c) Let (X, d) be a metric space and $Y \subset X$. Then [12

(i) If X is separable, then Y is separable.

(ii) If Y is separable and $\bar{Y} = X$, then X is separable.

4. (a) Prove that [6

$$f(z) = \begin{cases} \dfrac{x^3y^5(x + iy)}{x^4 + y^{10}} & , z \neq 0 \\ 0 & , z = 0. \end{cases}$$

The C–R equations are satisfied at $z = 0$ but not differentiable at $z = 0$.

(b) Prove that $|\exp(-2z)| < 1$ iff $\operatorname{Re} z > 0$. [6

OR

(c) Find number $z = x + iy$ such that $e^z = 1 + i$. [6

(d) Verify that the function is entire

$f(z) = \sin x \cosh y + i \cos x \sinh y$. [6

5. (a) Show that $\int_C \frac{e^{2z}\,dz}{(z-1)^4} = \frac{8\pi i e^2}{3}$, [6

where C is the circle $|z| = \frac{3}{2}$.

(b) Prove that $\left|\int_a^b f(t)dt\right| \leq \int_a^b |f(t)|\,dt$. [6

OR

(c) Show that $\sin h^{-1} z = \ln\left(z + \sqrt{z^2 + 1}\right)$. [6

5. (a) Obtain the optimum basic feasible solution to the following T.P. [12

Factory	Warehouse				Capacity
	W_1	W_2	W_3	W_4	
F_1	19	30	50	10	7
F_2	70	30	40	60	9
F_3	40	8	70	20	18
Required	5	8	7	14	

OR

(b) Find the assignment cost in a maximum cost. [12

	A	B	C	D	E
1	62	78	50	101	82
2	71	84	61	73	59
3	87	92	111	71	81
4	48	64	87	77	80

6. (a) Solve the following games and determine the value of the game [12

Player B

$$\text{Player A} \begin{bmatrix} 15 & 2 & 3 \\ 6 & 5 & 7 \\ -7 & 4 & 0 \end{bmatrix}$$

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.
The symbols used have their usual meaning.

GROUP - A

1. Answer any ten questions. [2 × 10

(a) Define feasible region.

(b) What is slack variable ?

(c) What is standard promal ?

(d) What do you mean by balanced T.P. ?

(e) State Existence Theorem.

(f) How to find a Sadle point ?

(g) Distinguish between T.P. and A. P.

(h) Write the Mathematical model of Linear Programming Problem.

(i) State the Fundamental Duality Theorem.

(j) What is Two-Person Zero-Sum Game ?

(k) What is optimal solution ?

GROUP - B

*Answer **ALL** questions.*

2. (a) Find the maximum value $Z = 2x + 3y$ [6

subject to constraints

$x + y \leq 30$

$x - y \geq 0$

$y \geq 0$

$0 \leq x \leq 20$

$0 \leq y \leq 12$

(b) Find the basic feasible solution of the equations [6

$2x_1 + 6x_2 + 2x_3 + x_4 = 3$

$6x_1 + 4x_2 + 4x_3 + 6x_4 = 2$

OR

(c) Solve the LPP [12

Maximise $Z = 5x_1 - 2x_2 + 3x_3$

subject to the constrants

$2x_1 + 2x_2 - x_3 \geq 2$

$3x_1 - 4x_2 \leq 3$

$x_2 + 3x_3 \leq 3$

$x_1 , x_2 , x_3 \geq 0$

3. (a) State and prove Basic Duality Theorem. [12

OR

(b) Use duality to solve the following LPP. [12

Maximise $Z = 2x_1 + x_2$

subject to $x_1 + 2x_2 \leq 10$

$x_1 + x_2 \leq 6$

$x_1 - x_2 \leq 2$

$x_1 - 2x_2 \leq 1$

$x_1 , x_2 \geq 0$

4. (a) State and prove Fundamental Theorem of Linear Programming. [12

OR

(b) Use two-phase simplex method to [12

Minimise $Z = x_1 + x_2$

subject to $x_1 + 2x_2 \geq 4$

$x_1 + 7x_2 \geq 7$

$x_1 \geq 0, x_2 \geq 0$

[5]

OR

(b) Solve the game whose payoff matrix is given below by graphical method. [12

	B_1	B_2	B_3	B_4
A_1	4	–2	3	–1
A_2	–1	2	0	1
A_3	–2	1	–2	0

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.
The symbols used have their usual meaning.

GROUP - A

1. Answer any ten questions. [2 × 10

   (a) Write equation of Osculating plane.

   (b) Define Involutes.

   (c) Define two parametric family of surfaces.

   (d) Write all second order Fundamental Magnitudes.

   (e) Define derivative of $\hat{n}$.

   (f) Define centre of curvature.

   (g) What is conjugative direction ?

   (h) Define Asymptotic lines.

   (i) Write equation of tangent plane.

   (j) Show that $\tan\psi = \sqrt{\frac{Ka}{Kb}}$.

(k) Prove that for any curve $t'b' = -k\tau$.

(l) Define Gaussina curvature.

GROUP - B

*Answer **ALL** questions.*

2. (a) State and prove Serret Frenet formula. [12

OR

(b) Find the curvature and the torsion of the curve $x = a(u - \sin v)$, $y = a(1 - \cos v)$, $z = bv$. [6

(c) Show that the radius of spherical cutvature of a circular helix is equal to the radius of circular curvature. [6

3. (a) The necessary and sufficient condition for the curve to be a helix is that ratio of curvature and torsion to the curve is constant. Prove. [12

OR

(b) Prove that the tangent to the involute is parallel to the principal normal to the given curve. [6

(c) In order that the principal normal of a curve be binormals of another the relation $a(k^2 + \tau^2) = bk$ must hold, where a and b are constants. [6

4. (a) Find out the required condition under which a surface $z = f(x . y)$ is a developable. [6

(b) Find the edge of regression of the envelope of the family of plane $x \sin\theta - y \cos\theta + z = a\theta$, being the parameter. [6

OR

(c) The normal at a point P of the allipsoid $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$ meets the coordinate plane in G_1, G_2 and G_3. Prove that $PG_1 : PG_2 : PG_3$ are constants. [12

5. (a) State and prove Meunier's Theorem. [12

OR

(b) If L, M, N vanish at all points, then prove that the surface is a plane. [6

(c) Calculate the Fundamental Magnitude of right helicoid given by $x = u \cos\phi$, $y = u \sin\phi$, $z = c\phi$ where c is a constant and u, ϕ are parameters. [6

6. (a) Find the principal direction and the principal curvature on the surface $x = a(u + v)$, $y = b(u - v)$, $z = uv$. [6

(b) Find the asymptotic lines on the surface $z = y \sin x$. [6

OR

(c) Find the principal curvature and line of curvature in a surface given in Monge's form. [12

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Write notes on any ten of following . [2 × 10

   (a) Errors of Commission

   (b) External Audit

   (c) Verification

   (d) Rotation of auditor

   (e) Auditor's Report

   (f) Financial audit

   (g) Management audit

   (h) Appointment of auditor

   (i) EDP equipment

   (j) Agency theory

(k) Corporate scandals

(l) Neo-classical theory

GROUP - B

*Answer **ALL** questions.*

2. Briefly explain the basic principles of auditing. [12

OR

Explain the principle or techniques of vouching. [12

3. What are the duties of a company auditor under Companies Act, 2013 ? [12

OR

Explain the qualifications and disqualifications of an auditor. [6 + 6

4. What is cost audit ? Explain the advantages and disadvantages of cost audit. [2 + 5 + 5

OR

Explain the benefits and demerits of EDP audit. [6 + 6

5. Briefly explain different models of corporate governance. [12

OR

Write notes on : [4 × 3

(a) Narayan Murthy Committee

(b) CII Committee Report

(c) Cadbury Committee Report

6. Explain internal and external dimensions of CSR. [12

OR

What are the advantages and disadvantages of CSR ? [6 + 6

(d) Credit period allowed = 1 month

(e) Credit period availed = 1.5 months

(f) Direct expenses are paid in one month arrear.

(g) Indirect expenses are paid in advance for an average period of $\frac{1}{2}$ month.

(h) Minimum cash balance required ₹ 19,200.

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Write notes on any ten of following . [2 × 10

(a) Profit planning

(b) Wealth maximization

(c) Sinking Fund

(d) Redeemable Bonds

(e) Ordinary Shares

(f) Cost of Equity

(g) Net cash flow

(h) Concept of working capital

(i) Net operating income

(j) Dividend

(k) Current assets

(l) Liquidity ratio

GROUP - B

*Answer **ALL** questions.*

2. Explain the scope of financial management. What role should financial manager play in a modern enterprise ? [12

OR

The total assets of ₹ 80,000 of a company are financed by equity funds only. The internal rate of return on assets is 10 per cent. The company has a policy of retaining 70% of its profits. The capitalization rate is 12%. The company has 10,000 shares outstanding. Calculate the present value per share. [12

3. Despite its weaknesses, the pay back period method is popular in practice. What are the reasons for its popularity ? [12

OR

The Bright Company is evaluating a project, which will cost ₹ 1,00,000 and will have no salvage value at the end of its 5-year life. The project will save costs of ₹ 40,000 a year. The comapny will finance the project by a 14% loan and will repay loan in equal instalments of ₹ 20,000 a year. If the firm's tax rate is 50% and the after-tax cost of capital is 18%, calculate the NPV of the project, assume SLM depreciation for tax. [12

4. What are the various concepts of capital ? Why should they be distinguished in financial management ? [12

OR

Define the marginal cost of capital. Why is the marginal cost of capital referred to as the weighted average cost of new capital. [12

5. According to Walter's model, the optimum pay out ratio can be either zero or 100%. Explain the circumstances when this is true. [12

OR

What are the factors that influence management's decision to pay dividend of a certain amount ? [12

6. Why is inventory management important ? Explain the objectives of inventory management. [12

OR

Prepare a statement of working capital requirement from the following informations : [12

(a) Estimated annual sales ₹ 19,20,000 ; in which cost of goods 60%, Direct expenses 15% and indirect expenses 10%.

(b) Cash sales in one-third of capital sales and cash purchase is one-fifth of tota;urchase.

(c) Stock holding period = 2 months

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Write notes on any ten of following . [2 × 10

   (a) Tax Evasion

   (b) Tax Management

   (c) Effective Management

   (d) Dividend Policy

   (e) Sale of Scientific Research Assets

   (f) House Rent Allowance

   (g) Residential Status of Individual

   (h) Slump Sale

   (i) Double taxation relief

   (j) Tax benefits to amalgamating company

(k) Person

(l) Merger

GROUP - B

*Answer **ALL** questions.*

2. Discuss the objectives and limitations of tax planning. [6 + 6

OR

What are the provisions of set off and carry forward of losses by a corporate assessee ? [12

3. What are the tax provisions of interest paid on bonds and debentures ? [12

OR

What are the tax incentives available to an enterprise undertaking any business in SEZ ? [12

4. Write notes on : [4 × 3

(a) Entertainment Allowance

(b) Deductions under section 80U

(c) Free medical facilities

OR

Explain the important aspects of repair. [12

5. What are the exempted incomes under section 10 for a non-resident ? [12

OR

What do you mean by transfer pricing ? What are the circumstances where it can be applied ? [12

6. Discuss various tax benefits available to a demerged company in case of demerger. [12

OR

What are tax provisions applicable to amalgamated company in case of amalgamation ? [12

OR

What is research ? Discuss purpose and significance of business research. [15

3. What is a research process ? How does it start and reach the ultimate goal ? [15

OR

Explain the characteristics and formulation of a research design. [15

2019

Time - 2 hours

Full Marks - 40

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Explain any five of following. [2 × 5

   (a) Research method

   (b) Primary data

   (c) Null hypothesis

   (d) Chi-square test

   (e) Ranking scale

   (f) Panel studies

   (g) Linear Regression

GROUP - B

*Answer **ALL** questions.*

2. Distinguish between research methods and research methodology. [15

3. “Asurya nāma te loka. Explain in context. [15

OR

Discuss how system of Indian Philosophy of the Vedic tradition related to the Upanisads.

