

ENTRANCE EXAMINATION, 2015

M.Phil./Ph.D.

STUDIES IN SCIENCE POLICY

[Field of Study Code : SSPP (148)]

Time Allowed : 3 hours

Maximum Marks : 70

- Note :** (i) This question paper has **four** Parts. Read the instructions given in each Part.
 (ii) All Parts are to be answered in the answer-script.
 (iii) The figures in the right-hand margin indicate marks for the questions.

PART—IChoose the correct option/Answer all the following : 1×10=10

1. The book entitled, *The Technological Society* was authored by
 - (a) Robert K. Merton
 - (b) Jacques Ellul
 - (c) Adam Smith
 - (d) Max Weber

2. Which of the following is not correctly matched?
 - (a) Scientific Policy Resolution, 1955
 - (b) Technology Policy Statement, 1983
 - (c) Science and Technology and Innovation Policy, 2013
 - (d) All of the above

3. The 'Lima Call for Climate Action' asks
 - (a) all countries to cut down their greenhouse gas emission
 - (b) only all developed countries to cut down their greenhouse gas emission
 - (c) to exclude the developing countries from any emission reduction commitment
 - (d) None of the above

4. The Food Safety and Standards Act, 2006 came into effect from
- 2006
 - 2010
 - 2011
 - None of the above
5. Who among the following is not a recipient of Bharat Ratna?
- A. P. J. Abdul Kalam
 - C. N. R. Rao
 - Homi Jehangir Bhabha
 - C. V. Raman
6. Which of the following is correctly matched?
- The Golden Quadrilateral—A highway network
 - North-South Corridor—A railways network
 - JNNURM—Rural employment
 - All of the above
7. Which of the following Indian States is famous for the 'living root bridges'?
- Nagaland
 - Meghalaya
 - Mizoram
 - Manipur
8. Narendra Dabholkar was primarily known for opposing
- magic and superstitions
 - scientific temper
 - illiteracy
 - industrialization
9. Which of the following is not true about India's Mars Orbiter Mission?
- India has become the first country to send its spacecraft in Mars orbit in its first attempt
 - It was launched in November, 2013 and entered into Mars orbit in September, 2014
 - India has become the second Asian country to successfully send spacecraft in Mars orbit
 - None of the above
10. Expand the following abbreviations :
- | | |
|----------|----------|
| (a) AMUL | (b) BRAI |
| (c) INSA | (d) ISAC |

PART—II

Explain any *five* of the following in 50 words each :

2×5=10

11. Chi square
12. Non-parametric test
13. Frugal innovation
14. Bibliometrics
15. Surplus value
16. Lotka's law
17. Photovoltaic cells
18. Greenhouse
19. 3-D printer
20. Technological lock-in

PART—III

Answer any *four* of the following in not more than 200 words each :

5×4=20

21. Analyze the socioeconomic impact of India-based neutrino observatory located in Tamil Nadu.
22. What is graphene? Discuss its socioeconomic significance.
23. Does the existing 'rewards system' promote excellence and innovation in science in India?
24. What is responsible innovation?
25. Discuss the concept of 'scientific temper' and its relevance in contemporary India.
26. What are the basic challenges related to the diffusion of drip irrigation technology in India?

27. Discuss the technological significance of 'Iron Pillar' located near the Qutb Minar.
28. Discuss the importance of 'Drone Technology' in civilian sector.
29. What is 'traceability' in agro-processing industry? Discuss its significance for consumers.
30. Discuss the merit and benefits of 'Open Science' vis-à-vis 'Secrecy in Science'.
31. Do you agree that biometric technology will bring efficiency in governance? Illustrate.
32. What is 'multiple discovery'? Discuss its significance in the context of the controversies surrounding the discovery of 'Pythagoras theorem'.
33. Discuss the role of public participation in S&T policy making in India.

PART—IV

Answer any *two* of the following in 1500 words each : 15×2=30

34. S&T revolution is leading towards a 'risk society'. Discuss.
35. Do you think 'technological foresight' is different from 'technological forecasting'? Explain.
36. Do you think that self-reliance is an obsolete policy goal in the era of globalization? Critically discuss.
37. Explain the new forms of innovations, which are different from the Schumpeterian notion of entrepreneur-based innovation.
38. Discuss the Science, Technology and Innovation Policy, 2013 and critically evaluate how this policy will meet the challenges of development in India.
39. Critically examine the role of Aadhar Card in minimizing corruption and bringing transparency in governance.
40. What are the challenges in forging the relations between university and industry in India? Discuss the latest policies and programme for increasing the university-industry relations.
41. What do you understand by 'Make in India' programme? Discuss its relevance for innovation and technology development in India.

ENTRANCE EXAMINATION, 2014

M.Phil./Ph.D.

STUDIES IN SCIENCE POLICY

[Field of Study Code : SSPP (148)]

Time Allowed : 3 hours

Maximum Marks : 70

- Note :** (i) This question paper has **four** Parts. Read the instructions given in each Part.
(ii) All Parts are to be answered in the answer-script.
(iii) The figures in the right-hand margin indicate marks for the questions.

PART—I

Choose the correct answer of the following :

1×10=10

1. In which year the latest Science, Technology and Innovation Policy was issued by the Government of India?
 - (a) 1958
 - (b) 2014
 - (c) 2003
 - (d) 2013
2. National Technology Day in India is observed on
 - (a) 11th May
 - (b) 5th June
 - (c) 28th February
 - (d) 7th December
3. The *Sociology of Science* (published in 1979) was a major contribution in the field of science policy studies by
 - (a) Max Weber
 - (b) Robert K. Merton
 - (c) Talcott Parson
 - (d) Emile Durkheim

