



[4023] – 404

M.A./M.Sc. (Semester – IV) Examination, 2011

MATHEMATICS

MT : 804 : Algebraic Topology

(2008 Pattern) (New)

Time : 3 Hours

Max. Marks : 80

N.B. : 1) Answer any five questions.

2) Figures to the right indicate full marks.

1. a) Define homotopy between two continuous functions from X to Y . Prove that this relation is an equivalence relation. 6
- b) Let $S^1 \rightarrow X$ be a continuous map. Show that f is nullhomotopic if and only if there is a continuous map $g : B^2 \rightarrow X$ with $f = g|_{S^1}$. 5
- c) Let $f_1 \approx f_2 : X \rightarrow Y$ and $g_1 \approx g_2 : Y \rightarrow Z$. Show that $g_1 \circ f_1 \approx g_2 \circ f_2 : X \rightarrow Z$. 5
2. a) Define a contractible space. Show that unit n -ball B^n is contractible. Give an example of a noncontractible space. 6
- b) Define a deformation retract of space X . Prove that S^1 is a deformation retract of $\mathbb{R}^2 - \{0\}$. 5
- c) Show that a contractible space is path connected. 5
3. a) Show that every open connected subset of \mathbb{R}^2 is path connected. 6
- b) Give an example of a connected subset of \mathbb{R}^2 which is not path connected. 5
- c) Let $A \subset B \subset X$. Suppose B is a retract of X , and A is a retract of B . Show that A is a retract of X . 5

P.T.O.



4. a) Let $x_0, x_1 \in X$. Show that if there is a path in X from x_0 to x_1 then the groups $\pi_1(X, x_0)$ and $\pi_1(X, x_1)$ are isomorphic. Hence prove that $\pi_1(X, x)$ and $\pi_1(X, y)$ are isomorphic for a connected path X with $x, y \in X$. **8**
- b) Let $f : X \rightarrow Y$ is continuous. Show that there exists a homomorphism $f^* : \pi_1(Y, f(x_0)) \rightarrow \pi_1(X, x_0)$ where x_0 is any point of X . **8**
5. a) Prove that the fundamental group of the circle S^1 is isomorphic to the additive group \mathbb{Z} of integers. **6**
- b) Define a simply connected space. Prove that a contractible space is simply connected. Is converse true ? Justify. **5**
- c) Prove that the retract of a Hausdorff space is closed. **5**
6. a) Define a covering map. Prove that $p : S^1 \rightarrow S^1$ defined by $p(z) = z^n$ is a projection map. Also prove that \mathbb{R} is a covering space of S^1 . **6**
- b) Prove that a covering map is a local homeomorphism. Also show that the converse is not true. **5**
- c) Prove that if $p_1 : X_1 \rightarrow Y_1$ and $p_2 : X_2 \rightarrow Y_2$ are covering maps then $p_1 \times p_2 : X_1 \times X_2 \rightarrow Y_1 \times Y_2$ is a covering map. **5**
7. a) Prove that a fibration has unique path lifting if and only if every fibre has no non-null path. **8**
- b) Suppose that K is a connected complex. Prove that the 0th homology group $H_0(K)$ of K is isomorphic with the additive group of integers. **8**
8. a) Prove that \mathbb{R}^n is homeomorphic to \mathbb{R}^m if and only if $n = m$. **6**
- b) Prove that two different complexes may have the same polyhedra. **5**
- c) Prove that the surface of a sphere in \mathbb{R}^3 is a triangulable space. **5**
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M.A./M.Sc. (Semester – IV) Examination, 2011
MATHEMATICS
MT – 804 : Mathematical Method – II (Old Course)

Time : 3 Hours

Max. Marks : 80

*N.B. : i) Attempt **any five** questions.
ii) Figures to the **right** indicate **full** marks.*

1. a) Define :
- i) Fredholm's integral equation of second kind
 - ii) Degenerate Kernels. **4**
- b) Show that the function $u(s) = (1 + s^2)^{-3/2}$ is a solution of the volterra integral equation $u(s) = \frac{1}{1+s^2} - \int_0^s \frac{t}{1+s^2} u(t) dt$. **6**
- c) Reduce the following boundary value problem into an integral equation $\frac{d^2y}{dx^2} + \lambda y = x, y(0) = y(\pi) = 0$. **6**
2. a) Prove that, the eigenvalues of a symmetric kernel are real. **8**
- b) Show that the homogeneous integral equation $\phi(x) - \lambda \int_0^1 (3x - 2) \phi(t) dt = 0$ has no characteristic numbers and eigen functions. **8**
3. a) Find eigen values and eigen functions of the homogeneous Fredholm integral equation of the second kind $\phi(s) = \lambda \int_0^1 (2st - 4s^2) \phi(t) dt$. **8**
- b) Solve the symmetric integral equation $y(x) = (x + 1)^2 + \int_{-1}^1 (xt + x^2t^2) y(t) dt$ by using Hilbert-Schmidt theorem. **8**