4. What are the consequences of Vidyā and Avidyā ? Explain. [15

OR

“Avidyā mṛtyam tritvā vidyayā amṛtam asnute.” Explain.

5. Bring out the distinction between Sambhūti and Asambhūti. [15

OR

“Krato Smara Krutaṁ Smara.” Explain.

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer any four of following questions. [5 × 4

   (a) What is Upanisad ?

   (b) What is Ātman ?

   (c) What is Avidyā ?

   (d) Briefly explain ‘Isāvasyam Idam Sarvam’.

   (e) Briefly distinguish the concept of Vidyā and Avidyā.

   (f) How ‘Agne naya Supatha’ is to be understood ?

GROUP - B

*Answer **ALL** questions.*

2. Discuss the concept of Brahman in Upanisads. [15

OR

Explain Brahman as Ātman following Upanisads.

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer the following questions by choosing the correct answer from the given alternatives. [2 × 10

   (a) Causation is based on _____ .

   (i) Induction (ii) Deduction

   (iii) Both (i) and (ii) (iv) None of these

   (b) Mill has put forth _____ kind(s) of scientific explanation.

   (i) 1 (ii) 2

   (iii) 3 (iv) 4

   (c) Popular explanation is based on _____ .

   (i) Popular belief (ii) Traditions

   (iii) Superstitions (iv) All of these

(d) Impure deductive system is concerned with _____ .

(i) Mathematics (ii) Physics

(iii) Logic (iv) None of these

(e) The explanation of a fact is systematic, coherent and logical consistent is called _____ .

(i) Popular explanation (ii) Logical explanation

(iii) Scientific explanation (iv) None of these

(f) Which of the following is not a form of scientific explanation ?

(i) Analysis (ii) Synthesis

(iii) Concatenation (iv) Subsumption

(g) Hypothesis should not be based on _____ .

(i) Explanation (ii) Observation

(iii) Real cause (iv) Superstition

(h) Hypothesis is a _____ .

(i) Real cause (ii) Probable cause

(iii) Known cause (iv) None of these

(i) 'Two plus two is four' is an example of _____ .

(i) Natural science (ii) Pure deductive science

(iii) Impure deductive science (iv) None of these

(j) Cause is sum total of _____ .

(i) The negative condition (ii) The positive condition

(iii) Both (i) and (ii) (iv) None of these

GROUP - B

*Answer **ALL** questions.*

2. Discuss the nature and characteristics of Science. [15

OR

Distinguish between pure deductive system anf impure deductive system.

3. What is explanation ? Explain popular explanation with examples. [15

OR

Make a detailed account of the similarities and dissimilarities between popular and scientific explanation.

4. What is hypothesis ? Discuss conditions of hypothesis. [15

OR

Discuss some of the views on hypothesis and scientific enquiry.

5. What is causation ? Discuss the relation between cause and condition. [15

OR

What is plurality of cause? Explain Mill's doctrine of plurality of cause with criticism.

5. Discuss the Plato's theory of Universal. [15

OR

State and explain Aristotle's reaction against Plato's theory of Universal.

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer the following questions by choosing the correct answer from the given options below each question. [2 × 10

(a) How many propositions are there in a Nyaya syllogism ?

(i) 1 (ii) 2

(iii) 3 (iv) 5

(b) Prama means _____ .

(i) Valid presentative cognition

(ii) Non-valid presentative cognition

(iii) Valid representative cognition

(iv) Non-valid representative cognition

(c) In Purvavat anumana, we infer _____ .

(i) The unperceived effect from a perceived cause

(ii) The unperceived cause from a perceived effect

(iii) Not on the basis of causation but on the basis of uniformity of coexistance

(iv) Imperceptible cause from perceptible effects

(d) The representative realism was introduced by _____ .

(i) Descartes (ii) Spinoza

(iii) Locke (iv) Kant

(e) Berkeley is _____ .

(i) Idealistic (ii) Phenomenalist

(iii) Pagmatist (iv) Realist

(f) Which among the theory of causation is accepted by Saṁkhya ?

(i) Satkaryavāda (ii) Asatkaryavāda

(iii) Arṁbhavāda (iv) Vivartavāda

(g) Which among the following is real to Plato ?

(i) Objects (ii) Ideas

(iii) Soul (iv) None of these

(h) Who is the founder of Saṁkhya philosophy ?

(i) Goutama (ii) Kanada

(iii) Kapila (iv) Mahavir

(i) The doctrine of Pre-establish harmony is introduced by _____

(i) Descartes (ii) Spinoza

(iii) Locke (iv) Leibnitz

(j) Who said that mind has innate concepts ?

(i) Hume (ii) Kant

(iii) Bacon (iv) Descartes

GROUP - B

*Answer **ALL** questions.*

2. What is Perception ? Discuss different kinds of perception according to Nyāya Philosophy. [15

OR

State and illustrate the comparison in Nyāya Philosophy.

3. How does phenomenalist explain our knowledge of physical world possible ? Discuss. [15

OR

Discuss the difference between Phenomenalism and Idealism.

4. Critically discuss the Saṁkhya theory of causation. [15

OR

Distinguish between Satkāryavāda and Asatkāryavāda.

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

୧ । ଯେକୌଣସି ୧୦ଟି ପ୍ରଶ୍ନର ଉତ୍ତର ପ୍ରତ୍ୟେକକୁ ଦୁଇଟି ବାକ୍ୟରେ ଲେଖ । (୨ × ୧୦

(କ) ପଶ୍ଚିମ ଦିଶାରୁ କେଉଁ ବରଦ ମୁଦ୍ରାରେ ଜଗତ୍ କଲ୍ୟାଣକାରୀ ମହୌଷଧିମାନେ ଶ୍ରୀକ୍ଷେତ୍ରରେ ଉଭା ହୋଇଛନ୍ତି, ପରିଚୟ ଦିଅ ।

(ଖ) 'ହୋ ଭଗତେ' ପାଠ୍ୟାହଶରୁ ଶୁଦ୍ରମୁନି ସାରଳାଙ୍କ ରୂପକାନ୍ତିର ବର୍ଣ୍ଣନା କର ।

(ଗ) ଟାହୁଲିଆ ଆମୋଦିଆ ଆଖିଯୋଡ଼ିକ ଥାଇ ମହାପୁରୁଷ ଜଣକ କିଏ ? ତାଙ୍କର ରୂପ ବର୍ଣ୍ଣନା କର ।

(ଘ) ଖିଂଚିକଟକର ପ୍ରାଚୀନ ଇତିହାସ

(ଙ) ରକ୍ଷଣଶୀଳ ବ୍ରାହ୍ମଣ ସମାଜ

(ଚ) 'ଅଦୃଶ୍ୟ କର୍ଣ୍ଣଧାର' ବୋଲି କାହାକୁ କୁହାଯାଇଛି ଓ କାହିଁକି ?

(ଛ) ହୋଜ୍ ଖାସ୍ ତଲାବ

(ଜ) ସୁଧୀ ସଜ୍ଜନ ସଙ୍ଗୀ କେଉଁମାନେ ? ସେମାନଙ୍କ ସଂକ୍ଷିପ୍ତ ପରିଚୟ ଦିଅ ।

(ଝ) 'ସିମଳା'ର ନାମକରଣ

(ଞ) 'ଚିନ୍ତାମଣି କବି' ବୋଲି କାହାକୁ କୁହାଯାଏ ?

(ଟ) 'ବିରାଗ ସଂଜାତ ପ୍ରଭାବ' କହିଲେ କ'ଣ ବୁଝ ?

(ଠ) ପ୍ରବୃତ୍ତିମାନଙ୍କୁ ବଶୀଭୂତ କରିବାର ଶାସ୍ତ୍ରୀୟ ପନ୍ଥା କ'ଣ ?

GROUP - B

ସମସ୍ତ ପ୍ରଶ୍ନର ଦୀର୍ଘ ଉତ୍ତର ପ୍ରଦାନ କର ।

୨ । 'ମୋ ସମୟର ଓଡ଼ିଶା'ରୁ ଲେଖକଙ୍କ ପ୍ରାଥମିକ ଛାତ୍ରଜୀବନର ଚିତ୍ର ପ୍ରଦାନ କର । (୧୨

ଅଥବା

ଐତିହାସିକ ଦୃଷ୍ଟି ଓ କୃଷ୍ଟିରେ 'ମୋ ସମୟର ଓଡ଼ିଶା'ର ଦ୍ୟୁତି ବିଭାସିତ – ଆଲୋଚନା କର ।

୩ । 'ଦୁଇ ଦିଗନ୍ତର ଆକାଶ' ପଠିତାଂଶ ଭିତ୍ତିରେ ଲେଖକଙ୍କ ଜୀବନବୋଧର ପରିଚୟ ପ୍ରଦାନ କର । (୧୨

ଅଥବା

'ଦୁଇ ଦିଗନ୍ତର ଆକାଶ' ଏକ ସାର୍ଥକ ଭ୍ରମଣ-ସାହିତ୍ୟ – ଆଲୋଚନା କର ।

୪ । "ମୁଁ ପୁରୁଣା – ଗଡ଼ିଯିବି । ସେ ନୂଆ, ଏମିତି ଆଉ କିଛି କାଳ ଗଡୁଥିବ ।" – ଉକ୍ତିଟିର ସାରବତ୍ତା 'ରଥସପ୍ତକ'ର ପାଠ୍ୟାଂଶ ଭିତ୍ତିରେ ଆଲୋଚନା କର । (୧୨

ଅଥବା

"ଭାବ ରସରେ କୋଳାକୋଳି, ଭାବଭୂମିରେ ମିଳାମିଳି – ଏ ସେଇ ବଡ଼ଦାଣ୍ଡ ।" ଉକ୍ତିଟିର ସାରବତ୍ତା ନିଜ ଭାଷାରେ ଉପସ୍ଥାପନ କର ।

୫ । 'କାବ୍ୟ ସମ୍ବାଦ'ର ପାଠ୍ୟାଂଶ ଭିତ୍ତିରେ ବାଣଭଟ୍ଟଙ୍କ ଜୀବନ ଚରିତ ବର୍ଣ୍ଣନା କର । (୧୨

ଅଥବା

'ସୋନ୍ମେଷଶାଳିତା ହିଁ ମୌଳିକତା' – ଉକ୍ତିଟିର ସତ୍ୟତା 'କାବ୍ୟ ସମ୍ବାଦ' ଭିତ୍ତିରେ ଆଲୋଚନା କର ।

୬ । ପ୍ରାବନ୍ଧିକଙ୍କ ବିଚାରବୋଧକୁ ଅନୁସରଣ କରି 'ମହାକାଳ ସ୍ରୋତ'କୁ ବିଶ୍ୱରାଜଙ୍କ ଦୂତ କହିବାର ତାତ୍ପର୍ଯ୍ୟ ସମ୍ପର୍କରେ ଆଲୋଚନା କର । (୧୨

ଅଥବା

'ନିଜ ଦାୟିତ୍ୱ' ପ୍ରବନ୍ଧ ଅନୁସରଣରେ ପ୍ରାବନ୍ଧିକଙ୍କ ଦୃଷ୍ଟିକୋଣର ପରିଚୟ ପ୍ରଦାନ କର ।

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

୧। ଯେକୌଣସି ୧୦ଟି ବିଷୟରେ ସଂକ ିପ୍ତ ଟିପ୍ପଣୀ ଲେଖ। (୨ × ୧୦

(କ) ଭାଷାର ବ୍ୟାବହାରିକ କ୍ଷେତ୍ର

(ଖ) ବ୍ୟାବହାରିକ ସାମାଜିକ ଯୋଗାଯୋଗ

(ଗ) କାର୍ଯ୍ୟାଳୟର ମୌଳିକ କାର୍ଯ୍ୟବିଧି

(ଘ) କାର୍ଯ୍ୟାଳୟ ଓ ପ୍ରଶାସନିକ ବିଭାଗ

(ଙ) ଅଧିସୂଚନା

(ଚ) ଆଫିସିକ ଲିଖନ କୌଶଳ

(ଛ) ନଥି ପ୍ରସ୍ତୁତିକରଣ ବିଧି

(ଜ) ସମ୍ବାଦ ଓ ରୂପକ (ଫିଚର)