4. Which of the following is not correctly matched?
- (a) *Operation Flood*—Production of Milk
 - (b) *Blue Revolution*—Production of Indigo
 - (c) *Green Revolution*—Use of High-yield Variety Seeds
 - (d) *Golden Quadrilateral*—Highway Network
5. Between the years 2001–2010, India's expenditure on R & D as percentage of Gross National Product has hovered around
- (a) 2 to 3 percent
 - (b) 3 to 4 percent
 - (c) 0.8 to 1 percent
 - (d) None of the above
6. Mars Mission was launched by ISRO in
- (a) September 2012
 - (b) November 2013
 - (c) December 2013
 - (d) Still awaited
7. Which one of the following is not true about the Jawaharlal Nehru National Solar Mission (JNNSM)?
- (a) It was started in 2009
 - (b) It aims to make India a global leader in solar energy
 - (c) It has three-phase approach
 - (d) It will end in the year 2015
8. Which one of the following is the nodal agency for international cooperation in the area of agricultural research and education in India?
- (a) Department of Agricultural Research and Education
 - (b) Ministry of External Affairs
 - (c) Indian Council of Agricultural Research
 - (d) All of the above
9. The e-waste (Management and Handling) Rule, 2011 came into effect from
- (a) 2011
 - (b) 2012
 - (c) 2013
 - (d) 2014
10. Expand the following abbreviations :
- (a) BARC
 - (b) ISRO
 - (c) NRDC
 - (d) UNESCO

PART—II

Explain about any *five* of the following in 50 words each :

2×5=10

11. Grassroots innovations
12. Social capital
13. Cryogenics
14. Lotka law
15. Crowdsourcing
16. Genomics
17. Quota sampling in social science research
18. Greening of Patent
19. Gini coefficient
20. Drip irrigation

PART—III

Answer any *four* of the following in not more than 200 words each :

5×4=20

21. What do you understand by Green Chemistry? Describe its significance.
22. Discuss the significance of National Electric Mobility Mission Plan (NEMMP), 2020.
23. Critically analyze the importance of National Action Plan on climate change in India.
24. Analyze the socioeconomic impact of the Kudankulam Atomic Power Plant.
25. Do you think that stem cell research in India requires any regulatory mechanism? Discuss.

26. What are the major challenges before India's science and technology policy in the twenty-first century?
27. How relevant is the Jawaharlal Nehru National Solar Mission for energy security in India?
28. Critically analyze the relevance of positivism in social science research.
29. Will the Patent Cliff by 2015 and the likely rush for the production of biosimilar prove to be a lethal blow for the development of the biopharmaceutical sector in India? Explain.

PART—IV

Answer any *two* of the following in 1500 words each :

15×2=30

30. Are the international trade and investment policies undermining India's national policy space? Discuss.
31. "MNCs are not the drivers for transferring of advance technologies in India." Do you agree?
32. Discuss the role of FDI in retail for bringing innovations in food-processing sector in India.
33. What are the key challenges for storage facilities in agriculture sector in India? Discuss the latest policies and programs for their development.
34. Can India develop energy security through renewables?
35. Globalization and market-based economy is widening the gap between 'haves' and 'have not'. Do you agree?
36. Discuss the role of social media in promoting participative democracy in the context of science and technology policy in India.
37. Analyze the consequences of the moratorium on the release of transgenic brinjal hybrid.
38. Discuss the relevance of views of Gandhi, Ambedkar and Tagore on rural development and empowerment of people of India.
39. Do you agree or disagree that the Indian Education System has produced very few techno-entrepreneurs? Explain with illustration.

ENTRANCE EXAMINATION, 2013

M.Phil./Ph.D.

STUDIES IN SCIENCE POLICY

[Field of Study Code : SSPP (148)]

Time Allowed : 3 hours

Maximum Marks : 70

- Note :** (i) This question paper has **four** Parts. Read the instructions given in each Part.
(ii) All Parts are to be answered in the answer-script.
(iii) The figures in the right-hand margin indicate marks for the questions.

PART—I

Choose the correct answer/Answer the following :

1×10=10

1. The book entitled, *Small is Beautiful* was authored by

- (a) Joseph Schumpeter
- (b) E. F. Schumacher
- (c) Joseph Needham
- (d) Max Weber

2. Which of the following is correctly matched?

- (a) Scientific Policy Resolution —1955
- (b) Technology Policy Statement —1983
- (c) Science and Technology Policy —2005
- (d) None of the above

3. The Frascati Manual refers to

- (a) technology transfer
- (b) environmental standards
- (c) agricultural productivity
- (d) measurement of R&D activities

4. The Decade of 2010–2020 has been declared by the Government of India as the Decade of
- (a) Innovation
 - (b) Energy
 - (c) Science
 - (d) All of the above
5. Bioequivalence refers to
- (a) standard on biofertilizers
 - (b) standard on generic pharmaceuticals
 - (c) standard on food and beverages
 - (d) standard on bottled drinking water
6. Which of the following is correctly matched?
- (a) *Wings of Fire*—A. P. J. Abdul Kalam
 - (b) *I too had a Dream*—Vergheese Kurian
 - (c) *Alternative Sciences*—Ashis Nandy
 - (d) All of the above
7. Which of the following is correct about the Human Genome Project?
- (a) It was started in 1980
 - (b) It was an effort of the USA alone
 - (c) It was completed in 2003
 - (d) It was initiated by India
8. 'National Science Day' is celebrated to honour which of the following scientists?
- (a) Ramanujam
 - (b) J. C. Bose
 - (c) Chandrasekhara Venkata Raman
 - (d) Chandrasekhar Subrahmanyam
9. India's 'Chandrayan-2' is scheduled to be launched in
- (a) November, 2013
 - (b) January, 2014
 - (c) December, 2013
 - (d) None of the above
10. Expand the following abbreviations :
- (a) DBT
 - (b) ICAR
 - (c) DAE
 - (d) ICMR

PART—II

Explain any *five* of the following in 50 words each :

2×5=10

11. Cluster sampling
12. Regression
13. R&D indicators
14. Science Citation Index
15. Cloud computing
16. Alienation of labour
17. Blue gene
18. SPSS
19. Cybernetics
20. Inclusive innovation

PART—III

Answer any *four* of the following in not more than 200 words each :

5×4=20

21. Discuss the basic differences between production of knowledge and production of goods.
22. Analyze the risk governance mechanism in nanotechnology.
23. What is the significance of stem cell research for India?
24. What is technological determinism?
25. Discuss Gandhi's ideas on technology and its relevance in contemporary India.
26. Explain the concept of increasing returns to scale in production of knowledge.
27. Discuss the process of institutionalization of science in India.