4. a) Find the iterated kernels for the kernel $k(s, t) = e^s \cos t$; $a = 0, b = \pi$. **8**

b) Find the resolvent kernel of the volterra integral equation with the kernel

$$K(s, t) = \frac{2 + \cos(s)}{2 + \cos(t)}. \quad \mathbf{8}$$

5. a) Find the Neumann series for the solution of the integral equation

$$y(x) = 1 + x + \lambda \int_0^x (x-t) y(t) dt. \quad \mathbf{8}$$

b) Let $\psi_1(s), \psi_2(s), \dots$ be a sequence of functions whose norms are all below a fixed bound M and for which the relation $\psi_n(s) = \lambda \int K(s, t) \psi_n(t) dt$ holds in the sense of uniform convergence. Prove that, the functions $\psi_n(s)$ form a smooth sequence of functions with finite asymptotic dimension. **8**

6. a) State and prove isoperimetric problem. **8**

b) Find the extremal for $I = \int_0^{\pi/4} (y''^2 - y^2 + x^2) dx, y(0) = 0, y'(0) = 1,$

$$y\left(\frac{\pi}{4}\right) = y'\left(\frac{\pi}{4}\right) = \frac{1}{\sqrt{2}}. \quad \mathbf{8}$$

7. a) Find the shortest distance between circle $x^2 + y^2 = 4$ and straight line $2x + y = 6$. **8**

b) Evaluate the resolvent kernel of the integral $K(x, t) = 1 + 3xt$; $0 \leq x \leq 1, 0 \leq t \leq 1$. **8**

8. a) State and prove Harr theorem. **8**

b) Show that an isosceles triangle has the smallest perimeter for a given area and given base (Use principle of reciprocity). **8**



M.A./M.Sc. (Sem. – IV) Examination, 2011
MATHEMATICS
MT-801 : Field Theory (New)
(2008 Pattern)

Time : 3 Hours

Max. Marks : 80

N.B. : i) Attempt **any five** questions.
ii) Figures to the **right** indicate **full** marks.

1. a) Let $F \subseteq E \subseteq K$ be fields. If $[K:E]$ and $[E:F]$ are finite, then prove that $[K:F]$ is finite and $[K:F] = [K:E][E:F]$. 8
- b) If $f(x) = x^2 - x - 1 \in \mathbb{Z}_3[x]$, then show that $f(x)$ is irreducible over \mathbb{Z}_3 . 3
- c) Show that there exists an extension K of \mathbb{Z}_7 with 49 elements. 5
2. a) If $E = F(u_1, u_2, \dots, u_k)$ is finitely generated field over F such that each of u_1, u_2, \dots, u_k is algebraic over F . Then prove that E is finite extension over F . Is E algebraic over F ? Justify. 6
- b) Let E be an algebraic extension of F , and let $\sigma : E \rightarrow E$ be an embedding of E into itself over F . Then prove that σ is onto and hence an automorphism of E . 4
- c) Find a suitable number α such that $\mathbb{Q}(\sqrt{3}, i) = \mathbb{Q}(\alpha)$. 6
3. a) Let F be a field, and let $\sigma : F \rightarrow L$ be an embedding of F into an algebraically closed field L . Let $E = F(\alpha)$ be an algebraic extension of F . Then prove that σ can be extended to an embedding $\eta : E \rightarrow L$, and the number of such extensions is equal to the number of distinct roots of the minimal polynomial of α . 8
- b) Show that $x^3 - 2 \in \mathbb{Q}[x]$ is irreducible over \mathbb{Q} . Find (if it exists) an extension K of \mathbb{Q} having all roots of $x^3 - 2$. Also find $[K:\mathbb{Q}]$. 8
4. a) Prove that any irreducible polynomial $f(x)$ over a field of characteristic zero has simple roots. Next prove that any irreducible polynomial $f(x)$ over a field F of characteristic $p \neq 0$ has multiple roots if and only if there exists $g(x) \in F[x]$ such that $f(x) = g(x^p)$. 8

P.T.O.