(ଝ) ସାମାଜିକ ସ୍ତମ୍ଭ ରଚନା

(ଞ) ପାଣ୍ଡୁଲିପି

(ଟ) ବନାନଗତ ଅଶୁଦ୍ଧି ନିରାକରଣ

(ଠ) ପ୍ରୁଫ୍ ସଂଶୋଧନ

GROUP - B

ସମସ୍ତ ପ୍ରଶ୍ନର ଦୀର୍ଘ ଉତ୍ତର ପ୍ରଦାନ କର ।

୨ । ଭାଷାର ବ୍ୟାବହାରିକ ବିବିଧ କ୍ଷେତ୍ର ସମ୍ପର୍କରେ ଆଲୋଚନା କର । (୧୨

ଅଥବା

ବ୍ୟାବହାରିକ ଲିଖନ କଳାର ସଂଜ୍ଞା ଓ ସ୍ୱରୂପ ସମ୍ପର୍କରେ ଆଲୋଚନା କର ।

୩ । କାର୍ଯ୍ୟାଳୟର ସଂଜ୍ଞା ଓ ଉଦ୍ଦେଶ୍ୟ ସମ୍ପର୍କରେ ଆଲୋଚନା କର । (୧୨

ଅଥବା

କାର୍ଯ୍ୟାଳୟ କାର୍ଯ୍ୟବିଧିର ବିବିଧ କ୍ଷେତ୍ରର ପରିଚୟ ପ୍ରଦାନ କର ।

୪ । ଗଣମାଧ୍ୟମଧର୍ମୀ ସମ୍ବାଦ ପ୍ରସ୍ତୁତିର ବିଭିନ୍ନ ଦିଗ ସମ୍ପର୍କରେ ଆଲୋଚନା କର । (୧୨

ଅଥବା

"ସମ୍ପାଦକୀୟ ଚାତୁରୀ କ୍ରମରେ ସାହିତ୍ୟର ରହିଛି ଏକ ଗୁରୁତ୍ୱପୂର୍ଣ୍ଣ ଭୂମିକା – ଆଲୋଚନା କର ।

୫ । ଫିଚରର ସଂଜ୍ଞା ଓ ସ୍ୱରୂପ ସମ୍ପର୍କରେ ଆଲୋଚନା କର । (୧୨

ଅଥବା

ସାମାଜିକ ସ୍ତମ୍ଭ ରଚନା ଓ ସମ୍ପାଦକୀୟ ଲିଖନ ଶୈଳୀ ସମ୍ପର୍କରେ ଆଲୋଚନା କର ।

୬ । ପୁସ୍ତକ ରଚନା କ୍ଷେତ୍ରରେ ବିବିଧ କୌଶଳ ସମ୍ପର୍କରେ ଆଲୋଚନା କର । (୧୨

ଅଥବା

'ସମ୍ପାଦନା କଳା' କହିଲେ କଣ ବୁଝ ? ପତ୍ର-ପତ୍ରିକା ପ୍ରକାଶନ କ୍ଷେତ୍ରରେ ଏହାର ଉପଯୋଗିତା ସମ୍ପର୍କରେ ଆଲୋଚନା କର ।

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

୧। ଯେକୌଣସି ୧୦ଟି ବିଷୟରେ ସଂକ ିପ୍ତ ଟିପ୍ପଣୀ ଲେଖ। (୨ × ୧୦

(କ) 'ପ୍ରବନ୍ଧ'ର ଆଭିଧାନିକ ବ୍ୟୁତ୍ପତ୍ତିଗତ ଅର୍ଥ

(ଖ) 'ପ୍ରବନ୍ଧ' ରଚନାର ଉଦ୍ଦେଶ୍ୟ

(ଗ) ବସ୍ତୁନିଷ୍ଠ ପ୍ରବନ୍ଧ

(ଘ) ମନ୍ମୟ କବିତା (ଗିତିକବିତା)

(ଙ) ସମ୍ବୋଧନ ଗୀତିକା

(ଚ) ରୂପକ କବିତା

(ଛ) ନାଟକୀୟ ଚରିତ୍ର

(ଜ) ନାଟକୀୟ ଐକ୍ୟ

(ଝ) ନାଟକୀୟ ଉତ୍କଣ୍ଠା

(ଞ) 'କ୍ଷୁଦ୍ରଗଳ୍ପ'ର ସ୍ୱରୂପ

(ଟ) ଭାବପ୍ରଧାନୀ ଗଳ୍ପ

(ଠ) ପ୍ରାୟୋଗିକ ସମୀକ୍ଷା

GROUP - B

ସମସ୍ତ ପ୍ରଶ୍ନର ଦୀର୍ଘ ଉତ୍ତର ପ୍ରଦାନ କର ।

୨ । ପ୍ରବନ୍ଧ ଲିଖନ କଳାର ବିବିଧ କୌଶଳ ସମ୍ପର୍କରେ ଆଲୋଚନା କର । (୧୨

ଅଥବା

'ବେକାର ସମସ୍ୟା' ଶିରୋନାମ ଆଧାରରେ ପ୍ରବନ୍ଧ ରଚନା କଳାର ସଂକ୍ଷିପ୍ତ ଲିଖନ ରୂପ ପ୍ରଦାନ କର ।

୩ । 'କବିତା'ର ସଂଜ୍ଞା ଓ ସ୍ୱରୂପ ସମ୍ପର୍କରେଆଲୋଚନା କର । (୧୨

ଅଥବା

କବିବର ରାଧାନାଥଙ୍କ 'କଞ୍ଚୁକୀର ଭାବନା' କବିତାର ଲିଖନ ଚାତୁରୀ ସମ୍ବନ୍ଧରେ ନିଜର ମତାମତ ଦିଅ ।

୪ । 'ଦ୍ୱନ୍ଦ୍ୱ' ହିଁ ନାଟକୀୟ ପ୍ରାଣ – ଉକ୍ତିଟିର ସତ୍ୟତା ପ୍ରମାଣ କର । (୧୨

ଅଥବା

" 'ଦୃଶ୍ୟକାବ୍ୟ-ନାଟକ'ର ସଫଳତା ହିଁ ମଂଚ ଉପସ୍ଥାପନା କୌଶଳ ଉପରେ ନିର୍ଭରଶୀଳ ।" – ଏ ବିଷୟରେ ଆଲୋଚନା କର ।

୫ । କ୍ଷୁଦ୍ରଗଳ୍ପ ରଚନାର ଗଠନ କୌଶଳ ସମ୍ପର୍କରେ ଆଲୋଚନା କର । (୧୨

ଅଥବା

ଫକୀର ମୋହନଙ୍କ କାଳଜୟୀ ଗଳ୍ପ 'ରେବତୀ'ର ମୂଲ୍ୟାୟନ କର ।

୬ । ନିମ୍ନଲିଖିତ କବିତାଟିର ପ୍ରାୟୋଗିକ ଆଲୋଚନା କର । (୧୨

ରାଜା, ମନ୍ତ୍ରୀ, ଧନିକର ସାଡ଼ମ୍ବର ଅହମିକା ତଳେ
ଜନତାର ଅଗୋଚରେ ଦୂରେ କେଉଁ ଅବଜ୍ଞାତ ଘରେ
ଦରିଦ୍ର କୁଟୀରାଙ୍ଗନେ ବଞ୍ଚେ ନାହିଁ ଶାନ୍ତ ସାଧୁ ପ୍ରାଣେ
ନାହିଁ ମାଗେ ଲୋକମାନ୍ୟ, ପୁରସ୍କାର, କ୍ଷମତା, ସମ୍ମାନ
ଆପଣାରେ ଆତ୍ମସ୍ଥିତ, ଶ୍ରମଲବ୍ଧ ଅଳ୍ପରେ ସନ୍ତୁଷ୍ଟ
ଧର୍ମତାର କୋଳାହଳେ, ଅନୁଷ୍ଠାନେ ନୋହେ ପରିପୁଷ୍ଟ
ପରିତୃପ୍ତ ସତ୍ୟ ବାକ୍ୟେ, ପ୍ରତିବେଶୀ ଜନେ ସେବିପାରେ,
ନରତ୍ୱର ସେ ମଧ୍ୟ ବିକାଶେ,
ଦେବତାର ସେହି ଏକ ଛୋଟ ଅବତାର
ତୁମର ହେ ପ୍ରଭୁ ଜୀବନେ
ବାରମ୍ବାର ମୁହିଁ ନମସ୍କାରେ
ନ ଅନାଇ ମନ୍ତ୍ରୀ ବା ନେତାରେ
କୋଳାହଳ ମନ୍ଦିରେ, ଗୀର୍ଜାରେ ।

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer any ten of following questions. [2 × 10

   (a) Who is the ex-girl friend of Shyam in *One Night at the Call Centre* ?

   (b) What is the bay's name described in the vovel ?

   (c) Who in the novel *Bhirayana* experiences the worst through violence ?

   (d) What becomes of Arjie's grandparents in the novel *Funny Boy* ?

   (e) According to relatives Arjie is 'funny'. What does funny imply ?

   (f) In Chaprer-I of the novel *The Murder of Roger Ackroyd* who had died ?

   (g) Why doesn't Alice want to go back to the hose ?

(h) What language did the Queen tell Alice to speak ?

(i) What is popular literature ?

(j) How is Canonical literature different from popular literature ?

(k) What is high literature ?

(l) What does the knight do in the game of chess ?

GROUP - B

*Answer **ALL** questions.*

2. In what ways does chess in *Through the Looking Glass* suggest a deterministic conception of life ? Discuss. [12

OR

Sketch the character of Red Queen.

3. Eveyone in *The Murder of Roger Acknoyd* has something to hide. What does the novel say about the deceit by having so many 'guilty' characters ? [12

OR

Sketch the character of Poirot.

4. *Funny Boy* concerns the loneliness and humiliation of a person. Discuss. [12

OR

Sketch the character of Arjie.

5. Describe the novel *One Night at the Call Centre* as comedy of romance. [12

OR

Sketch the character of Shyam.

6. Discuss Bhimayana as a pictorial biography. [12

OR

How Bhimayana attempts to address the experiences of un-touchability through narrating crucial episodes from the life of Ambedkar ? Discuss.

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer any ten of following. [2 × 10

(a) What holy animal does Okonkwo's clan suspect the Christians have killed and eaten ?

(b) How many villages does Umuofia comprise ?

(c) What two significant events are mentioned in the first sentence of the novel *Chronicle of the Death Foretold* ?

(d) What is Santiago's mother's name and what is she wellknown for ?

(e) What is the theme of the poem Tonight I Can Write *?*

(f) Write three characteristics of postcolonial literature.

(g) What were Okonkwo's greatest fear and greatest passion ?

(h) What is the fatal door ? Why is it important to the plot ?

(i) Write the major theme of *The Girl Who Can.*

(j) Write a note on Globalization.

(k) What is Decolonization of mind ?

(l) Write a note on the conflicting reaction of Luisa Santiago to Bayardo ?

GROUP - B

*Answer **ALL** questions.*

2. Discuss the major symbols in *Things Fall Apart* and how do they relate to the plot and characters ? [12

OR

Sketch the character of Okonkwo.

3. How are the barriers of authority and power portrayed in the *Chronicle of a Death Foretold* ? Discuss. [12

OR

In the novel *Chronicle of a Death Foretold*, how does the theme of honor relate to the foretold death of Santiago ?

4. *The Collector of Treasures* is a dramatic indictment of an oppressive attitude of men in her culture toward women and children they are supposed to care for and love. Justify. [12

OR

Discuss how the Green leaves reveal the tenuous grasp that many indigenous culture in Kenya had on their traditional ways of life by British Colonial force.

