

# SIKKIM UNIVERSITY

*(A Central University established by an Act of Parliament of India, 2007)*

6th Mile, Samdur, PO Tadong, Gangtok- 737102

Academic Session 2010-11

Entrance test (SET:B- SOCIOLOGY)

M.Phil/PhD Integrated Programme

Time: Three hours

Maximum Marks: 75

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## Instructions for the candidates

1. Duration of the Entrance Test is three hours.
2. No candidate shall be allowed to enter the examination hall half an hour after the commencement of the examination.
3. Candidates can only be allowed to leave the examination hall one hour after the commencement of the examination.
4. No candidate shall be allowed to continue writing the examination after the final bell.
5. If any answer is to be crossed out, cancel it by drawing a line across it.
6. Please read the questions carefully before answering.
7. Each question shall carry 15 marks. Wherever required the marks distribution is indicated alongside the questions.
8. Candidates have to answer only 5 questions. One question from each section is compulsory.
9. Please (✓) mark the question you have attempted in the cover page of the answer booklet.
10. Candidates can choose any discipline/subject and can attempt any question subject to the condition mentioned at Sl. No. 8 above.
11. After finishing the work, handover the answer book only to the Invigilator.

One question from each section is compulsory

## **SECTION 1: GENERAL**

1. Attempt a critical summary of the discussions on the recent trends of poverty in India
2. What do you mean by the term globalisation? Assess its impact on globalisation on India's agricultural sector.
3. Discuss the features of Indian federalism and the changing nature of center-state relations post-liberalisation era
4. How does the reservation of thirty three percent seats for women in Lok Sabha and State Legislative Assemblies empower women in India? Discuss
5. Outline the trends in social sector spending in India. How far is it right to say that Government is abdicating its social responsibility in the new economic regime?

## **SECTION 2: CORE-SOCIOLOGY**

6. Explain the evolution and development of Feminist theories.
7. Film is a both reflection and as an agent of social change. Give your answer with the critical analysis of any film that you have seen recently.
8. How would you compare the sociological methods of Durkheim and Weber?
9. What is Family? Do you think that joint family system has disintegrated! Discuss.
10. What is social mobility? Has sanskritisation got relevance in contemporary India?

## **SECTION 3: ELECTIVE**

### **BOTANY**

11. Describe denaturation and renaturation of DNA.
12. Name two asymbiotic nitrogen-fixing bacteria. Mention the importance of *Agrobacterium tumefaciens*?
13. Describe the mechanisms of stomatal transpiration.
14. What are phytochromes? Mention their structure and functions.
15. Differentiate between C3 and C4 plants. Name three CaM Plants.

## **INTERNATIONAL RELATION**

16. What are the basic tenets of Traditional/Classical, Positivist and Post-Positivist Approaches in the study of International relations?
17. Give an account of Postcolonial theory in International Relations
18. What are the main features of the Arab-Israeli conflict?
19. Do you think the contemporary international/world system is a uni-polar system? Substantiate your arguments
20. "Non-alignment is an attribute of sovereignty". Critically examine this statement in the context of the contemporary relevance of NAM in post-cold war international relations.

## **ECONOMICS**

21. Explain the rationale of planning in the context of economic development with specific reference to India.
22. Distinguish between substitution and income effect
23. Using economic theory, interpret the recent global economic crisis. What are the implications of this crisis for economic theory?
24. Attempt a critical summary of the discussions on the recent trends of poverty in India.
25. Discuss the key elements of the conceptual framework for the short run equilibrium price and output determination under the market structure known as 'perfect competition'

## **EDUCATION**

26. Write a note on Gandhiji's ideas of basic education or his views on language education.
27. Discuss the concept and nature of learning
28. What is meant by grading system? Discuss its importance and base. State the merits and limitations of grading
29. What is the meaning of technology? What do you understand by Technology in Education?

