

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:C- ECONOMICS)

Post Graduate Courses

Time: Three hours

Maximum Marks: 100

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 20 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 (\surd) 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. Do you agree with the statement that globalisation as a process brings about homogeneity in the society? Discuss.
2. Write an essay on Politisation of caste and castism in politics in India.
3. Critically examine recently concluded Indo-US nuclear deal. Discuss the significance of it on India's nuclear policy.
4. Women should get 33 percent reservation in Parliament and State legislatures. Give your views with justification.
5. In India religion and politics are closely inter-linked. Do you agree. Give reasons

SECTION 2: CORE-ECONOMICS

6. Define economics. Explain the relationship between scarcity and choice in the light of the statement that "economics is a science of choice making".
7. What are the sources of competitive market failure? Explain in each case why the competitive market not always operates efficiently.
8. What is the difference between real GDP and nominal GDP and why does this distinction matter? Which measures would be appropriate for judging changes in the standard of living?
9. Compare and contrast monetary and fiscal policies as tools for controlling output and inflation. When the monetary authorities set interest rate, what role does the money stock play in monetary policy?
10. Explain with a suitable example the value added method of measuring national income of an economy. What are the difficulties in measuring national income in developing countries?

SECTION 3: ELECTIVE

BOTANY

11. Give an account of the origin and evolution of sex in Algae.

12. What is photophosphorylation? Compare Cyclic and non-Cyclic photophosphorylation and bring out the role of each.
13. What is artificial seed? How is it prepared in the laboratory? Discuss the importance of somatic embryogenesis and artificial seed production in plant science.
14. Describe the role of edaphic and biotic factors in the distribution of plants.
15. "Forest fires in Sikkim hills is a serious environmental issue". Comment on above statement with emphasis on possible causes, demerits, benefits (if any) and reliable control measures.

CHEMISTRY

16. (a) Why is aluminum stable in air ?
 (b) Discuss the oxidation states of Group V elements. Give reasons for the observed stability of the oxidation states in each case.
 (c) Draw a labeled diagram to show the splitting of d-orbital in
 (i) octahedral field (ii) square planar field, for Ni(II) system
17. (a) Derive rate equation for a reaction of the type $A \longrightarrow B + C$. Show that half life for such a reaction is independent of initial concentration of the reactant.
 (b) Deduce thermodynamically an expression for equilibrium constant.
 (c) Discuss critically how chemical equilibrium of a reaction responds to
 (i) temperature change (ii) the presence of a catalyst and (iii) addition of inert gas.
18. (a) Discuss briefly the hybridization of allene system.
 (b) What do you mean by anti-aromaticity ? How can you differentiate it from non-aromaticity ? Give example.
 (c) What do you mean by kinetically and thermodynamically controlled reactions ? Give example.
 (d) Give one example each of carbocation, carbanion, carbene, nitrene and mention their hybridization.
 (e) Represent 1,2 ethandiol in Newman, sawhorse, Fischer and other stable conformational forms. [4+4+3+5+4]
19. Discuss briefly the following reactions on the basis of mechanism and applications
 (a) Shapiro reaction
 (b) Semipinacol deamination reaction

- (c) Curtius reaction
- (d) 1,3 dithianes and Umpolung reactivity
- (e) Michael reaction [4 x 5]

20. (a) Discuss in the light of VSEPR theory the structures of :
- (i) ICl_2^-
 - (ii) IF_7
 - (iii) ClF_3
 - (iv) ICl_4^- [2x4]
- (b) What is diazo coupling reaction ? How do you differentiate it from Suzuki coupling reaction? Give example. [4]
- (c) From the relation $PV = 1/3.mnc^2$
- (i) deduce Graham's Law of diffusion of gases
 - (ii) calculate kinetic energy for 2 moles of CO_2 at $300^\circ C$ assuming ideal behavior. [4+4]
- (d) Give an example of fluxanal molecule. [2]

COMMERCE

- 21. What do you mean by e-commerce? Discuss its advantages and disadvantages.
- 22. Discuss the statutory rights of an Auditor under the Companies Act, 1956.
- 23. Describe the modes of dissolution of a partnership firm.
- 24. What are the grounds of compulsory winding up of a company?
- 25. What are the different elements of cost? Explain; also draw up specimen cost sheet.

