

Basic nuclear properties-size, binding energy, angular momentum, parity, magnetic moment; Semi-empirical mass formula and applications. Mass parabolas; Ground state of a deuteron, magnetic moment and non-central forces; Meson theory of nuclear forces; Salient features of nuclear forces; Shell model of the nucleus - success and limitations; Violation of parity in beta decay; Gamma decay and internal conversion; Elementary ideas about Mossbauer spectroscopy; Q-value of nuclear reactions; Nuclear fission and fusion, energy production in stars. Nuclear reactors.

Classification of elementary particles and their interactions; Conservation laws; Quark structure of hadrons : Field quanta of electroweak and strong interactions; Elementary ideas about unification of forces; Physics of neutrinos.

#### **4. Solid State Physics, Devices and Electronics :**

Crystalline and amorphous structure of matter; Different crystal systems, space groups; Methods of determination of crystal structure; X-ray diffraction, scanning and transmission electron microscopies; Band theory of solids—conductors, insulators and semi-conductors; Thermal properties of solids, specific heat, Debye theory; Magnetism: dia, para and ferromagnetism; Elements of super-conductivity, Meissner effect, Josephson junctions and applications; Elementary ideas about high temperature super-conductivity.

Intrinsic and extrinsic semi-conductors- p-n-p and n-p-n transistors; Amplifiers and oscillators. Op-amps; FET, JFET and MOSFET; Digital electronics-Boolean identities, De Morgan's laws, Logic gates and truth tables. Simple logic circuits; Thermistors, solar cells; Fundamentals of microprocessors and digital computers.

### **POLITICAL SCIENCE AND INTERNATIONAL RELATIONS**

#### **PAPER- I**

##### **Political Theory and Indian Politics :**

1. Political Theory: meaning and approaches.
2. Theories of state : Liberal, Neo-liberal, Marxist, Pluiralist, post-colonial and Feminist.
3. Justice : Conceptions of justice with special reference to Rawl's theory of justice and its communitarian critiques.
4. Equality : Social, political and economic; relationship between equality and freedom; Affirmative action.
5. Rights : Meaning and theories; different kinds of rights; Concept of Human Rights.
6. Democracy : Classical and contemporary theories; different models of democracy—representative, participatory and deliberative.
7. Concept of power : hegemony, ideology and legitimacy.
8. Political Ideologies : Liberalism, Socialism, Marxism, Fascism, Gandhism and Feminism.
9. Indian Political Thought: *Dharamshastra*, *Arthashastra* and Buddhist Traditions; Sir Syed Ahmed Khan, Sri Aurobindo, M. K. Gandhi, B. R. Ambedkar, M. N. Roy.
10. Western Political Thought : Plato, Aristotle, Machiavelli, Hobbes, Locke, John S. Mill, Marx, Gramsci, Hannah Arendt.

##### **Indian Government and Politics**

###### **1. Indian Nationalism :**

(a) Political Strategies of India's Freedom Struggle : Constitutionalism to mass Satyagraha, Non-cooperation, Civil Disobedience; Militant and Revolutionary Movements, Peasant and Workers Movements.

Government strives to have a workforce which reflects gender balance and women candidates are encouraged to apply.

(b) Perspectives on Indian National Movement; Liberal, Socialist and Marxist; Radical Humanist and Dalit.

2. Making of the Indian Constitution : Legacies of the British rule; different social and political perspectives.

3. Salient Features of the Indian Constitution : The Preamble, Fundamental Rights and Duties, Directive Principles; Parliamentary System and Amendment Procedures; Judicial Review and Basic Structure doctrine.

4. (a) Principal Organs of the Union Government : Envisaged role and actual working of the Executive, Legislature and Supreme Court.

(b) Principal Organs of the State Government : Envisaged role and actual working of the Executive, Legislature and High Courts.

5. Grassroots Democracy : Panchayati Raj and Municipal Government; Significance of 73rd and 74th Amendments; Grassroot movements.