28. Will mobile phones replace computer-based Internet in India?
29. Should there be more CCTVs to prevent crimes in the society? Or, is privacy more important?
30. "Jugaad is a corrupt way of looking at innovation." Do you agree? Explain.
31. Is climate change anthropogenic? Explain.
32. Discuss the role of ICTs in bringing transparency in governance.
33. Discuss the role of leadership and organization in 'white revolution' in India.

PART—IV

Answer any *two* of the following in 1500 words each :

15×2=30

34. Discuss the importance of the Science, Technology, and Innovation Policy, 2013.
35. "Monopoly is a natural breeding ground for innovation." Do you agree? Explain.
36. Prepare a hypothetical research design to study the importance of nuclear energy programme in India.
37. Discuss the role of 'social network sites' in promoting participative democracy across the nations.
38. What is people's science movement? Analyze the role of leadership and institutions involved in this movement in India.
39. Discuss the ideological underpinnings of India's science policy in post-Independence period (1950–2013).
40. Discuss the significance of harmonizing the international agreements at national level in the context of Convention on Biological Diversity and FAO Treaty on plant genetic resources for food and agriculture.
41. Analyze critically the role of technology foresight for a balanced socioeconomic development.
42. "Increasing number of international collaboration necessarily indicates India's emergence as a global power in setting the agenda for scientific research." Do you agree? Illustrate.

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ENTRANCE EXAMINATION, 2012

M.Phil./Ph.D.

STUDIES IN SCIENCE POLICY

[Field of Study Code : SSPP (148)]

Time Allowed : 3 hours

Maximum Marks : 70

- Note :** (i) This question paper has **four** Parts. Read the instructions given in each Part.
(ii) All Parts are to be answered in the answer-script.
(iii) The figures in the right-hand margin indicate marks for the questions.

PART—I

Write the correct answer of the following (Q. Nos. 1 to 9) :

1×9=9

1. The book entitled *Against Method* was authored by
 - (a) J. D. Bernal
 - (b) Karl Popper
 - (c) Paul Feyerabend
 - (d) Vannevar Bush

2. The Scientific Policy Resolution was passed by the Parliament of India in the year
 - (a) 1957
 - (b) 1974
 - (c) 1983
 - (d) None of the above

3. India's current national R & D expenditure as a proportion of GDP is around
 - (a) 0.50 percent
 - (b) 2.50 percent
 - (c) 1.50 percent
 - (d) None of the above

4. Which of the following genetically modified crops/vegetables is/are approved for farming in India?
- (a) Cotton and Tomato
 - (b) Cotton and Brinjal
 - (c) Cotton only
 - (d) None of the above
5. S. S. Bhatnagar Award is given for exemplary contribution in the field of
- (a) Biology and Medicine
 - (b) Physics and Mathematics
 - (c) Environmental Science
 - (d) All of the above
6. Which one of the following is **not** correctly matched?
- (a) National Physical Laboratory → Gurgaon
 - (b) Indian Toxicological Research Centre → Kanpur
 - (c) Centre for Cellular and Molecular Biology → Kolkata
 - (d) Physical Research Laboratory → Allahabad
 - (e) All of the above
7. The concept of 'division of labour' finds a place in the works of
- (a) Karl Marx
 - (b) Adam Smith
 - (c) Emile Durkheim
 - (d) All of them
8. Which one of the following is **not** correctly matched?
- (a) *The Social Function of Science* → J. D. Bernal
 - (b) *Science in a Free Society* → Karl R. Popper
 - (c) *Capitalism, Socialism and Democracy* → Joseph Schumpeter
 - (d) *Science : The Endless Frontier* → Vannevar Bush

9. Venkataraman Ramakrishnan got Nobel Prize in the field of

- (a) Chemistry
- (b) Physics
- (c) Medicine
- (d) None of the above

10. Write the full forms of IISER, NCERT, ISRO and ICSSR.

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PART—II

Explain any *five* of the following in 50 words each :

2×5=10

- 11. Laissez-faire
- 12. Humanistic Temper
- 13. Indian Citation Index
- 14. Techno-nationalism
- 15. Human Development Index
- 16. Gini Coefficient
- 17. Critical Region
- 18. Patent Thicket
- 19. Environmental Kuznets Curve
- 20. Journal Impact Factor

PART—III

Answer any *four* of the following in not more than 200 words each :

5×4=20

- 21. Discuss the salient features of India's Science and Technology Policy, 2003.
- 22. Discuss the scope of Nanotechnology in medical research.
- 23. Discuss the role of 'Mathew effect' for scientific community.
- 24. Explain the Marxian notion of capital accumulation.

25. Discuss the concept of 'cultural lag' in the context of diffusion of new technology.
26. Write a short note on cyber crimes in India.
27. Discuss S-shaped curve of diffusion of technology.
28. "Gandhi was not against technology." Illustrate your answer with examples.
29. Explain, with the help of diagrams, the difference between 'drastic' and 'non-drastic' innovation.
30. Describe stratified random sampling. How is it different from cluster sampling?
31. Discuss the significance of 'demographic dividend' in India.
32. "A perfectly competitive firm has more incentive to adopt new technology than a monopolist." Explain with the help of diagrams.