5. "*Tonight I Can Write* is an expression of sincere love and acceptance of reality." Justify. [12

OR

Critically appreciate the poem *Wild Lemons.*

6. What are the characteristics of post-colonial literature and the issues of address ? [12

OR

Discuss the various factors that contributed to the process of Decolonization.

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer any ten of following questions. [2 × 10

(a) What is an autobiography ? Give a definition of your own.

(b) What was the cause of clashes between Richard and his family women ?

(c) In *Black Boy* what does Richard Wright attributes his child-hood hunger to ?

(d) *Truth About Me* is originally written in which of the Indian lan-guages ?

(e) 'Binodini Dasi' belongs to which state of India ?

(f) Where did Gandhi spend his childhood ?

(g) In what other fields of employment did Franklin note some fund interest ?

(h) *Confusion* falls on which genre of literature ?

(i) Who did Franklin initially address his autobiography opening to ?

(j) Write the context of Rousseau's *Confession.*

(k) What characters working in the hospital basement scare Richard ?

(l) What is the author's main point of discussion in *Black Boy* ?

GROUP - B

*Answer **ALL** questions.*

2. Discuss the main principles of writing an autobiography. [12

OR

Discuss the role of memory in writing an autobiography.

3. Discuss how Rousseau explains the move embarraing experiences of his life and devotes much of his section to these types of episodes. [12

OR

What is Benjamin Franklin's attitude towards religion ? Discuss this aspect of his autobiography.

4. Write a summary of Chapter-I of Gandhi's autobiography. [12

OR

Give a summary of Anibesant's autobiography.

5. Critically estimate Binodini Dasi as an actress from her autobiography. [12

OR

Discuss the struggles and pain Revathi to make her place in society from the chapters you have read.

6. Discuss the role of art in Richard's life. What significance do Richard's feelings about art have for an interpretation of *Black Boy* ? [12

OR

Write a critical summary of Chapter-3 of R.K. Narayan's *My Days.*

3. What is a term paper ? State all the components of a term paper. [15

4. What is a research proposal ? Discuss how to structure it. [15

5. What is bibliography ? Discuss different types of bibliographies. [15

2019

Time - 2 hours

Full Marks - 40

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Write notes on any five of following. [2 × 5

   (a) What is Practical Criticism ?

   (b) What is Bibliography ?

   (c) Write a note on Referencing.

   (d) What is Descriptive Bibliography ?

   (e) Write about two style manuals you know.

   (f) State the four kinds of meaning given by I. A. Richards.

   (g) What do you mean by Conceptualizing ?

GROUP - B

*Answer **any two** questions.*

2. What is literary research ? How is it different from other research ? State its objectives. [15

GROUP - B

*Answer **ALL** questions.*

2. Examine the concept of General Will of Rousseau. [12

OR

Discuss Rousseau's concept of sovereignty.

3. "Over himself, over his own body and mind, the individual is sovereign." Comment. [12

OR

Explain J. S. Mill's views on Representative Democracy.

4. Examine the theory of Dialectical idealism of Hegel. [12

OR

Analyse the contribution of Hegel to the history of Political Science.

5. Discuss the Marxian conception of materialistic interpretation of History. [12

OR

Write an essay on Marx's theory of class struggle.

6. Explain the basic tenets of Leninism. [12

OR

Discuss Mao's contribution to the growth of Chinese Constitution.

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer all questions. [2 × 10

(a) What is the difference between 'Actual Will' and 'Real Will'.

(b) According to Rousseau, where does a government obtain power ?

(c) Why J. S. Mill is considered as a liberal democrat ?

(d) What is happiness according to J. S. Mill ?

(e) Who were the main influences on Hegel's philosophy ?

(f) What was Hegel's view on war ?

(g) What is Dictatorship of Proletariat in Marxism ?

(h) What do you mean by Communism ?

(i) Mention the major writings of Karl Marx.

(j) What was Lenin's greatest contribution to Marxism ?

GROUP - B

*Answer **ALL** questions.*

2. Critically evaluate Gandhi's arguments against modern civilization. [12

OR

Discuss Gandhiji's alternative perception of modernity as described in Hindu Swaraj.

3. Analyse Gandhi's views on truth and non-violence. [12

OR

Write an essay on the peasant satyagraha at Kheda by Gandhiji.

4. Explain the idea of Gram Swaraj as propounded by Gandhiji. [12

OR

Why is 'Swadeshi' regarded as one of the fundamental aspects of Gandhian philosophy ? Discuss.

5. Discuss the role of Martin Luther King Jr. in the anti-apartheid movement. [12

OR

Describe Gandhi's contribution towards empowerment of women.

6. Discuss Gandhi's idea of Trusteeship. Is it relevant today ? [12

OR

Discuss the contemporary relevance of Gandhi.

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer all questions. [2 × 10

(a) What was Gandhi's approach to machines ?

(b) What did truth mean by Gandhi ?

(c) When did Gandhi started Satyagraha in South Africa ?

(d) State any two techniques of Satyagraha .

(e) What do you mean by Sarvodaya ?

(f) What is Swadeshi ?

(g) What is Swaraj according to Gandhi ?

(h) What do you mean by racial discrimination ?

(i) What was Gandhi's views on women's emancipation ?

(j) What is Gandhigiri ?

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer all questions. [2 × 10

   (a) What was the Sati tradition in India ?

   (b) What is Radical feminism ?

   (c) What do you mean by Patriarchy ?

   (d) What is SAKHI ?

   (e) Write any two invisible works of women.

   (f) What is maternity leave ?

   (g) Write the objectives of Alcohol Movement.

   (h) What is trafficking of women and girls ?

   (i) What do you mean by women's security ?

(j) What is the main objective of the National Commission for women ?

GROUP - B

*Answer **ALL** questions.*

2. Discuss the status of women in pre-independence India. [12

OR

Write an essay on women's movement in India.

3. What do you mean by feminism ? Discuss its origin and features. [12

OR

Critically examine the sex-gender debate in feminist theories.

4. Discuss the different problems faced by working women in India. [12

OR

Discuss the causes of gender inequality in India. How can we eliminate it ?

5. Describe the major causes of domestic violence in our society. How can it be checked ? [12

OR

Discuss the Constitutional provisions regarding women rights in India.

6. Make a brief note on the history of women's struggle for citizenship. [12

OR

Is women reservation essential for women empowerment ? Comment.

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Write notes on any ten of following within two sentences each. [2 × 10

   (a) Raja Rammohan Roy

   (b) Sir Syed Ahmed

   (c) Moderates

   (d) Extremists

   (e) Rawlatt Act

   (f) Jallianawalahbagh Tragedy

   (g) Dandi March

   (h) R.S.S.

   (i) Communal Riots

   (j) B. R. Ambedkar

(k) Azad Hind Fauz

(l) Sardar Patel

GROUP - B

*Answer **ALL** questions.*

2. Write short notes any two : [6 × 2

(a) Brahma Samaj

(b) Aligarh Movement

(c) Sanskritization

OR

Discuss about the reforms of Swami Dayananda Saraswati. [12

3. Write short notes any two : [6 × 2

(a) Moderates

(b) Indian National Congress

(c) Extremists

OR

Describe the causes and consequences of Swadeshi Movement. [12

4. Write short notes any two : [6 × 2

(a) Non-Co-operation MOvement

(b) Subash Chandra Bose

(c) Quit India Movement

OR

Write an essay on the Civil Disobediance Movement. [12

5. Write short notes any two : [6 × 2

(a) Hindu Mahasabha

(b) Muslim League

(c) Partition of India

OR

Discuss the origin and growth and impact of communalism in India. [12

6. Write short notes any two : [6 × 2

(a) Salient features of Indian Constitution

(b) Land Reforms

(c) Five Years Planning

OR

Write a brief note on the integration of Princely States in India. [12

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Write notes on any ten of following within two sentences each. [2 × 10

(a) Luddites

(b) Socialism

(c) Karl Marx

(d) Tsar Nicholas-II

(e) Tripple Alliance

(f) Tripple Entete

(g) Kaiser William-II

(h) New Deal

(i) Fascism

(j) Nazism

(k) Adolf Hitler

(l) Winston Churchill

(m) Darwin

GROUP - B

*Answer **ALL** questions.*

2. Write short notes any two : [6 × 2

(a) Food riots in England

(b) Marxian Socialism

(c) Chartism

OR

Discuss about the struggle for Parliamentary Democracy in Britain. [12

3. Write short notes any two : [6 × 2

(a) Emancipation of Serfs

(b) Revolution of 1905

(c) Monshevic Revolution

OR

Discuss the causes and consequences of Russian Revolution of 1917. [12

4. Write short notes any two : [6 × 2

(a) Theory of Imperialism

(b) Military Alliance

(c) New Deal

OR

What is the Great Depression ? Discuss its consequence. [12

5. Write short notes any two : [6 × 2

(a) Rise of Fascism

(b) Rise of Nazism

(c) Causes of the Spanish Civil War

OR

Discuss the causes and consequences of the Second World War. [12

6. Write short notes any two : [6 × 2

(a) Intellectual Development since 1850

(b) Mass Education

(c) Darwin Theory

OR

Examine the institutionalisation of disciplines since 1850 with reference to history and sociology of modern Euriope. [12

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Write notes on any ten of following within two sentences each. [2 × 10

   (a) Dyarchy

   (b) Federal Government

   (c) B. R. Ambedkar

   (d) Jawaharlal Nehru

   (e) Marshall Tito

   (f) Ryotwari Settlement

   (g) Minorities

   (h) Women Empowerment

   (i) Caste system

   (j) Meghnad Shah

(k) Premchand

(l) Zamindari system

GROUP - B

*Answer **ALL** questions.*

2. Write short notes any <u>two</u> : [6 × 2

(a) Provisions of Indian Independence Act

(b) Mountbatten Plan – its features

(c) Preamble of the Constitution

OR

Write critically the Government of India Act, 1935. [12

3. Write short notes any <u>two</u> : [6 × 2

(a) Indo-China Relations

(b) Panchasheela

(c) Objectives of NAM

OR

Analyse critically Indo-Pak Relations [12

4. Write short notes any <u>two</u> : [6 × 2

(a) First Five Year Plan

(b) Industrial Policy

(c) Planned Economy

OR

Discuss the Land Revenue Policy of India after independence. [12

5. Write short notes any <u>two</u> : [6 × 2

(a) Inter-Caste tensions

(b) Communalism in Indian politics

(c) Minorities in India

OR

Discuss the necessity and objectives of women empowerment in India. [12

6. Write short notes any <u>two</u> : [6 × 2

(a) Premchand

(b) C. V. Raman

(c) Meghnad Shah

OR

Describe the life and contribution of Rabindranath Tagore to Indian literature. [12

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer any ten of following. [2 × 10

   (a) What is Green Revolution ?

   (b) Gender Develoment Indices

   (c) FDI

   (d) Define Balance of Payment.

   (e) MNCs

   (f) MRTP Act

   (g) What is Agricultural Marketing ?

   (h) What is Industrial Finance ?

   (i) What is HRD ?

   (j) Export Promotion

(k) Components of PQLI

(l) The National Forest Policy

GROUP - B

*Answer **ALL** questions.*

2. What is Planning ? Discuss different objectives and strategy of Planning. [12

OR

Write notes any two of the following. [6 × 2

(a) Role of State

(b) PQLI

(c) Economic Development

3. What is Agricultural Marketing ? Discuss the problems and their remedial measures. [12

OR

Write notes any two of the following. [6 × 2

(a) Factors determining low productivity in agriculture

(b) Land Reforms

(c) New Agricultural Strategies

4. Discuss the growth and problems of SSIs. [12

OR

Write notes any two of the following. [6 × 2

(a) Industrial Policy, 1948

(b) Industrial Financing

(c) FEMA

5. Define Human Development. Discuss its evolution and measurement. [12

OR

Write notes any two of the following. [6 × 2

(a) HRD

(b) Educational Policy

(c) Contribution of tertiary sector to Indian GDP

6. Explain Export Promotion and Import Substitution. [12

OR

Write notes any two of the following. [6 × 2

(a) Foreign Trade Policies

(b) Foreign Aid

(c) Trade Composition

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer any ten of following. [2 × 10

   (a) What do you mean by land reforms ?