6. Statutory Institutions/Commissions : Election Commission, Comptroller and Auditor General, Finance Commission, Union Public Service Commission, National Commission for Scheduled Castes, National Commission for Scheduled Tribes, National Commission for Women; National Human Rights Commission, National Commission for Minorities, National Backward Classes Commission.

7. Federalism : Constitutional provisions; changing nature of centre-state relations; integrationist tendencies and regional aspirations; inter-state disputes.

8. Planning and Economic development : Nehruvian and Gandhian perspectives; Role of planning and public sector; Green Revolution, land reforms and agrarian relations; liberalization and economic reforms.

9. Caste, Religion and Ethnicity in Indian Politics.

10. Party System : National and regional political parties, ideological and social bases of parties; Patterns of coalition politics; Pressure groups, trends in electoral behaviour; changing socio-economic profile of Legislators.

11. Social Movement : Civil liberties and human rights movements; women's movements; environmentalist movements.

## **PAPER-II**

### **Comparative Politics and International Relations**

#### **Comparative Political Analysis and International Politics :**

1. Comparative Politics : Nature and major approaches; Political economy and political sociology perspectives; Limitations of the comparative method.

2. State in Comparative Perspective : Characteristics and changing nature of the State in capitalist and socialist economies, and advanced industrial and developing societies.

3. Politics of Representation and Participation : Political parties, pressure groups and social movements in advanced industrial and developing societies.

4. Globalisation : Responses from developed and developing societies.

5. Approaches to the Study of International Relations : Idealist, Realist, Marxist, Functionalist and Systems theory.

6. Key Concepts in International Relations : National interest, security and power; Balance of power and Government strives to have a workforce which reflects gender balance and women candidates are encouraged to apply.

deterrence; Transnational actors and collective security; World capitalist economy and globalisation.

7. Changing International Political Order :

(a) Rise of super powers; Strategic and ideological Bipolarity, arms race and cold war; Nuclear threat;

(b) Non-aligned Movement : Aims and achievements.

(c) Collapse of the Soviet Union; Unipolarity and American hegemony; Relevance of non-alignment in the contemporary world.

8. Evolution of the International Economic System : From Brettonwoods to WTO; Socialist economies and the CMEA (Council for Mutual Economic Assistance); Third World demand for new international economic order; Globalisation of the world economy.

9. United Nations : Envisaged role and actual record; Specialized UN agencies—aims and functioning; need for UN reforms.

10. Regionalisation of World Politics : EU, ASEAN, APEC, AARC, NAFTA.

11. Contemporary Global Concerns : Democracy, human rights, environment, gender justice terrorism, nuclear proliferation.

### **India and the World**

1. Indian Foreign Policy : Determinants of foreign policy; the institutions of policy-making; Continuity and change.

2. India's Contribution to the Non-Alignment Movement Different phases; Current role.

3. India and South Asia :

(a) Regional Co-operation : SAARC-past performance and future prospects.

(b) South Asia as a Free Trade Area.

(c) India's "Look East" policy.

(d) Impediments to regional co-operation : River water disputes; illegal cross border migration; Ethnic conflicts and insurgencies; Border disputes.

4. India and the Global South : Relations with Africa and Latin America; Leadership role in the demand for NIEO and WTO negotiations.

5. India and the Global Centres of Power : USA, EU, Japan, China and Russia.

6. India and the UN System: Role in UN Peace-keeping; Demand for Permanent Seat in the Security Council.

7. India and the Nuclear Question : Changing perceptions and policy.

8. Recent developments in Indian Foreign Policy : India's position on the recent crises in Afghanistan, Iraq and West Asia, growing relations with US and Isreal; Vision of a new world order.

## **PSYCHOLOGY**

### **PAPER-I**

#### **Foundations of Psychology**

1. **Introduction** : Definition of Psychology; Historical antecedents of Psychology and trends in the 21st century; Psychology and scientific methods; Psychology in relation to other social sciences and natural sciences; Application of Psychology to societal problems.

Government strives to have a workforce which reflects gender balance and women candidates are encouraged to apply.