PART—IV

Answer any *two* of the following in 1500 words each :

15×2=30

33. Discuss the role of media in science communication and coproduction of knowledge.
34. Discuss the role of technology for inclusive growth with a focus on Mahatma Gandhi National Rural Employment Guarantee Act and National Rural Health Mission.
35. Critically discuss the role of Antrix Corporation in the development of India's Space Programme.
36. What are the major challenges of nuclear energy technology? Illustrate your answer with relevant examples from Indian context.
37. "Does technology drive history?" Critically examine the role of technology in social change.
38. Discuss the importance of technological collaboration in rural reconstruction programme initiated by Rabindranath Tagore.
39. "Bridging the digital divide will not bring digital equality." Illustrate your answer with suitable examples.
40. Discuss the significance of and difference between 'technology forecasting' and 'technology foresight'.

ENTRANCE EXAMINATION, 2010

M.Phil./Ph.D.

STUDIES IN SCIENCE POLICY

[Field of Study Code : SSPP (148)]

Time Allowed : 3 hours

Maximum Marks : 70

- Note :** (i) This question paper has Four Parts. Please read the instructions given in each Part.
(ii) All Parts to be answered and answered in the answer-script.

PART—I

Write the correct answer. Answer **all** questions :

1×10=10

1. *The Social Function of Science* published by the MIT Press in 1967 was authored by
 - (a) R. K. Merton
 - (b) Talcott Parson
 - (c) Max Weber
 - (d) J. D. Bernal

2. India's national R & D expenditure in the last ten years has hovered around
 - (a) 1 percent
 - (b) 2.5 percent
 - (c) 3.5 percent
 - (d) 4 percent

3. 'Science and Technology Policy' was launched by the Government of India in the year
 - (a) 1958
 - (b) 1983
 - (c) 1993
 - (d) 2003

4. Write the full form of all the following :

- (a) TIFAC — Technology, Information, Forecasting and Assessment Council.
(b) DAE — Department of Atomic Energy
(c) ICAR — Indian Council of Agricultural Research
(d) ICMR —

5. The book, The Theory of Economic Development, is written by

- (a) Nathan Rosenberg
(b) Joseph Needham
(c) Joseph Schumpeter ✓
(d) Karl Marx

6. 'Jhum' is a type of

- (a) shifting cultivation ✓
(b) agricultural implement
(c) irrigation
(d) waterless cultivation

7. 'Nash Equilibrium' is a concept used in

- (a) game theory ✓
(b) technological forecasting
(c) regression analysis
(d) chaos theory

8. Which one of the following is not correctly matched?

- (a) Prafulla Chandra Ray—Chemistry
(b) Birbal Sahni—Physics ✓
(c) Srinivas Ramanujan—Mathematics
(d) Vikram Sarabhai—Space Science

9. Who is the author of the book, Science in a Free Society published in 1979?

- (a) Karl Popper
- (b) Robert K. Merton
- (c) Thomas S. Kuhn
- (d) Paul Feyerabend ✓

10. Most of the developing countries are required to protect plant variety by patents or a *suis generis* system under the agreement of

- (a) FAO
- (b) WTO ✓
- (c) UNESCO
- (d) WHO

PART—II

Explain any *five* of the following in 50 words each :

2×5=10

- 11. Normal Distribution
- 12. Correlation and Regression
- 13. Induced Technological Change
- 14. Division of Labour
- 15. Lotka's Law
- 16. Snowball Sampling
- 17. Science Citation Index
- 18. Technological Lag
- 19. Open Source Movement
- 20. GMO

PART—III

Answer any *four* of the following in not more than 200 words each :

5×4=20

- 21. Explain Total Factor Productivity Growth (TFPG).
- 22. "Diffusion of Technology is an automatic process." Critically discuss.
- 23. Does science provide infallible knowledge?

24. "Operationalisation of concept in social sciences is a myth." Critically explain.
25. In what contexts would you deploy the idea of the 'Precautionary Principle'?
26. Discuss the concept of National Innovation System.
27. What is *Technological Learning* and its significance in the innovation system?
28. Discuss the implications of 'Golden Rice' in the context of fragmented ownership of intellectual property rights.
29. Describe the distinction between technological forecasting and technological foresight methodologies.
30. Explain the concept of 'Matthew Effect' in science.

PART—IV

Answer any *two* of the following in 1500 words each :

15×2=30

31. "Technological progress promotes gender discrimination." Critically discuss.
32. What are the social and cultural barriers in the diffusion and adaptation of science and technology in India? Illustrate your answer with suitable examples.
33. Critically analyse the basic features of 'new mode of knowledge production' in a knowledge-based economy and its impact on academic institutions.
34. Are the provisions of the Bayh-Dole Act of USA relevant to the Indian conditions?
35. Analyse the relevance of Mahatma Gandhi's ideas of science and technology in the context of rural development.
36. Discuss the socioeconomic and ethical issues involved in research and international trade related to stem cell.
37. Discuss the current debate on the introduction of Bt Brinjal in India.
38. To what extent the increasing trend of internationalisation of R & D is beneficial to the developing countries?
39. "Intellectual property protection over Traditional Knowledge has led to a clash of cultures." Critically analyse with suitable examples in the medical or agricultural sector.
40. Discuss the significance of technology foresight in R & D planning.

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ENTRANCE EXAMINATION, 2009

M.Phil./Ph.D.

STUDIES IN SCIENCE POLICY

[Field of Study Code : SSPP (197)]

Time Allowed : 3 hours

Maximum Marks : 70

- Note :** (i) This question paper has Four Parts. Please read the instructions given in each Part.
(ii) All Parts to be answered and answered in the answer-script.