   (b) What is Sustainable Development ?

   (c) What is Multiple Social Equilibria ?

   (d) Write two measures adopted for Globalisation in India.

   (e) What do you mean by population explosion ?

   (f) What is public goods ?

   (g) What is fertility ?

   (h) Write down birth rate and death rate of India according to the 2011 Census.

   (i) Define agricultural credit in India.

   (j) Define Environment.

(k) Write two factors which is responsible for the growth of globalisation.

(l) What do you mean by demographic dividend ?

GROUP - B

*Answer **ALL** questions.*

2. Population growth as retading factor of economic development in India. Explain. [12

OR

Write notes on : [6 × 2

(a) Quality of population in India

(b) Demographic Dividend in India

3. Discuss the factors which are responsible for low agricultural productivity. What are the measures should be undertaken for improving agricultural productivity in India ? [12

OR

What are the sources of agricultural credit in India ? Discuss the disbursement of agricultural credit in India in recent years.

4. Examine how environment affects the development of human behaviour. [12

OR

What is meaning of organisational inefficiency ? Examine what are the signs that indicate an ineffective organisation and how to improve this organisational inefficiency.

5. What is environmental pollution ? Explain the necessary steps that should be taken to reduce the degree of environmental pollution to maintain healthy and good environment. [12

OR

What do you mean by sustainable development ? Explain the strategies to attain sustainable development.

6. Define globalisation. What are the measures adopted to promote globalisation in India ? Discuss. [12

OR

Discuss the impact of globalisation on Indian economy.

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer any ten of following questions in ine orv two sentences each. [2 × 10

   (a) What is property right ?

   (b) What do you mean by pollution tax ?

   (c) Define welfare economics.

   (d) What is risk perception ?

   (e) What do you mean by negative externality ?

   (f) What is Law of Entropy ?

   (g) What is tradable permit ?

   (h) What is cost illness method ?

   (i) What do you mean by transboundary environmental problem ?

(j) Write two current Environmental Policies implemented in India.

(k) What is hedonic property price ?

(l) What is Environmental degradation ?

GROUP - B

*Answer **ALL** questions.*

2. Briefly state Environmental supplier of renewable and non-renewable resources approach with help of a diagram. [12

OR

What is Environmental Economics ? Describe the impact of economic growth on Environment.

3. To waht extent externalities are responsible for market failure ? How efficient adjustment by made for externalities ? [12

OR

Write notes any <u>two</u> of the following. [6 × 2

(a) Coase Theorem

(b) Negative Externality

(c) Public goods and market failure

4. Discuss the Environmental Policies in India towards achieving sustainable development. [12

OR

Write notes on : [6 × 2

(a) Tradable Permits

(b) Pigouvian Tax

5. Discuss the environmental impact of trade and variety of approaches have been suggested in balancing the goals of trade benefits and environmental protection. [12

OR

Write notes on : [6 × 2

(a) Economics of climate change

(b) Transboundary environmental problem

6. What is a risk assessment ? Discuss the methods for risk assessment. [12

OR

Briefly discuss the non-market valuation methodology.

2019

Time - 3 hours

Full Marks - 80

*Answer **ALL** questions.*
Figures in the right hand margin indicate marks.

१। 'अभिज्ञानशाकुन्तलम्' इति नाटकस्य मिलनाङ्कं वर्णयत । (१५

अथवा

मुद्रिकालाभात् परं राज्ञः विरहावस्थां वर्णयत ।

२। संक्षेपेण चतुर्णां उत्तरं लिखत । (५ × ४

(क) हंसपादिकाप्रसङ्गस्य का नाटकीय उपयोगिता ?

(ख) किं स्त्रीणाम् अशिक्षितपटुत्वम् ? एतत् कस्मिन् प्रसङ्गे वर्णितम् ?

(ग) कथं मुद्रिका राज्ञः करं आगता ?

(घ) धनमित्रप्रसङ्गस्य का नाटकीय उपयोगिता ?

(ङ) षष्ठाङ्के मातलिः कथं किं च कृतवान् ?

(च) अन्तिमाङ्के वर्णितस्य भरतवाक्यस्य अर्थं लिखत।

३। (क) सप्रसङ्गं व्याख्याय कुरुत । (१०

त्वमर्हतां प्रग्रसरः स्मृतोऽसि नः
शकुन्तला मूर्तिमती च सत्क्रिया ।
समान यं तुल्यगुणं वधुवरं
चिरस्य वाच्यं न गतः प्रजापतिः ।।

अथवा

सुतनु हृदयात् प्रत्यादेशव्यलीकमपैतु ते
किमपि मनसः संगोहो मे तदा वलवान्वभूत् ।
प्रवलतमसामेवप्रायाः शुभेषु हि वृत्तयः
स्रजमपि शिरस्यन्धः क्षिप्तां धुनोत्यहिशङ्कया ।।

(ख) उत्कलभाषया अनूद्यताम् । (५

अस्मात्परंवत यथाश्रुति संभृतानि
को नः कुले निवपनानि नियच्छतीति ।
नूनं प्रसूतिविकलेन मया प्रसिक्तं
धौतश्रुशेषमुदकं पितरः पिवन्ति ।।

अथवा

शापदसि प्रतिहता स्मृतिरोध रक्षे
भर्तर्यपेततमसि प्रभुता तवैव ।
छाया न मूर्च्छतिमलोपहतप्रसादे
शुद्धे तु दर्पणतले सुलभावकाशा ।।

४। द्वयोः संक्षिप्तटिप्पणी प्रदेया । (७$\frac{१}{२}$ × २

(क) नान्दी

(ख) प्रस्तावना

(ग) नाटकम्

(घ) प्रकरणम्

५। द्वयोः संक्षिप्तटिप्पणी प्रदेया । (७$\frac{१}{२}$ × २

(क) विन्दुः

(ख) मुखसन्धिः

(ग) विष्कम्भकः

(घ) प्रवेशकः

३। सोदाहरणं सूत्रद्वयस्य व्याख्यां कुरुत । (७$\frac{१}{२}$ × २

(क) मुखनासिकवचनोऽनुनासिक:

(ख) तुल्यास्यप्रयत्नं सवर्णम्

(ग) नाऽऽज्झलौ

(घ) अदेङ् गुण:

४। सोदाहरणं सूत्रद्वयस्य व्याख्यां कुरुत । (७$\frac{१}{२}$ × २

(क) गतिश्च

(ख) सुप्तिङन्तं पदम्

(ग) भूवादय धातव:

(घ) अ अ

५। चतुर्णां छन्दसां लक्षणं सोदाहरणं लिखत । (५ × ४

(क) मन्दाक्रान्ता

(ख) अनुष्टुप्

(ग) उपेन्द्रवज्रा

(घ) मालिनी

(ङ) आर्या

(च) स्रग्धरा

2019

Time - 3 hours

Full Marks - 80

*Answer **ALL** questions.*
Figures in the right hand margin indicate marks.

१। केषांचित् पञ्चानां टिप्पणीप्रदेया । (३ × ५

(क) सिद्धान्तकौमुदी

(ख) आदेश:

(ग) कृदन्त

(घ) सनन्त

(ङ) तिङन्त

(च) अष्टाध्यायी

(छ) मण्डुकप्लुति:

२। सोदाहरणं सूत्रद्वयस्य व्याख्यां कुरुत । (७$\frac{१}{२}$ × २

(क) हलन्त्यम्

(ख) समाहार: स्वरित:

(ग) आदिरन्त्येन सहेता

(घ) उच्चैरुदात्त:

४। (क) सप्रसङ्गं व्याख्याय कुरुत । (८

वर्षमावपतां श्रेष्ठं वीजं निवपतां वरम् ।
गाव: प्रतिष्ठमानानां पुत्र: प्रसवतां वर: ।।

अथवा

माता गुरुतरा भूमे: पिता उच्चतरश्च खात् ।
मन: शीघ्रतरं वायोश्चिन्ता वहुतरा नृणाम् ।।

(ख) उत्कलभाषया अनूद्यताम् । (५

अतिथि: सर्वभूतानामग्नि: सोमो गवामृतम् ।
सनातनोऽमृतो धर्मो वायु: सर्वमिदं जगत् ।।

अथवा

हिमवान् पारियात्रश्च विन्ध्यो मलय एव च।
चत्वार: पर्वता: केन पतिता भुवि तेजसा ।।

५। (क) केषांचित् पञ्चानां सप्तमी एकवचने रूपाणि लिखत । (२ × ५

पितृ, सेधु, तद् (स्त्री), कवि, गुणी, देव, अस्मद्

(क) केषांचित् पञ्चानां धातूनां लटि प्रथमपुरुषैकवचने रूपाणि लिखत ।

दा, कृ, हन्, लभ्, भम्, पठ्, दृश्, पा (२ × ५

2019

Time - 3 hours

Full Marks - 80

*Answer **ALL** questions.*
Figures in the right hand margin indicate marks.

१। गृध्रविडालयो: कथां सनीतिवाक्यं वर्णयत । (१५

अथवा

''हितोपदेश:'' इति कथाग्रन्थस्य महत्वं विचारयत ।

२। केषांचित् पञ्चानाम् संक्षेपेण उत्तरं लिखत । (३ × ५

(क) का अम्बा वन्ध्या सदृशी ?

(ख) क: अन्ध: ?

(ग) क: पण्डित: ?

(घ) पुंसां धिय: कदा कथं च मालिनी भवन्ति ?

(ङ) के स्वभावात् त्रितयं हितम् ?

३। यक्षस्य प्रश्नानाम् उत्तरं युधिष्ठिर: कथं दत्तवान् ? (१५

अथवा

महाभारतस्य यक्षप्रश्नमवलम्ब्य निवन्धमेकं लिखत ।

2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.
Draw labelled diagrams wherever necessary.

GROUP - A

1. Write notes on any five of the following in two to five sentences each. [2 × 5

   (a) Drosophila of plant kingdom

   (b) Teleutospore

   (c) Crustose lichen

   (d) Symptomology

   (e) Eucarpic fungi

   (f) Budding

   (g) Dikaryotypic mycelium

GROUP - B

*Answer **ALL** questions.*

2. Describe the life history of Aspergillus. [10

OR

Write notes on <u>any two</u> of the following. [5 × 2

(a) General characters of fungi

(b) Sexual reproduction of Rhizopus

(c) Asexual reproduction of Penicillium

3. Explain the life history of Phytophthora. [10

OR

Write notes on <u>any two</u> of the following. [5 × 2

(a) Perithecium

(b) Asexual reproduction of Albugo

(c) Slime molds

4. Give an account of reproduction of Lichen. [10

OR

Write notes on <u>any two</u> of the following. [5 × 2

(a) Fruticose Lichen

(b) General characters of Lichen

(c) Mycirrhiza and their significance

5. Discuss the uses of fungi in fermentation, pharmaceuticals and synthesis of organic acids. [10

OR

Write notes on <u>any two</u> of the following. [5 × 2

(a) Fungi as bilogical control agent

(b) Application of fungi in food industry

(c) Role of fungi in agriculture

6. Describe the symptoms, causal organism and control measures of ‘Early blight of potato’. [10

OR

Write notes on <u>any two</u> of the following. [5 × 2

(a) Symptoms and control measures of Tobacco Mosaic

(b) Citrus canker

(c) Causal organism of black stem rust of wheat

APV-KNJ-Sem-II-19-Bot(C-3)/60

2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.
Draw labelled diagrams wherever necessary.