30. What is meant by constructivism? Illustrate its assumptions and perspectives. Differentiate between constructivist and cognitivist view points on learning

## **ENGLISH**

31. Critically analyse the work of any one of the Indian author in English literature
32. Write an essay on the origin and development of the one-act play in the modern age
33. Write an essay on verse satire or prose satire in English literature
34. Discuss the features of an epic poem with reference to any work you have read
35. Examine the significance of literature in today's world

## **GEOGRAPHY**

36. Examine critically the theories of the formation of coral reefs and atolls
37. How would you place the core problematic of Geography? Write succinctly in light of views of Kant and Humboldt.
38. What factors determine population distribution? Substantiate your answer with examples from South Asia.
39. Does Richard Hartshorne's definition of areal differentiation as the "accurate, orderly, and rational description and interpretation of the variable character of the earth surface" still serve as a useful general guide to geographic method?
40. What is land use change? Is land use change inevitable and what measures can be taken to minimise its deleterious effects?

## **HISTORY**

41. How did the Indian National Movement contribute to the making of Modern India?
42. How far was the peasant revolts in 17th century in Northern India rooted in the very nature of Mughal agrarian systems?
43. Give a critical account of Mauryan art and architecture. Do you notice any foreign inspiration in Mauryan art?

44. To what extent was the nationalist interpretation of the revolt of 1857 being modified by modern researchers?
45. Bring out varied dimensions and contradictions of non-cooperation movement through regional studies.

## MATHEMATICS

46. (a) State and prove Leibnitz theorem.
- (b) If  $u = \tan^{-1} \frac{x^3 + y^3}{x - y}$  show that  $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = \sin 2u$  [10+10]
47. (a) Find the asymptotes of

$$x^3 - 2y^3 + xy(2x - y) + y(x - y) + 1 = 0$$

- (b) Evaluate

$$\lim_{n \rightarrow \infty} \left[ \frac{1}{\sqrt{n^2 + 1}} + \frac{1}{\sqrt{n^2 + 2}} + \dots + \frac{1}{\sqrt{n^2 + n}} \right]$$

[10+10]

48. (a) Define a group giving example. Is it necessary for the underlying set to be non-empty? Justify. [3+1+6]
- (b) If  $\mathbf{G}$  is a group show that [5+5]
- i.  $e$  and  $e'$  are identity elements in  $\mathbf{G}$  implies that  $e = e'$
  - ii. For  $a \in \mathbf{G}$ , if  $a'$  and  $a''$  are inverses of  $a$  then  $a' = a''$  [10+10]
49. (a) Define linearly independent set of vectors giving example. Show that the standard basis of  $\mathbf{R}^3$  form a linearly independent set.
- (b) If  $\beta = \{(1, 2, 3), (1, 3, 2), (2, 1, 5)\}$ , obtain an orthonormal basis for the subspace spanned by  $\beta$  in  $\mathbf{R}^3$  using Gram-Schmidt Orthogonalisation process. [10+10]

50. (a) Evaluate

$$\int \int_A xy dy dx$$

where  $A$  is the domain bounded by  $x$ -axis, ordinate  $x = 2a$  and the curve  $x^2 = 4ay$ .

- (b) Change the order of integration in  $I = \int_0^1 \int_{x^2}^{2-x} xy dx dy$  and hence evaluate the same.

## **MICROBIOLOGY**

51. What are transcriptional start signal and stop signal in prokaryotes and eukaryotes? Describe how these signals are recognised in prokaryotes?
52. Describe the role of skin in immunity of humans? Write short notes on in relation to inflammation:
  - a) Vasodilation
  - b) Edema
  - c) Margination
  - d) Extravasation
  - e) Chemotaxis
53. Yeast growing in anaerobic condition consumes more glucose than those yeasts growing aerobically. What is the reason behind it? What is the fate of pyruvic acid in anaerobic microorganisms?
54. Describe the structure of genome of retroviruses. Describe the role of various proteins present in HIV virion and explain its function. Describe the four stages of HIV infection?
55. Write note on:
  - a) microRNA
  - b) Real Time PCR
  - c) Western Blot

## **PEACE AND CONFLICT**

56. The defeat of the Liberation Tigers of Tamil Eelam (LTTE) by the Sri Lankan military forces proves the statement that Wars are important for bringing about Peace. Discuss.
57. The conflicts of the future will be conflicts over natural resources like Water and energy. What are the ways in which each country can ensure water and energy security for its population?
58. Describe the situation in Nepal which remains critical with the continuing standoff between the Maoists and the Government.
59. Education can be one of the most important tools of Peace as well as of Violence. Elaborate on the above statement.