PART—I

Write the correct answer. Answer **all** questions :

1×10=10

1. The book *Capitalism, Socialism and Democracy* is authored by
 - (a) J. D. Bernal
 - (b) Joseph Schumpeter ✓
 - (c) Karl Marx
 - (d) None of the above
2. *Science in History* (published in 1954) is authored by
 - (a) D. D. Kosambi
 - (b) Joseph Needham
 - (c) J. D. Bernal
 - (d) Romila Thapar
3. 'Science and Technology Policy' was launched by the Government of India in
 - (a) 1958
 - (b) 1983
 - (c) 1991
 - (d) 2003

4. The first stage of the Kyoto Protocol expires in
- (a) 2010
 - (b) 2012
 - (c) 2014
 - (d) 2015
5. *Healing the Planet* is authored by
- (a) Thomas Kuhn
 - (b) Paul A. Erlich
 - (c) V. Bush
 - (d) Robert K. Merton
6. Which of the following forms of IPR applies, most commonly, to technological innovations?
- (a) Patent
 - (b) Trademarks
 - (c) Copyrights
 - (d) Geographical indicator
7. International effort in R & D measurement or "The Proposed Standard Practice for Surveys of Research and Experimental Development" is now known as
- (a) Delhi Manual
 - (b) Berne Convention
 - (c) Frascati Manual
 - (d) Scientific Policy Resolution
8. The year 2009 is celebrated as
- (a) International Year of Astronomy
 - (b) International Year of the Earth
 - (c) International Year of Water Resources
 - (d) International Year of Climate Change

9. Write the full form of all the following :

- (a) FICCI
- (b) DRDO
- (c) DAE
- (d) ICAR

10. Which of the following is not correctly matched?

- (a) Indian Space Research Organisation—Bengaluru
- (b) Tata Institute of Fundamental Research—Mumbai
- (c) Indian Institute of Science—Chennai
- (d) Saha Institute of Nuclear Science—Kolkata

PART—II

Explain any *five* of the following in 50 words each :

2×5=10

- 11. 'Bail-out' Package
- 12. Tacit Knowledge
- 13. Rationality
- 14. Public Science
- 15. 'Invention' and 'Innovation'
- 16. Type II Error
- 17. Scientific Forestry
- 18. Biodiversity Hotspots
- 19. Geographical Indicators
- 20. S & T Indicators

PART—III

Answer any *four* of the following in not more than 200 words each :

5×4=20

- 21. What is 'Market Environmentalism'?
- 22. Is Biofuel a solution to Global Warming?
- 23. Discuss the 'Survey Method' of data collection.

24. Is Technology Assessment and Forecasting counterproductive in private industries?
25. Discuss 'Carbon Trading'.
26. Discuss the advantages and disadvantages of Genetically Modified Foods.
27. "Strong patent rights are conducive to economic progress." Discuss.
28. What is a Production Function?
29. "Market for technology is, at best, imperfect." Explain.
30. Explain 'economies of scope' and 'economies of scale'.

PART—IV

Answer any *two* of the following in 1500 words each :

15×2=30

31. "Shifting cultivation is an environmentally hazardous practice and should be done away with." Do you agree? Explain with reason.
32. How relevant are Mahatma Gandhi's ideas on Science and Technology today?
33. "Drug Discovery research is biased towards life style diseases." Discuss.
34. Discuss the implications of S & T international cooperation for developing countries.
35. Are wind and solar energy technologies better than thermal and nuclear energy technologies? Explain in detail.
36. Discuss the significance of technology foresight in technology planning.
37. Can the effects of displacements be mitigated by a proper Rehabilitation and Resettlement Policy?
38. Examine critically the impact of climate change on migration.
39. "Division of labour leads to technological progress." Discuss.

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M.Phil./Ph.D. STUDIES IN SCIENCE POLICY

Time Allowed 3 hours

Maximum Marks : 70

This question paper has Four Parts.

Please read the instructions given in each Part.

PART—I

Write the correct answer. Answer **all** the following :

1×10=10

1. *Science : the endless frontier* (published in 1945) was a major contribution in science policy studies by
 - (a) Thomas Kuhn
 - (b) Karl Popper
 - (c) Max Weber
 - (d) Vannevar Bush

2. 'Science and Technology Policy' was adopted in
 - (a) 1958
 - (b) 1985
 - (c) 2003
 - (d) 2005

3. Cryogenic engines are used by
 - (a) Automobile industry
 - (b) Space exploration technology
 - (c) Harvesting in agriculture
 - (d) Railways

4. Kalinga Prize is given for the promotion of
- (a) Peace and Social Harmony
 - (b) Classical Arts and Culture
 - (c) Popularization of Science
 - (d) Sports
5. Name the Indian scientist who propounded a theory on the evolution of the universe and on cosmology
- (a) Jagadish Chandra Bose
 - (b) Jayant V. Narlikar
 - Satyendra Nath Bose
 - (d) C. V. Raman
6. Which is not correctly matched?
- (a) National Physical Laboratory—Pune
 - (b) Central Drug Research Institute—Lucknow
 - (c) National Leather Research Institute—Chennai
 - (d) Physical Research Laboratory—Ahmadabad
7. 'Bottom of the Pyramid' concept was given by
- (a) C. K. Prahlad
 - (b) Amartya Sen
 - (c) Ratan Tata
 - (d) C. H. Hanumantha Rao
8. GM technology is concerned with
- (a) Ethics and environmentalism
 - (b) Automobile sector
 - (c) Aviation
 - (d) Computers

9. 'Digital divide' is concerned with
- (a) Income gap between rural and urban India
 - (b) Communication revolution
 - (c) Mobile Phone
 - (d) Animation
10. Write the full forms of—
TRIPS; CBD; DST; ICSSR.

PART—II

Explain any *five* of the following in 50 words each

2×5=10

- 11. Bio-register
- 12. Genetic Engineering
Scientometrics
- 14. Frontier in Science
- 15. Joint Forest Management
Positivism
- 17. Tsunami
- 18. Hybrid Embryos
Nano Science
- 20. 'Big Science' and 'Little Science'

PART—III

Answer any *four* of the following in not more than 200 words each

5×4=20

- 21. Are all innovation strategies shaped by market calculation?
- 22. "Imitation of a technology is costless." Do you agree? Explain with evidence.
What are the main techniques of scaling in social sciences?
Explain the concept of Indigenous Knowledge.
- 25. Is the boundary between science and technology blurring? Elaborate your answer with illustrations.