GROUP - A

1. Write notes on any five of the following in two to five sentences each. [2 × 5

   (a) Protonema

   (b) Amphibians of plant kingdom

   (c) Rhizophore

   (d) Polyembryony

   (e) Microsporophyll of Cycas

   (f) Calcification

   (g) Heterospory

GROUP - B

*Answer **ALL** questions.*

2. Describe the gametophytic generation of *Marchantia.* [10

OR

Write notes on any two of the following. [5 × 2

(a) *Riccia* thallus

(b) Sexual reproduction in *Pellia*

(c) Brief classification of Bryophytes

3. Write the sporophytic generation of *Anthoceros.* [10

OR

Write notes on any two of the following. [5 × 2

(a) Economic importance of Bryophytes

(b) Sexual reproduction of *Sphagnum*

(c) *Funaria* capsule

4. What is stele ? Discuss the range of stelar organisation in Pteridophytes. [10

OR

Write notes on any two of the following. [5 × 2

(a) Strobilus of *Selaginella*

(b) Stem anatomy of *Psilotum*

(c) Apogamy

5. *Ginkgo* is a living fossil. Explain giving suitable reasons. [10

OR

Write notes on any two of the following. [5 × 2

(a) Young stem anatomy of *Cycas*

(b) Staminate of *Pinus*

(c) General characters of Gymnosperms

6. Give an account of reproductive organs of *Lyginopteris* and discuss its affinities. [10

OR

Write notes on any two of the following. [5 × 2

(a) Megasporophyll of *Cycadeoidea*

(b) Stem of *Lepidodendron*

(c) Geological time scale

APV-KNJ-Sem-II-19-Bot(C-4)/60

2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.
Draw labelled diagrams wherever necessary.

GROUP - A

1. Answer any five of the following questions. [2 × 5

   (a) Explain types of nephridia in Annelida.

   (b) Enumerate characters of coelom.

   (c) What is a Beehive ? Explain its formation.

   (d) Enumerate general characters of Gastropoda.

   (e) Explain moulting in insects.

   (f) Enumerate characters of Onychophora.

   (g) Explain significance of water vasuclar system in Echinodermata.

   (h) What is Asteroidea.

GROUP - B

*Answer **ALL** questions.*

2. Give an account of Regeneration and autonomy in Polychaeta. [10

OR

Explain metamerism in Annelida.

3. Describe the process of Respiration in Arthropoda. [10

OR

Answer any two of the following. [5 × 2

(a) Enumerate general characters characters of Arthropoda.

(b) Explain hormonal control of metamorphosis in insects.

(c) Give an account of vision in Arthropoda.

4. Give an explanatory account on social organisation in termites. [10

OR

Write notes on any two of the following. [5 × 2

(a) Economic importance of insects

(b) Evolutionary significance of Peripatus

(c) Explain social life of honey bee.

5. Enumerate the process of torsion and detorsion in Gastropoda. [10

OR

Write notes on any two of the following. [5 × 2

(a) General characters of Mollusca

(b) Ctenidial and pulmonary respiration in Mollusca

(c) Pearl oyster

6. Write an explanatory account on larval forms of Echinodermata. [10

OR

Write notes on any two of the following. [5 × 2

(a) Evolutionary significance of Echinodermata

(b) General characters of Echinodermata

(c) Role of tube foot in the water vascular system of Echinodermata

APV-KNJ-Sem-II-19-Zool(C-3)/70

2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.
Draw labelled diagrams wherever necessary.

GROUP - A

1. Answer any five questions. [2 × 5

   (a) Role of liver in digestion

   (b) Oxygen dissociation curve

   (c) What is respiratory volume.

   (d) What is loop of Henle.

   (e) Explain structure of Haemoglobin.

   (f) Composition of blood plasma

   (g) What is systolic and diastolic blood pressure.

   (h) Explain myogenic heart.

GROUP - B

*Answer **ALL** questions.*

2. Give an accont of structural organisation, histology and functions of pancreas. [10

OR

Write notes on any two of the following. [5 × 2

(a) Digestion of carbohydrates

(b) Histology of ileum

(c) Absorption of lipids

3. Give an account of mchanism of breathing during pulmonary ventilation. [10

OR

Write notes on any two of the following. [5 × 2

(a) Carbon monoxide poisoning

(b) Mechanism of oxygen transport in blood

(c) The histology of trachea

4. Explain the structure and histology of kidney. [10

OR

Write notes on any two of the following. [5 × 2

(a) Ultrafiltration

(b) Renal blood supply

(c) Regulation of urine formation

5. Explain the mechanism of blood coagulation. [10

OR

Write notes on any two of the following. [5 × 2

(a) Different blood groups

(b) Disorders of blood

(c) Homeostasis

6. Explain different events in cardiac cycle. [10

OR

Write notes on any two of the following. [5 × 2

(a) Electrocardiogram

(b) Cardiac output and its regulation

(c) Nervous and chemical regulation of heart rate

APV-KNJ-Sem-II-19-Zool(C-4)/70

Sem-II-Science-Zool-GE-B$_1$
(Reg&Back)

2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.
Draw labelled diagrams wherever necessary.

GROUP - A

1. Answer any five questions. [2 × 5

   (a) What is parasitism ?

   (b) What do you mean by diploblastic animal ?

   (c) Explain pearl culture in bivalves.

   (d) What is Marsupium ?

   (e) Enumerate characters of Cobra.

   (f) What do you mean by spermatoleosis ?

   (g) What is “Master endocrine gland” ?

   (h) What is peristalsis ?

GROUP - B

*Answer **ALL** questions.*

2. Give an account of canal system of Sycon. [10

OR

Write notes on any two of the following. [5 × 2

(a) Pathogenicity of Plasmodium

(b) General characters of Porifera

(c) Structural organisation of *Taenia solium*

3. Give an account of water vascular system in Asteroidea. [10

OR

Write notes on any two of the following. [5 × 2

(a) General characters of Arthropoda

(b) Culture techniques of Silkworm

(c) Evolution of coelom

4. Write an essay on Fish migration. [10

OR

Write notes on any two of the following. [5 × 2

(a) Parental care in Amphibia

(b) General characters of birds

(c) Prototheria

5. Give an explanatory account on nature, types and characters of hormones. [10

OR

Write notes on any two of the following. [5 × 2

(a) Mechanism of oogenesis

(b) Adenohypophysis

(c) Structure of spermatozoa

6. Give an account of structure and working of heart. [10

OR

Write notes on any two of the following. [5 × 2

(a) Histology of stomach

(b) Digestion of proteins

(c) Mechanism of breathing

APV-KNJ-Sem-II-19-Zool(GE-B1)/50

2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer any five questions. [2 × 5

   (a) Show that electric field intensity is equal to the negative potential gradient.

   (b) Charge of an electron is 1.6×10^{-19} C and its mass is 9.1×10^{-31} kg. Calculate the acceleration of an electron in an electric field of 9×10^{5} N/C.

   (c) What do you mean by polar and nonpolar molecules.

   (d) Define Lorentz force and write its expression.

   (e) State Faraday's laws of electromagnetic induction.

   (f) Define magntozation vector.

   (g) Find the qulaity factor for an LCR circuit with L = 0.25 mH, c = 25 μF and R = 10 Ω.

GROUP - B

*Answer **ALL** questions.*

2. What is Gaussian surface ? State Gauss's theorem in electrostatics and use this law to find the electric field strength of a specifically symmetric charge distribution for an external and internal point. [2 +2 + 4 + 4

OR

Find the expression for potential at any point due to an electric dipole and hence find the expression for electric field from the same. [8 + 2

3. Find the expression for electrostatic potential energy of a spherical charge. [10

OR

(a) Find capacitance of an isolated spherical conductor. [4

(b) Find capacitance of parallel plate capacitor completely filled with a dielectric. [6

4. Define molecular polarisability, electric susceptibility and diekectric constant. Find relation between dielectric constant and susceptibility. [2 + 2 + 4

OR

(a) Explain Gauss law as applied to dielectric. [4

(b) Derive the differential form of Gauss's law in dielectric. [6

5. State and prove Ampere's circuital law. [4 + 6

Find magnetic field due to a long solenoid carrying current.

OR

Find expression for torque acting on a current loop placed in uniform magnetic field. [10

6. Define self and mutual inductance. Prove the reciprocity theorem of mutual inductance. [10

OR

Find the exprssion for instantaneous current i_0 in terms of maximum current i_0 in terms of R-L circuit connected with D.C. source during growth and decay. [10

2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer any five questions. [2 × 5

   (a) What are Fermat's principles of Least time ?

   (b) Distinguish between longitudinal and transverse wave.

   (c) State Huygen's principle.

   (d) In Young's double slit experiment light of wavelength 5000 Å is ised to get an interference pattern on a screen. The fringe width changes by 2. mm when the screen towards the double slit by 100 cm. Find the distance between two slits.

   (e) Why is the centre of ring dark in Newton's ring set up ?

   (f) Can we produce interference with white light ?

   (g) Explain the difference between Fresnel's and Fraunhofer diffraction.

GROUP - B

*Answer **ALL** questions.*

2. Describe the construction, working and ray diagram of Huygen's eye-piece. What are its merits and demerits ? [7 + 3

OR

Find an expression for energy and energy density in a progressive wave. [10

3. Compound analytically two rectangular simple harmonic motions of different amplitudes and the frequencies in the ratio 2 : 1 (or periods in the ratio 1 : 2). Discuss the cases when the phase difference is 0, $\frac{\pi}{2}$ and π. [10

OR

State Huygen's principle and derive the law of refraction on its basis. [3 + 7

4. Describe Fresnel's biprism. Explain how the wavlength of light can be determined woth its help. [3 + 7

OR

Explain how Newton's rings are formed and describe the method for determination of wavelength of light using Newton's ring. [4 + 6

5. Describe the construction of Michelson's interferometer and explain the formation of fringes in it. [4 + 6

OR

Describe Fabry-Perot interferometer and explain its action. How it is used to find wavelength of light ? [4 + 6

6. Define resolving power of a telescope and derive an expression for the same. [2 + 8

OR

Explain Fresnel's half period zone. Find the phase difference between wavelets from successive half period zone. [10

APV-KNJ-Sem-II-19-Phy(C-4)/65

2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer any five questions. [2 × 5

   (a) If **r** is the position vector of a point then show that div **r** = 3.

   (b) State the principle of conservation of angular momentum.

   (c) Disstinguish between inertial mass and gravitational mass.

   (d) State Gauss's law in electrostatic.

   (e) State first law of thermodynamocs.

   (f) Distinguish between Fresnel and Fraunhofer diffraction.

   (g) State fundamental postulates of special theory of relativity.

GROUP - B

*Answer **ALL** questions.*

2. (a) Prove that [5

$$\mathbf{A} \cdot (\mathbf{B} \times \mathbf{C}) = \mathbf{B} \cdot (\mathbf{C} \times \mathbf{A}) = \mathbf{C} \cdot (\mathbf{A} \times \mathbf{B}).$$

(b) If $\mathbf{A} = 5t^2\mathbf{i} + t\mathbf{j} - t^3\mathbf{k}$ and $\mathbf{B} = \sin t\mathbf{i} - \cos t\mathbf{j}$, find [3

$$\frac{d}{dt}(\mathbf{A} \cdot \mathbf{B})$$

(c) If $\mathbf{A}$ is a consstant vector, prove that $\nabla(\mathbf{r} \cdot \mathbf{A}) = \mathbf{A}$ where $\mathbf{r}$ is a position vector. [2

OR

What do you mean by moment of inertia ? Calculate the moment of inertia of a solid sphere about a diameter. [2 + 8

3. What are Kepler's laws of planetary motion ? Derive Kepler's laws from Newton's laws of gravitation. [1 + 1 + 1 + 7

OR

Find gravitational fields and potentials due to a solid sphere for external and internal points. [10

4. (a) Derive differential form of Gauss's law. [3

(b) Using Gauss's theorem find electric field due to a sphrically symmetric charge distribution when points lying outside and inside the sphere. [7

OR

Whatis forced vibration ? Derive and solve the differential equation of a forced harmonic oscillator. [2 + 8

5. What is zone plate and how is it made ? Explain how a zone plate acts like a convergent lens having multiple foci. Derive an expression for its focal length. [2 + 8

OR

(a) Derive adiabatic equation PV^{γ} = constant where the letters have their usual meaning. [8

(b) A Carnot engine whose heat sink is at 27^0 C utilizes 4.0% of heat absorbed into useful work. How much should be the cahnge in the temperature of source that efficiency becomes 50% ? [2

6. (a) Derive the formula for the variation of the mass of a particle with its velocity. [8

(b) Show that rest mass of a photon is zero. [2

OR

Find the expression for instantaneous current i in terms of time t and maximum current i_0 in R-L circuit connecting with DC source during growth and decay. [6 + 4

(b) What is Friedel Craft reaction ? Discuss the mechanism of acylation of benzene. [5

OR

(a) Discuss the molecular orbital structure of benzene. [5

(b) Give the general mechanism of electrophilic aromatic substitution reaction. [5

2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

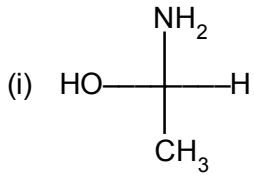
1. Answer any five questions. [2 × 5

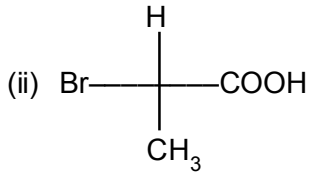
(a) Classify the electrophile and nucleophile of the following :

NH_3 , BF_3 , CN^- and SO_3

(b) Define dipolemoment.