60. North East India is the location of numerous autonomy and secessionist demands. Using any one conflict as an example, enumerate the state-civil society relations and the consequences of the continuation of the conflict.

## PHYSICS

61. (a) Show that the transformation [5]

$$Q = p^2 + q$$

$$P = p + t$$

is canonical.

- (b) Find the generating function  $\mathbf{F}(q, p, t)$  using the given transformation. [5]

- (c) The motion of a projectile near the surface of the earth is governed by the Hamiltonian

$$\mathbf{H} = \frac{1}{2m}(p_x^2 + p_y^2) + mgy$$

where  $x$  denotes the horizontal coordinate and  $y$  the vertical, and  $p_x$  and  $p_y$  are their conjugate momenta.

Set up and find a complete integral  $\mathbf{W}$  to the time-independent Hamilton–Jacobi equation. [5]

62. Consider the following two kets:

$$|\Psi\rangle = \begin{pmatrix} -3i \\ 2+i \\ 4 \end{pmatrix}, |\Phi\rangle = \begin{pmatrix} 2 \\ -i \\ 2-3i \end{pmatrix}$$

- (a) Find the bra  $\langle\Phi|$  [5]

- (b) Evaluate the scalar product  $\langle\Phi|\Psi\rangle$ ,  $\langle\Phi|\Phi\rangle$  and  $\langle\Psi|\Psi\rangle$  [6]

- (c) Examine why the products  $|\Phi\rangle|\Psi\rangle$  and  $|\Psi\rangle|\Phi\rangle$  do not make sense. [4]

63. (a) Show that the following vectors,

$$u = (1, -2, 5, -3) \quad , \quad v = (2, 3, 1, -4) \quad , \quad w = (3, 8, -3, -5),$$

satisfy  $2v = u + w$ .

- (b) Let

$$F : \mathbf{R}^2 \rightarrow \mathbf{R}^3 \quad \text{given by} \quad F(x, y) = (x + y, x - 2y, 3x + y).$$

Show that  $F$  is nonsingular. [5+6+4 = 10]

64. A static charge distribution produces a radial electric field

$$\vec{E} = A \frac{e^{(-kr)}}{r} \hat{r}$$

where A and k are constants.

- (a) What is the charge density? Sketch it.
  - (b) What is the total charge Q? [10+5]
65. A crystal diode having internal resistance 20 Ohm is used for half wave rectification. If the applied voltage is  $50\sin\omega t$  and load resistance is 800 Ohm, find
- (a)  $I_m, I_{dc}, I_{rms}$
  - (b) a.c. power input and d.c. power output
  - (c) d.c. output voltage
  - (d) efficiency of rectification. [5+5+2+3]

## POLITICAL SCIENCE

66. Critically examine the significance of political economic approach to study comparative politics
67. How do you account for the expansion of civil society in contemporary times and assess their implications for democracy in India.
68. Discuss John Locke's idea of natural rights, with particular reference to his understanding of the right to property? Do you consider Locke as the precursor of the capitalist state?
69. Discuss the difference between identity and interest based social movements. Why have interest based movements remained largely local whereas identity movements have acquired the national profile?
70. 'The ambivalence of the Constitution of India on the question of sharing power between the different tiers of government has resulted in the on-going feud between the Centre and State on vital questions of policy.' Discuss.

## ZOOLOGY

71. Write Mendel's law of independent assortment. What is the difference between independent assorted and linked genes? Cite an example to prove the association of linkage with sex. Why is crossing over absent in male *Drosophila*?



72. What do you understand by organic evolution? Discuss the various theories of origin of life on earth. Describe Stanley Miller's experiment and explain how it proves the biochemical theory of origin of life.
73. Describe the role of temperature as ecological factor. Give an account of morphological and physiological adaptations in plants and animals in relation to temperature.
74. Define hormone. How is the neurohypophysial hormone secreted? Discuss the function of hormones secreted by Pituitary gland.
75. Write short notes on any four of the following:
- (a) Importance of wildlife conservation
  - (b) Polymerase chain reaction
  - (c) Insulin hormone
  - (d) Circadian Rhythms
  - (e) Apiculture
  - (f) Edge effect
  - (g) Satellite DNA