26. What do you understand by systematic basis of innovation?
27. Is Indian science essentially 'colonial science'?
- What do you mean by carbon trading? How is it relevant to India?
29. "Small is beautiful." Critically discuss.
30. What is NREGS? Discuss its main features and relevance.
- What are the differences between occupation and profession?
32. Explain 'Big Bang Theory'.
33. How will you describe the differences between 'Technology Forecasting' and 'Technology Foresight' approaches?

PART—IV

Answer any *two* of the following in 1500 words each :

15×2=30

What are the pros and cons of patenting research outputs of Universities and Public Research Institutions in India?

What is globalization? How is it influencing science and technology systems in India?

Gandhi and Nehru have different perspectives on science, technology and development. Discuss.

37. What role can science and technology play for developing rural India?
38. Can economic growth and environmental concerns be reconciled in current development models?
39. What do you understand by the terms 'brain drain', 'brain gain' and 'brain circulation'? Discuss these concepts with reference to India.
40. Modern Science is associated with the growth of science as a profession. Discuss.
41. What are the two main perspectives on the nuclear debate in recent times? Discuss with reference to India.
42. Discuss the debate on large dams and displacement in India.

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ENTRANCE EXAMINATION, 2007

M.Phil./Ph.D. STUDIES IN SCIENCE POLICY

Time Allowed 3 hours

Maximum Marks : 70

This question paper has Four Parts.

All parts need to be answered.

Please read the instructions given in each Part

PART—I

Write the correct answer of the following

1×10=10

1. *The Structure of Scientific Revolutions* (published in 1962) was a major contribution in science policy studies by
 - (a) Thomas Kuhn
 - (b) Karl Popper
 - (c) Max Weber
 - (d) Karl Marx
2. Scientific Policy Resolution was passed by
 - (a) Indian Parliament in 1958
 - (b) Supreme Court of India in 1959
 - (c) US Senate in 1949
 - (d) House of Commons in 1957
3. Member countries of the World Trade Organization are required to sign which of the following?
 - (a) Bio-safety Protocol
 - (b) Ramsar Convention
 - (c) Trade Related Intellectual Property Rights
 - (d) None of the above
4. Montreal Protocol was concerned with the
 - (a) ozone layer depletion
 - (b) pesticide control
 - (c) CO₂ emission
 - (d) toxic waste

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on cosmology.

- (a) Jagadish Chandra Bose
- (b) Jayant V. Narlikar
- (c) Satyendra Nath Bose
- (d) C. V. Raman

6. Which of the following is not correctly matched?

- (a) National Chemical Laboratory—Pune
- (b) Central Food Technological Research Institute—Mysore
- (c) Central Leather Research Institute—Kanpur
- (d) Physical Research Laboratory—Ahmedabad

7. The correct rate of GDP growth in India during 2006–07 ranges between

- (a) 5 to 6 per cent
- (b) 6 to 7 per cent
- (c) 7.5 to 8 per cent
- (d) 8.5 to 9.5 per cent

8. India's expenditure on R & D as percentage of Gross National Product during 2005–06 has hovered around

- (a) 0.2 to 0.3
- (b) 0.5 to 0.6
- (c) 0.6 to 0.7
- (d) 0.8 to 1

9. Who is the author of the influential work *Science and Civilization in China*?

- (a) J. D. Bernal
- (b) Gu Shulin
- (c) Joseph Needham
- (d) George Basalla

10. The only GM crop approved in India is

- (a) rice
- (b) wheat
- (c) cotton
- (d) soya bean

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PART—II

Explain *any five* of the following in 50 words each : 2×5=10

Traditional Knowledge

12. Geographical Indicators

13. Scientometrics

Total Factor Productivity Growth

15. Incremental Innovation

Bio-prospecting

17. Chi-square (χ^2) Test

18. *Sanskritisation*

19. Renaissance and Reformation

20. Rainwater Harvesting

PART—III

Answer *any four* of the following in not more than 200 words each : 5×4=20

21. Describe the meaning of Institutionalisation and Professionalisation of Science.

Discuss the problems of objectivity in social science research.

23. Is the boundary between science and technology blurring? Elaborate your answer with illustrations.

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What do you mean by social stratification in science?

Discuss the concept of 'colonial science' in India.

26. Describe some of the fears about the GM food.

What is carbon trading?

Is the concept of appropriate technology still relevant?

PART—IV

Answer *any two* of the following in 1500 words each : 15×2=30

29. Discuss the significance of science governance and ethics in the globalised world.
30. Analyze critically the terms/concepts of 'environmentalism' and 'ecologism'. Explore their relevance and trace main developments in the Indian context.

The 'Malthusian trap' is still relevant in the modern technological society. Critically examine and illustrate your answer.

32. Prepare a research design to conduct a social research on 'River Linking Project in India'.

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33. Describe India's efforts in harmonizing different conflicting interests in framing the "Plant Variety Protection and Farmers' Right Act, 2001".
34. A strong Patent Regime fosters innovation and technology transfer. Critically discuss it.
35. What are the factors responsible for rapid increase in demand for mobile telephony in India? To what extent in your assessment this has contributed to development?
36. Describe the meanings of internationalization of R & D and discuss the role of foreign multinational corporations in the era of liberalization in India.
37. Has the effects of Green Revolution Technologies on the agriculture productivity reached a plateau? Discuss.
38. Define Indian science community. Trace the institutional growth and explore main contributions of leading Indian scientists in the post-independence period.