(c) Assign R and S configuration –

(i) 

(ii) 

(d) What is Wurtz-Fittig reaction ?

(e) Complete the reaction –

$$HC{\equiv}CH + H_2O \xrightarrow[H_2SO_4]{HgSO_4} ?$$

(f) State and explain Huckel's rule.

(g) Convert Benzene to Benzoic acid.

GROUP - B

*Answer **ALL** questions.*

2. (a) Why monochlore acetic acid is more is more acidic than acetic acid. [5

(b) Explain the acidic character of phenol. [5

OR

(a) What are carbanions ? Discuss their formation, stability and structure. [5

(b) Explain Resonance with examples and Resonance energy. [5

3. (a) What are the necessary conditions for a compound to show optical activity ? [3

(b) Discuss the optical isomerism of tactic acid. [5

(c) What do you understand by E and Z notation ? [2

OR

Write notes on : [5 × 2

(a) Specific Rotation

(b) Distereomers

4. (a) Write a note on Baeyer's strain theory. [5

(b) What do you understand by boat and chair confirmation of cyclohexane ? [5

OR

Discuss thw confirmational isomerism of n-butane with energy level diagram. [10

5. (a) What are elimination reactions ? Discuss the mechanism of E_2 reaction. [5

(b) Explain hydroboration and oxidation reaction of alkene. [5

OR

(a) Complete the reaction : [3

$$CH_3{-}CH{=}CH_3 + O_3 \longrightarrow ? \xrightarrow{Zn\,/\,H_2O} ?$$

(b) Explain the acidic strength of acetylene, ethylene and ethane. [4

(c) Convert Propyne to But-2-yne. [3

6. (a) Write the mechanism of Nitration of Benzene. [5

(b) Discuss the effect of pressure on equilibrium constants, K_P and K_x. [4

6. (a) Derive thermodynamically the relation between the elevation of boiling point of a solution and the molar mass of the dissolved solute. [8

(b) When 2 gm of nonvolatile solute is dissolved in 70 gm of water, boiling point of the solution is found to be 100.25^0 C. Calculate the molecular weight of the solute. [2
(K_b = 0.51 K.kg.mol^{-1})

OR

(a) Derive thermodynamically, expressions for the following colligative properties of dilute solution : [4 + 4

(i) Relative lowering of vapour pressure

(ii) Osmotic pressure.

(b) An aquous solution of glucose contains 18 gm of glucose per 500 cc of solution. Calculate the osmotic pressure of the solution at 27^0 C. (R = 0.082 L.atmK^{-1}.mol^{-1}) [2

2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer any five questions. [2 × 5

(a) Distinguish between extensive and intensive properties.

(b) Calculate the work done when 16 gm of oxygen gas undergoes reversible isothermal expansion from 4 L to 16 L at 27^0 C. (R = 831 JK^{-1}.mol^{-1})

(c) Discuss the effect of temperature and pressure on the following gaseous reaction :

$$2SO_2 + O_2 \rightleftharpoons 2SO_3 + 188 \text{ kJ}.$$

(d) Between 0.1 M NaCl and 0.1 M $Ca(NO_3)_2$ solution which will have higher freezing point and why ?

(e) Explain what is meant by the term “Chemical Potential”.

(f) What is Inversion Temperature ? How is it related to Van der Waal’s constants, aand b ?

(g) Write down two different statements of second law of thermodynamics.

GROUP - B

*Answer **ALL** questions.*

2. (a) Derive thermodynamically the relationship between C_P and C_V for an ideal gas. [6

(b) What is meant by Internal energy ? Prove that internal energy is a state function. [4

OR

(a) (i) State and explain the first law of thermodynamics. [3

(ii) Write a note on Enthalpy. [3

(b) Deduce the values of w, q, ΔE and ΔH for reversible isothermal expansion of an ideal gas. [4

3. (a) What is meant by Entropy ? Deduce an expression for the molar entropy change of mixing of ideal gases. [3 + 5

(b) Calculate the entropy change when 3.2 gm of oxygen gas and 16.8 gm of Nitrogen gas at 25 C are mixed assuming the gases to behave ideally at this temperature. [2
($R = 8.31\ JK^{-1}.mol^{-1}$)

OR

(a) State and explain the third law of thermodynamics. [4

(b) How does the third law help in the calculation of absolute entropies of chemical compounds at any desired temperature ? [6

4. (a) Distinguish between Hemlholtz free energy and Gibbs free energy and derive Gibbs-Helmholtz equation. [2 + 4

(b) Deduce the following thermodynamic expressions : [4

(i) $\left(\frac{\partial G}{\partial T}\right)_T = V$

(ii) $\left(\frac{\partial A}{\partial V}\right)_T = -P$

OR

(a) Derive an expression for chemical potential of ideal mixtures in terms of mole fractions of constutuents. [5

(b) Deduce the following thermodynamic equation of state :

$$\left(\frac{\partial E}{\partial V}\right)_T = T\left(\frac{\partial P}{\partial T}\right)_V - P.$$ [5

5. (a) What are criteria of thermodynamic equilibrium ? Derive an expression for thermodynamic equilibrium constant. [2 + 4

(b) Establish the relationship between the equilibrium K_P , K_C and K_x. [4

OR

(a) Derive integrated form of Van't Hoff equation. [6

(ii) $CH{\equiv}CH \xrightarrow[KMnO_4]{\text{alkaline}} ?$

(iii) $CH{\equiv}CH + Cu_2Cl_2 + 2NH_4OH \longrightarrow ?$

2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer any five questions. [2 × 5

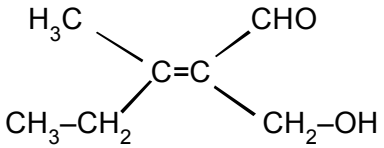
(a) Give the significance of ψ and ψ^2.

(b) Write the electronic configuration of Cu^+ and Fe^{3+}.

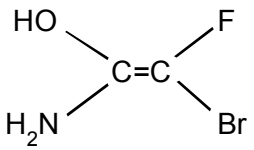
(c) Define Lattice energy and solvation energy.

(d) Assign E and Z notation of the following :

(i)



(ii)



(e) Define Resonance and Resonance energy.

(f) Write the structural isomer of Butane.

(g) What happens when Calcium carbide treated with water ?

GROUP - B

*Answer **ALL** questions.*

2. Derive Schrodinger's wave equation for hydrogen atom. [10

OR

Write notes on : [6 + 4

(a) Quantum Number

(b) Electronegativity

3. Explain the VSEPR theory and discuss the shape of NH_3 and H_2O molecule with the help of VSEPR theory. [5 + 2½ + 2½

OR

Draw molecular orbital diagram of N_2 and CO molecules. Find the bond order, bond length and magnetic behaviour. [5 + 5

4. What are carbocations ? How they are formed ? Discuss their structure and stability. [2 + 8

OR

Write notes on : [5 × 2

(a) Inductive effect

(b) Hyper conjugation

5. (a) Discuss the confirmation of cyclo hexane and its stability. [6

(b) Write a note on Diastereomer. [4

OR

(a) Explain optical activity and specific rotation. [6

(b) Write a note on Meso Compound. [4

6. (a) How Propene is prepared from Propyl alcohol and Propyl bromide. [4

(b) Complete the reactions : [2 × 3

(i) $CH_3–CH=CH_2 + H–Br \xrightarrow{R_2O_2} ?$

(ii) $CH_3–CH=CH_2 + H_2O \xrightarrow[KMnO_4]{\text{alkaline}} ?$

(iii) $CH_3–CH=CH_2 + O_3 \longrightarrow ? \xrightarrow{Zn / H_2O} ?$

OR

(a) Write any two methods of preparation of ethyne. [4

(b) Complete the reactions : [2 × 3

(i) $CH{\equiv}CH \xrightarrow[H_2SO_4]{HgSO_4} ?$

(c) If $\overline{\lim}\left(\frac{a_{n+1}}{a_n}\right) < 1$, then the series $\sum a_n$ converges. Prove this. [6

(d) Test the convergence of the series $\sum a_n$ where $a_n = \sqrt{n+1} - \sqrt{n}$. [6

6. Let $0 \le m < n$, $S_n = a_0 + a_1 + \ldots\ldots + a_n$ and $a_{-1} = 0$. Then prove that

$$\sum_{k=m}^{n} a_k b_k = \sum_{k=m}^{n-1} S_k(b_k - b_{k+1}) + S_n b_n - S_{m-1} b_m. \quad [12$$

OR

Let $a_n \in \mathbb{C}$. If the series $\sum a_n$ is absolutely convergent, then it is convergent, but the converse is not true. Prove this. [12

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.
The symbols used have their usual meaning.

GROUP - A

1. Answer any ten questions. [2 × 10

(a) Define Ordered field.

(b) Define least upper bound property.

(c) Find maximum, minimum, supremum, infimum of a set $S = \left\{\frac{5n+2}{n} : n \in \mathbb{N}\right\}$.

(d) Determine the set of all cluster points of the sequence (x_n), where $x_n = \frac{(-1)^n}{n}$.

(e) Test the convergence of the series $\sum a_n$ where $a = \frac{10^n}{n!}$.

(f) State the conditional convergence of the series

$$1 - \tfrac{1}{3} + \tfrac{1}{5} - \tfrac{1}{7} + \ldots\ldots$$

(g) Write value of $\lim\left(n^{\frac{1}{n}}\right)$ as $n \to \infty$.

(h) Test the absolute convergence of the series

$$1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \text{.....}$$

(i) Give an example of a sequence which is unbounded and oscillatory.

(j) Give an example that the sequence $(x_n \, . \, y_n)$ is convergent whenever (x_n) and (y_n) are both divergent.

(k) Determine the sequence (a_n) is bounded, unbounded, convergent, divergent, oscillatory when $a_n = 10(-1)^n + \frac{1}{n}$.

(l) Find the value of x that satisfies $|3x - 5| < 2$.

GROUP - B

*Answer **ALL** questions choosing*
either {(a), (b)} or {(c), (d)} from each question except Q.No. 6.