EDUCATION

- 26. What is pragmatism? Discuss the influence of pragmatism in the field of education.
- 27. What are the various aims of education? Which of them do you like best? Give reasons for your choice.
- 28. Define the term 'Guidance'. Enumerate the nature of guidance. Differentiate between guidance and counseling?
- 29. What is meant by vocationalisation of secondary education? Mention Kothari Commission's recommendations and the measures to be taken for the implementation in this regard.
- 30. Discuss Gandhiji's philosophy and scheme of basic education.

ENGLISH

31. Write an essay on the mixture of Christian and Pagan elements in Anglo-Saxon poetry
32. Discuss the salient features of Shakespearean tragedy
33. Trace the origin and development of the novel in English literature
34. Write an essay on structuralism and post-structuralism and its impact on literary criticism
35. Trace the different stages in the growth of the early English drama through miracles and morality plays till the interludes

GEOGRAPHY

36. Classify rocks according to their mode of origin and discuss their characteristics.
37. Give an account of the internal structure of the earth with the help of seismological evidences. Illustrate your answer with suitable diagrams.
38. What is meant by Isostasy? Discuss the theory of Isostasy with reference to the view of Pratt and Airy.
39. "Man plays a dual role of a producer or creator and a consumer or destroyer of resources." Explain.
40. What are the different forms of rural settlements? Write an account on the morphology of rural settlements in India.

HISTORY

41. Write a note on the town planning of the city of Mohenjodaro.
42. Discuss the causes of the Sepoy mutiny of 1857?
43. Discuss the religious policy of Akbar the Great.
44. Review the social and economic condition of France on the eve of French Revolution of 1789.
45. Was Hitler responsible for the Second World War? Justify.

MATHEMATICS

46. (a) State and Prove Archimedean property. [10]
(b) If $x \in \mathbf{R}$, $y \in \mathbf{R}$ and $x < y$, then show that there exists a $p \in \mathbf{Q}$, such that $x < p < y$ where \mathbf{Q} and \mathbf{R} denote the set of real and rational numbers respectively. [10+10]

47. (a) Find the magnitude and the equations of the shortest distance between the lines

$$\frac{x}{2} = \frac{y}{-3} = \frac{z}{1} \quad \text{and} \quad \frac{x-2}{3} = \frac{y-1}{-5} = \frac{z+2}{2}$$

- (b) Find the equation of the cone whose vertex is at the origin and guiding curve is

$$\frac{x^2}{4} + \frac{y^2}{9} + \frac{z^2}{1} = 1 \quad , \quad x + y + z = 1$$

[10+10]

48. (a) Show that if

$$x \in \mathbf{R}, \quad y \in \mathbf{R}, \quad \text{and} \quad x > 0$$

then there exists a positive number n such that $nx > y$.

- (b) Show that \mathbf{Q} , the set of rational numbers, is dense in \mathbf{R} , the set of real numbers. [10+10]

49. (a) Show that the sequence

$$x_n = \left\{ \frac{1}{n} \right\}_{n \in \mathbf{N}}$$

is Cauchy but not convergent on $(0, 1)$.

- (b) Show that any arbitrary union of open sets is open. What can you say about arbitrary union of closed sets? Justify [10+10]

50. (a) Verify Green's theorem for

$$\int_C [(xy + y^2)dx + x^2dy]$$

where C is bounded by $y = x$ and $y = x^2$.

- (b) Find Particular Integral of

$$(D^2 + 5D + 6)y = e^x$$

[10+10]

MICROBIOLOGY

51. DNA : ACCTGCGACTGGACGCTG

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DNA : ACCTGTGACTGGACACTG

What type of mutation is this? What are different types of mutations of DNA? Explain how you can induce mutation artificially in bacteria.