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ENTRANCE EXAMINATION, 2006**M.Phil./Ph.D. STUDIES IN SCIENCE POLICY***Time Allowed* 3 hours*Maximum Marks* : 70

This question paper has Four Parts

All parts need to be answered

Please read the instructions given in each Part

PART—I

Write the correct answer. Answer **all** the following : 1×10=10

1. In which year the latest Science and Technology Policy was issued by the Government of India?

(a) 1958
(b) 2001
(c) 2003
(d) 2005

The New Patent Policy of India gives protection to Patents for

(a) 7 years
(b) 13 years
(c) 19 years
(d) 20 years

The Social Function of Science (published in 1939) was a major contribution in the field of science policy studies by

(a) Joseph Needham
(b) Robert K. Merton
(c) J. D. Bernal
(d) Derek de Solla Price

4. In which year was the first science and technology plan introduced in India?

(a) 1958
(b) 1974
(c) 1983
(d) 2003

Between the years 2001-2006, India's expenditure on R & D as percentage of Gross National Product has hovered around

- (a) 2 to 3 per cent
- (b) 3 to 4 per cent
- (c) 1 to 0.8 per cent
- (d) None of the above

6. EDUSAT satellite was launched in the year

- (a) 1974
- (b) 2000
- (c)
- (d)

7. The IPCC refers to

- (a) Interprovincial Committee on Climate
- (b) Intergovernmental Committee on Climate Change
- (c) International Protocol on Cyber Communication
- (d) Intellectual Protection for Cyber Communication

8. The nodal agency for international cooperation in science and technology in India is

- (a) Ministry of External Affairs
- (b) Ministry of Human Resource Development
- (c) Department of Science and Technology
- (d) Council of Scientific and Industrial Research

9. The Basel Convention refers to

- (a) Export of GM crops
- (b) Control of Transboundary Movements of Hazardous Wastes and their Disposal
- (c) Wetland Conservation
- (d) Convention on Climate Change

10. The latest round of WTO negotiations took place in

- (a) Marrakesh
- (b) Davos
- (c) Helsinki
- (d) Hong Kong

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Explain *any five* of the following in 50 words each : 2×5=10

Radical Innovations

Hicks Neutral Technological Change

E-Bay

Mathew Effect in Science

Biodiversity and Benefit Sharing

Bio-Informatics

Sampling in Social Science Research

18. Trade Related Intellectual Property Rights
19. The 'Warship' Clemenceau
20. Nanotechnology

PART—III

Answer *any four* of the following in not more than 200 words each : 5×4=20

What is Open Source Software? Describe its significance.

22. Describe different sources of bio-fuels and its significance to India's economy and environment.
23. Is Bangalore city India's Silicon Valley or merely an 'IT Coolie' city?
24. Discuss the significance of technology assessment and forecasting for technological planning.

Is science and technology policy essentially political? Discuss.

What are the major challenges before India's science and technology policy in the twenty-first century?

"Every technology eventually reaches a decline phase." Critically examine the statement.

28. What is Positivism? Discuss its significance in social science research.

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PART—IV

Answer *any two* of the following in 1500 words
each : 15×2=30

29. "Social embeddedness of economic activities is a myth." Discuss.
30. "MNCs are the drivers of technology transfer." Do you agree?
31. Discuss the impact of globalisation on science, technology and development.
32. Describe India's "Plant Variety Protection and Farmers' Rights Act, 2001" and analyse its impact on the Indian agricultural sector.
33. Can India develop energy security through nuclear energy?
34. Is UPOV (International Union for the Protection of New Varieties of Plants) Convention appropriate for India?
35. Discuss the relevance of Mahatma Gandhi's ideas on modern technology in the context of the twenty-first century.
36. What are the Millennium Development Goals adopted by United Nations? Are these goals attainable by 2015? Comment.

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ENTRANCE EXAMINATION, 2005

M.Phil./Ph.D. STUDIES IN SCIENCE POLICY

*Time Allowed : 3 hours**Maximum Marks : 70*

This question paper has Four Parts.

All parts need to be answered.

Please read the instructions given in each Part.

PART--I-A

Write the correct answer of the following

1×8=8

1. What does the Cartagena Protocol refer to?
 - (a) Human Rights
 - (b) Industrial disaster
 - (c) Space exploration
 - (d) Bio-safety

2. In which year was the first Patent Act in India promulgated?
 - (a) 1911
 - (b) 1946
 - (c) 1970
 - (d) 1982

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3. What is Bio-prospecting?
- (a) Trade in wildlife
 - (b) Human cloning
 - (c) Biological transformation of plants
 - (d) Scientific research that looks for a useful application, process, or product in nature
4. Which of the following is an eminent historian of science?
- (a) Francis Crick
 - (b) C. V. Raman
 - (c) J. D. Bernal
 - (d) Srinivasa Ramanujan
5. In which year was the Scientific Policy Resolution passed by the Government of India?
- (a) 2003
 - (b) 1993
 - (c) 1983
 - (d) 1958
6. In which year did the NCST prepare the first comprehensive science and technology plan in India?
- (a) 1958
 - (b) 1974
 - (c) 1983
 - (d) 2003

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7. What percentage of India's Gross National Product is currently spent on R & D?

5 to 7 per cent

2 to 4 per cent

(c) 1 to 0.8 per cent

(d) None of the above

8. Robert K. Merton is known for his pioneering work in the field of

(a) Molecular Biology

(b) Biotechnology

(c) Sociology of Science

(d) Economics of Science

PART—I-B

9. Expand any *two* of the following acronyms : 2

CBD; DST; ICSSR; ICSU; IPCC;
TIFAC; WIPO

Or

10. What do the following organisations regulate? (Answer any *two*) 1×2=2

(a) WTO

(b) AERB

(c) TRAI

(d) BIFR

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PART—II

Explain any *five* of the following in 50 words each : 2×5=10

11. Innovations
Scientific Paradigms
Knowledge Society
14. General Agreement on Trade in Services (GATS)
15. Biodiversity and Benefit Sharing
Tsunami
17. Non-conventional Energy Sources
Trade Related Intellectual Property Rights
19. Bioremediation
Standard Deviation

PART—III

Answer any *four* of the following in not more than 200 words each : 5×4=20

What are the pros and cons of setting up Business Process Outsourcing (also referred to as Call Centres) in India?

Describe different sources of bio-fuels and their significance to India's economy and environment.

Discuss the significance of technology assessment and forecasting.

24. Is technological planning important for accelerated development?

25. Is technological choice political? Discuss.

What, according to you, are the major science and technology achievements in India in the post-Independence period? Provide reasons for the same.

What are the major elements introduced in the National Environment Policy, 2004? Comment.