2. (a) Let F be an ordered field and a, b, c $\in$ F. Then prove that, if for all $c > 0$, $a < b + c$, then $a \leq b$. [6

(b) Prove that Q, the set of rational number, is countable. [6

OR

(c) Find the value of x for which $|7x - 5| \geq 3$ holds. [6

(d) Prove that (a, b) is uncountable where a, b $\in \mathbb{R}$ and $a < b$. [6

3. (a) Define continuum property. Prove that the set Q, set of rational numbers is not complete. [6

(b) Let $z_n \leq y_n \leq z_n$ for $n \in \mathbb{N}$ and $\lim x_n = l = \lim z_n$ as $n \to \infty$. Then prove that $\lim y_n = l$ as $n \to \infty$. [6

OR

(c) Define dense in $\mathbb{R}$. Prove that Q is dense in $\mathbb{R}$. [6

(d) State and prove Archimedian principle. [6

4. (a) Define convergence sequence. Prove that every Cauchy sequence is bounded. [6

(b) Define subsequence. Prove that every bounded sequence has convergent subsequence. [6

OR

(c) A sequence (x_n) is convergent to l if and only if every subsequence of (x_n) is also convergent to l. Prove this. [6

(d) Every Cauchy sequence of real numbers is convergent. Prove this. [6

5. (a) Let the series $\sum b_n$ be convergent. If there exists a constant $k > 0$ such that $0 \leq a_n \leq kb_n$, then prove that the series $\sum a_n$ is convergent. [6

(b) Test the convergence of the series $\sum a_n$ where [6

$$a_n = \frac{n ! \times 2^n}{n^n} .$$

OR

OR

(c) Solve the initial value problem by using Laplace transform

$y'' + 2y' + 5y = \sin t,\ y(0) = 1,\ y'(0) = 2.$ [5

(d) Find the inverse Laplace transform of [5

$$\bar{f}(p) = \frac{p + 1}{p^3 + p^2 - 6p} .$$

2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.
The symbols used have their usual meaning.

GROUP - A

1. Answer any five questions. [2 × 5

(a) Solve the differential equation

$$\frac{dy}{dx} = \frac{y}{x} + \tan\left(\frac{y}{x}\right).$$

(b) Solve $y = xp + \sin^{-1} p$, where $p = \frac{dy}{dx}$.

(c) Find the general solution of

$y'' + 8y = 0.$

(d) Solve the Euler's equation

$(x^2D^2 - 3xD)y = 0.$

(e) Find the Laplace transform of

$t^5 + e^{-2t} \cos t.$

(f) Find the inverse Laplace transform of

$$\frac{3p - 2}{p^2 + 1}$$

(g) Find the complementary function of

$$(D^2 + 1)y = \text{cosec } x.$$

GROUP - B

*Answer **ALL** questions choosing*
either {(a), (b)} or {(c), (d)} from each question except Q. No. 5.

2. (a) Solve : [5

$$(2x + y + 3)\frac{dy}{dx} = x + 2y + 3.$$

(b) Solve : [5

$$\frac{dy}{dx} + y \tan x = \sin 2x, \; y(0) = 1.$$

OR

(c) Solve : $(px - y)(x - py) = 2p$ [5

(d) Solve : $y = 2xy - p^3$ [5

3. (a) Find the general solution of [5

$$(D^2 + 4)\, 4D + 5)y = 0.$$

(b) Find the particular integral of [5

$$(D^2 + 4)y = x \sin x.$$

OR

(c) Solve : $(2x^2D^2 + 5xD + 1)y = ax + b.$ [5

(d) Solve, using method of variation of parameter, [5

$$(D^2 + 2D + 5)y = e^{-x} \sec 2x.$$

4. (a) Solve : $x^2y'' + 3xy' + y = x \log x.$ [5

(b) Solve : $xy'' - y' + (1 - x)y = xe^{-x}.$ [5

OR

(c) Solve the initial value problem [5

$$x^2y'' - 2xy' + 2y = 0 \; ; \; y(1) = 3 \text{ and } y'(1) = 5.$$

(d) Solve : $y'' + 4xy' + 4x^2y = 0.$ [5

5. Find the power series solution of [10

$$(x^2 + 1)y'' + xy' + xy = 0.$$

OR

Find the power series solution of [10

$$(1 - x^2)y'' - 2xy' + 2y = 0.$$

6. (a) Find the Laplace transform of the function [5

$$f(t) = a + bt + ct^2 + \sin^2 2t.$$

(b) Using Laplace transform solve the initial value problem [5

$$y'' + y' + y = 1, \; y(0) = y'(0) = 1.$$

OR

(c) Solve : $\frac{dy}{dx} - a\frac{y}{x} = \frac{x+1}{x}$. [6

(d) Solve : $p^2 + px + py + xy = 0$ [6

6. (a) Solve $(D^2 + 2D + 5)y = e^{-x} \sec 2x$. [6

(b) Find the Laplace transform of $e^{-2t} \cdot \cos 3t$. [6

OR

(c) Solve : $(1 - x^2)y'' - 2xy' + 2y = 0$ [6

(d) Solve : $(D^2 + 3D\ \ 10)y = 6e^{-3x} + \sin 2x$ [6

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.
The symbols used have their usual meaning.

GROUP - A

1. Answer any ten questions. [2 × 10

(a) Find the asymptotes parallel to co-ordinate axes for the curve

$a^2x^2 + b^2y^2 = x^2y^2$.

(b) Find the curvature at any point of the curve $s = a \sin \psi$.

(c) Find the radius of curvature at the origin for

$(x^3y - xy^3 + 2x^2y - 2xy^2 + 2y^2 - 3x^2 + 3xy - 4x = 0$.

(d) Find the limit of the function

$f(x, y) = \frac{2y^2}{\sqrt{x^2 + xy}}$ as $x \to 0$ and $y \to 0$.

(e) For the function $f(x, y) = \sqrt{16 - x^2 - y^2}$

find $\frac{\partial f}{\partial y}$.

(f) Determine the equation of the sphere passing through the point (1, 2,1) and the circle $x^2 + y^2 + z^2 - 9 = 0 = z$.

(g) Find the equation of cone whose vertex is at the origin and whose guiding curve is the curve of intersection of the surface $2x^2 + 3y^2 + 4z^2 = 5$ and the plane $x + y + z = 2$.

(h) Solve : $(x + y)dx + dy = 0$

(i) Solve : $p^2 + y^2 = 9$

(j) Find the solution of $y'' - y' - 6 = 0$

(k) Find the inverse Laplace transform of $\frac{1}{p(p + 1)}$.

(l) Find the Laplace transform of $t^3 + 3 \cos 2t$.

GROUP - B

*Answer **ALL** questions choosing*
either {(a), (b)} or {(c), (d)} from each question.

2. (a) Find the asymptotes of the curve [6

$$x(y - x)^2 = x(y - x) + 2$$

(b) Trace the curve $y^2 = x(x + 1)^2$. [6

OR

(c) Find the area of the curve $x^4y^2 = x^5(2a - x)$. [6

(d) Find the radius of curvature of the curve $x^2y = a(x^2 + y^2)$ at the point $(-2a, 2a)$. [6

3. (a) Find the equation of the sphere through the circle $x^2 + y^2 + z^2 - 4 = 0 = x^2 + y^2 + z^2 - 2x - 2y - 4$, whose centre lies on the plane $x + y + z = 1$. [6

(b) Find the equation of the cone whose vertex is the origin and whose guiding curve is the circle $x^2 + y^2 = 4$, $z = 2$. [6

OR

(c) Find the equation of sphere for which the circle $x^2 + y^2 + z^2 + 7y - 2z + 2 = 0 = 2x + 3y + 4z - 8$ is a great circle. [6

(d) Find the equation of the cylinder whose guiding curve is given by the equation $3x^2 + 2y^2 - 1 = 0 = z - 3$ and whose axis has direction ratios 1, 1, 2. [6

4. (a) Prove that $f(x, y) = \sqrt{|xy|}$ is not differentiable at the origin. [6

(b) Find the naximum value of [6

$$x^2 + y^2 + (x + y + 1)^2.$$

OR

(c) Find the double limit and repeated limits of $f(x, y) = \frac{x^3y}{x^4 + y^4}$ at (0, 0). [6

(d) State and prove Taylor's theorem for a function of two variables. [6

5. (a) Solve : $(y^2 - 2xy)dx - (x^2 - 2xy)dy = 0$ [6

(b) Solve : $y = px + p - p^2$ [6

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer any ten questions. [2 × 10

   (a) Distinguish between Trade and Commerce.

   (b) What do you mean by liberalisation ?

   (c) Discuss the nature of services.

   (d) What is “Make in India” campaign ?

   (e) What do you understand by “Sole Proprietorship” ?

   (f) What is Public Company ?

   (g) State three characteristics of Cooperative Organisation.

   (h) What is Management ?

   (i) What is Informal Organisation ?

   (j) What do you mean by “Departmentation” ?

(k) State the characteristics of Decentralisation ?

(l) What is marketing mix ?

GROUP - B

*Answer **ALL** questions.*

2. What do you understand by e-commerce ? State its benefits for the modern business. [12

OR

Define Small Scale Industries. What steps have been taken by the Government for their development ?

3. What is Partnership ? Discuss merits and demerits of Partnership. [12

OR

What do you mean by a company ? Discuss advantages and limitations of a Company Organisation.

4. What are the factors to be considered for starting a business ? Discuss. [12

OR

Define Management. Explain its essential characteristics.

5. Defie Motivation. Explain the importance of motivation. [12

OR

What is Communication ? Discuss characteristics and importance of communication.

6. What do you mean by product life cycle ? Discuss various stages of product life cycle. [12

OR

What are Preference Shares ? Distinguish between Equity share and Preference share.

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2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer any ten questions. [2 × 10

   (a) Define a company limited by shares.

   (b) What is a Government Company ?

   (c) What is meant by Articles of Association ?

   (d) What is Prospectus of a company ?

   (e) Define the term “Managing Director”.

   (f) Distinguish between Share and Stock.

   (g) How is a Company Secretary appointed ?

   (h) What is Annual General Meeting ?

   (i) What is Inetrim dividend ?

   (j) What are Books of Accounts ?

(k) What is the minimum and maximum number of Directors of a private and public company ?

(l) State three liabilities of an Auditor.

GROUP - B

*Answer **ALL** questions.*

2. Define the tern Company. What are its characteristics ? [12

OR

What is Incorporation of a company ? Discuss the steps to be taken for incorporation of a company.

3. What is Memorandum of Association ? What are its contents ? [12

OR

Briefly discuss the provisions of Companies Act regarding appointment of directors of a company.

4. Who is a Company Secretary ? Discuss the provisions of the Companies Act regarding rights and duties of a Company Secretary. [12

OR

What is Extraordinary Meeting ? Discuss the legal provisions of Companies Act for conducting Extraordinary Meeting.

5. What is Audit Committee ? Discuss the scope and functions of Audit Committee. [12

OR

Explain rights and duties of Auditors.

6. What is Winding up a company ? Discuss various modes of winding up. [12

OR

What do you mean by transfer of shares ? Distinguish between transfer of shares and transmission of shares.

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer any ten of the following questions. [2 × 10

   (a) Define STatistics.

   (b) State three characteristics of Classification.

   (c) State three methods of collecting secondary data.

   (d) State three merits of Arithmetic Mean.

   (e) Find H. M. of 5, 10, 15, 20, 25.

   (f) State three merits of Quartile Deviation.

   (g) Define Standard Deviation.

   (h) Give an example of Positive Correlation.

   (i) What is Regression Analysis ?

   (j) State three uses of Index Numbers.

(k) State components of Time Series.

(l) Explain Addition theorem of probability.

GROUP - B

*Answer **ALL** questions.*

2. From the follwing series compute the value of Geometric Mean. [15

Marks	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
No. of students	5	13	7	11	4

OR

(a) Explain various sources of collecting primary data. [7½

(b) Explain median. State its merits and demerits. [7½

3. Calculate Standard Deviation from the following data. [15

Marks	10	20	30	40	50	60
No. of students	13	7	20	10	7	3

OR

From the following, calculate the Karl Pearson's coefficient of correlation.

X	8	4	10	2	6
Y	9	11	5	8	7

4. From the following data, form the regression equations $Y_c = a + bX$ and $X_c = a + bY$ using normal equation method. [15

OR

Write short notes on : [5 × 3

(a) Secular Trend

(b) Seasonal Variation

(c) Cyclical variation

5. From the following data given beow compute Fisher's Ideal Index Number. [15

Commodity	Year			
	2014		2017	
	Price	Qnty	Price	Qnty
P	20	8	40	6
Q	50	10	60	5
R	40	15	50	15
S	20	20	20	25

OR

What is Index Number ? Discuss various problems in the construction of Index Number.