52. Name two double stranded RNA viruses. Give a detailed description of TMV.
53. Describe the structure of DNA and explain the experimental evidences to prove that DNA is the genetic material.
54. Name five microorganisms used in Biotech Industry? Name the most widely used bacteria in Biotech industry and explain why it is widely used. Describe any one industrial product made with the help of microorganism.
55. Name one flagellated and one non-flagellated bacteria. Differentiate between flagella and pilus with diagrams.

PHYSICS

56. (a) Set up the Lagrangian of a simple pendulum. Using Euler-Lagrange equation show that its time period T is given by $T = 2\pi\sqrt{\frac{l}{g}}$. [3+7]
- (b) State and prove parallel axis theorem of moments of inertia. [2+4]
- (c) State Hamilton's principle in classical mechanics. [4]
57. (a) Write down the Schrödinger equation for a particle confined in a one dimensional infinite potential well. [7]
- (b) State and explain Heisenberg's uncertainty principle. Using Heisenberg's uncertainty principle show that a free electron cannot reside inside an atomic nucleus. [2+4]
- (c) Using Bohr's theory, find the expression for energy of the particle in n^{th} orbit of a hydrogen atom. [7]
58. (a) What are the majority and minority carriers? [3]
- (b) Why does the resistance of a semiconductors decreases with rise of temperatures? [2]
- (c) What are the characteristics of an ideal OP-AMP? How can OP-AMP be used as an adder and differentiator. [6]
- (d) What do you mean by load line and Q-point of a transistor. [4]

- (e) Prove the Boolean's relation
 $ABC + \bar{A}BC + B\bar{C} + AD + \bar{A}D = B + D$ [3]
- (f) For a buffer amplifier between a high impedance source and a low impedance source which among the three configuration CB,CE and CC amplifier is suitable. [2]
59. (a) Derive the expression for speed of sound waves in a fluid and hence show that the speed of sound in air is given by $v = \sqrt{\frac{\gamma P}{\rho}}$, where symbol have their usual meaning. [6+3]
- (b) Spherical sound waves are emitted uniformly in all directions from a point source, the radiated power being $25W$. What is the intensity of the sound at a distance $2.5m$ from a source. [5]
- (c) Prove the relation, $\frac{\mu_2}{v} = \frac{\mu_1}{u} = \frac{\mu_2 - \mu_1}{R}$, for refraction at a spherical surface? [6]
60. (a) What modification is introduced in Bohr's theory due to finite mass of the nucleus? [5]
- (b) What is Compton effect. Derive the expression for Compton shift, angle of scattering of the photon in terms of the recoil electron. [7]
- (c) Explain the origin of continuous and characteristic X-ray spectra. [5]
- (d) Hydrogen has one electron. How does it produce so many spectral lines. [3]

POLITICAL SCIENCE

61. Explain the Marxist theory of class and class struggle.
62. Discuss the powers and functions of the Speaker of the Lok Sabha.
63. India, that is Bharat, shall be a union of states (Article-1). Explain the nature of the Indian federation in the light of the above statement.
64. Legitimate power is authority. Discuss.
65. Do you think that globalisation has undermined the traditional concept of sovereignty? Where does sovereignty lie in a modern democratic state?

SOCIOLOGY

66. Analyze Durkheim's idea of division of labour and society.
67. What do you mean by caste? How is caste hierarchy maintained in traditional society?

68. What do you mean by rural society? Identify the important features of rural society.
69. What are the major problems faced by Indian youths? What measures would you suggest for solving these problems?
70. Define Culture. Write a short note on the characteristic features and elements of culture.

ZOOLOGY

71. Define recombination. Discuss the cytological basis of crossing over. Give one experimental evidence to show the crossing over occurs due to breakage and exchange of parts between homologous chromosomes.
72. Differentiate between colouration and mimicry. Describe types of colouration. Distinguish between Batesian and Mullerian mimicry.
73. What do you mean by community? Discuss the stratification of community. Differentiate between habitat and niche concept.
74. What do you mean by respiration? Differentiate between aerobic and anaerobic respiration. Discuss glycolysis with illustration. (3+5+12)
75. What do you mean by wild life conservation? What are the different strategies adopted for the conservation of wildlife. Explain the decrease in number of tigers in India. (3+10+7)