PART—IV

Answer any *two* of the following in 1500 words each : 15×2=30

28. What are the pros and cons of India's new TRIPS compatible Patent Act?

29. Describe briefly the different technology missions introduced so far and analyse critically the impact of one of them.

30. Discuss the impact of globalisation on science, technology and development.

Should the Gene Revolution succeed the Green Revolution?

"International cooperation in science and technology often assumes the role of international competition." Discuss the statement in the context of the developing countries.

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M.Phil./Ph.D. STUDIES IN SCIENCE POLICY

Time Allowed 3 hours

Maximum Marks 70

This question paper has Four Parts.

All parts need to be answered.

Please read the instructions given in each Part.

PART—I

Write the correct answer. Answer **all** the following : 0.5×20=10

1. The Kyoto Protocol refers to
 - (a) climate change
 - (b) biodiversity
 - (c) automobile emission
 - (d) tourist destination in Japan

2. The names of the two NASA land rovers landed on Mars recently were
 - (a) Santa Maria and Pinta
 - (b) Eagle and Apollo
 - (c) Opportunity and Spirit
 - (d) Solaris 7 and Star League

3. There is growing opposition in the United States of America to
 - (a) textile exports from India
 - (b) immigration from India
 - (c) establishment of Foreign R&D Centres in India
 - (d) outsourcing to India

4. The term 'division of labour' in economics is primarily associated with
 - (a) Karl Marx
 - (b) Joseph Schumpeter
 - (c) Adam Smith
 - (d) Nathan Rosenberg

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5. Write the full forms of the following
- (a) CDRI
 - (b) ISRO
6. C.DOT's major contributions to Indian technology lay with area of
- (a) high speed computing
 - (b) nuclear power research
 - (c) telecommunications
 - (d) medical biotechnology
7. The difference between 'radical innovation' and 'incremental innovation' was first discussed by
- (a) Joseph Schumpeter
 - (b) Kenneth Arrow
 - (c) Joseph Stiglitz
 - (d) Nathan Rosenberg
8. What percentage of India's Gross National Product is spent on R & D in the year 2002-03?
- (a) 2 to 5 percent
 - (b) 0.25 to 0.5 percent
 - (c) 0.5 to 1 percent
 - (d) None of the above
9. The Doha Declaration was primarily aimed at
- (a) Public Health
 - (b) Pesticide control
 - (c) Phyto-sanitary Standards
 - (d) Sustainable Development
10. The diffusion of technology follows
- (a) a linear path
 - (b) a S-shaped path
 - (c) an exponential path
 - (d) no definite path

11. The Ramsar Convention refers to
- (a) wetland conservation
 - (b) a peace treaty
 - (c) human rights
 - (d) a declaration on AIDS/HIV control
12. India's Scientific Policy Resolution was passed in
- (a) 1946
 - (b) 1951
 - (c) 1954
 - (d) 1958
13. Dr. Meghnad Saha is known for his
- (a) Thermal Ionisation
 - (b) Radioactive Ionization
 - (c) Fluid Dynamics
 - (d) Particle Physics
14. Dr. P. C. Ray achieved fame from his publications on
- (a) Carbon Monoxide
 - (b) Mercurous Sulphate
 - (c) Sulphuric Acid
 - (d) Mercurous Nitrite
15. Heliocentricism refers to the notion that
- (a) the Earth orbits the Sun
 - (b) the Sun orbits the Earth
 - (c) the Moon orbits the Earth
 - (d) the Jupiter orbits the Earth

Technology Assessment
methodological tool for

- (a) astrophysics
- (b) science and technology policy, and planning
- (c) tax assessment
- (d) weather forecasting

17. The nodal agency designated for international cooperation in science and technology sector in India is

- (a) Department of Space
- (b) Ministry of Commerce and Industry
- (c) Ministry of External Affairs
- (d) Department of Science and Technology

18. The Precautionary Principle adopted at the Rio Declaration on Environment and Development, 1992, refers to

- (a) action established on the basis of sound scientific principle
- (b) the Principle 15 that states that where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing action against environmental degradation
- (c) a process for Bio-Propecting
- (d) None of the above

19. INSAT-3D was launched from

- (a) Cape Canaveral
- (b) Baikounur
- (c) Sriharikota
- (d) Xichang

20. Write full forms of the following :

- (a) NTPC
- (b) CSIR

PART—II

Write 50 words on any *five* of the following :
2×5=10

1. The historic meeting at Porto Allegro
2. Technological Capability
3. Linux and the Open Source Movement
4. The concept of Bioleaching
5. Indian science Congress
6. Joint Forest Management
7. 'Small is Beautiful'
8. Stem Cell Research
9. Industrial Revolution

PART—III

Answer any *four* of the following in
approximately 200 words each 5×4=20

1. Is the Conditional Access System a solution to the current problems of cable networking in India?
2. Comment on some of the ethical issues involved in human cloning.
3. What are the pros and cons of growing or importing Genetically Modified foods?

4. Would water be better managed as a private resource rather than as a public one?
5. Is economic development necessarily incompatible with the conservation of natural endowments?
6. What are the economic consequences of patenting an innovation?
7. Discuss the role of the Kerala Shastra Sahitya Parishad (KSSP) in the people's science movement in India.

PART—IV

Write essays in approximately 1500 words on any *two* of the following : 15×2=30

1. What sort of ethics would you desire if given to formulate India's Nuclear policy for weapons and energy?
2. It has been argued, "high quality medicines are safer but also costlier". Given the highly skewed income distribution, what kind of pharmaceutical quality norms would you recommend for India?
3. Comment on the controversy involving the plan to inter-link India's rivers.
4. Should India meet its current energy demands through investments in either a) nuclear technology, b) Coal-based thermal plants or c) alternatives such as wind and solar, etc?
5. Should the "Gene Revolution" succeed the "Green Revolution"?
6. Does the "Information and Communication Technology Revolution" lead to a "Digital Divide"?
7. Does technology shape history or history shape technology? Discuss.