- b) Construct splitting field over \mathbb{Q} of $x^6 - 1$, also find the degree of the extension. 3
- c) Which of the following are extensions are normal over \mathbb{Q} ?
- $\mathbb{Q}(\sqrt[5]{7})$
 - $\mathbb{Q}(\sqrt{-1})$ and
 - $\mathbb{Q}(x)$,

Where x is not algebraic over \mathbb{Q} . 5

5. a) Prove that the prime field of a field F is either isomorphic to \mathbb{Q} or to \mathbb{Z}_p , p -prime. 6
- b) Prove that the multiplicative group of non-zero elements of a finite field is cyclic. 6
- c) Find irreducible polynomial of degree 3 over \mathbb{Z}_2 . 4
6. a) Let E be a finite extension of a field F . Then prove that $E = F(\alpha)$ for some $\alpha \in E$ if and only if there are only finite number of intermediate fields between F and E . 8
- b) Find $\alpha \neq \sqrt{2} + \sqrt{3}$ such that $\mathbb{Q}(\sqrt{2}, \sqrt{3}) = \mathbb{Q}(\alpha)$. 4
- c) If E is finite extension of a field F , and E is splitting field of a polynomial in $F[x]$, then E is normal extension of F , prove. 4
7. a) Let E be a finite separable extension of a field F , and let $H < G(E/F)$. Then prove that $G(E/E_H) = H$ and $[E:E_H] = |G(E/E_H)|$. 6
- b) Let $E = \mathbb{Q}(\sqrt[3]{2})$, prove that $G(E/\mathbb{Q})$ is trivial. 6
- c) Let F be a field of characteristic $\neq 2$. Let $x^2 - a \in F[x]$ be an irreducible polynomial over F . Then show that Galois group of $x^2 - a$ is of order 2. 4
8. a) A polynomial $f(x) \in F[x]$ is solvable by radicals over F if its splitting field E over F has solvable Galois group $G(E/F)$, prove this statement. 8
- b) Prove that the group of automorphisms of a field F with p^n elements is cyclic of order n . Find its generator. 8



M.A./M.Sc. (Semester – IV) Examination, 2011
MATHEMATICS
MT – 802 : Combinatorics (New)
(2008 Pattern)

Time : 3 Hours

Max. Marks : 80

N.B.: i) Attempt **any five** questions.

ii) Figures to the **right** indicate **full** marks.

1. a) How many ways are there to pick 2 different cards from a standard 52 card deck such that :
 - i) The first card is an ace and the second card is not a Queen ?
 - ii) The first card is a spade and the second card is not a Queen ? **6**
- b) There are 10 people at a party. How many different ways are there to pair them off into a collection of 5 pairings ? **5**
- c) How many ways are there to arrange the seven letters in the word SYSTEMS ? In how many of these arrangements do the '3 S' appear consecutively ? **5**
2. a) If a coin is flipped 10 times, what is the probability of 8 or more heads ? **6**
- b) How many ways are there to fill a box with a dozen doughnuts chosen from five different varieties with the requirement that atleast one doughnut of each variety is picked ? **5**
- c) How many integer solutions are there to $x_1 + x_2 + x_3 = 0$ with $x_i \geq -5, i = 1, 2, 3$? **5**
3. a) Find the coefficient of x^{16} in $(x^2 + x^3 + x^4 + \dots)^5$. What is the coefficient of x^r ? **8**
- b) How many ways are there to select 25 toys from seven types of toys with between two and six of each type ? **8**
4. a) Find the generating function of a_r , the number of ways to select r balls from a pile of three green, three white, three blue and three gold balls. **6**
- b) Prove using a combinatorial argument $\binom{2n}{2} = 2 \binom{n}{2} + n^2$. **5**
- c) Find a generating function for a_r , the number of ways that we can choose 2 cents, 3 cents and 5 cents stamps adding to a net value of r cents. **5**



5. a) Find a recurrence relation for the number of ways, to arrange n dominos to fill a $2 -$ by $- n$ checkerboard. **5**
- b) Find a recurrence relation for the number of sequences of 1's, 3's and 5's whose terms sum to n . **6**
- c) Solve the recurrence relation $a_n = 2a_{n-1} + 1$ with $a_1 = 1$. **5**
6. a) Use generating functions to solve the recurrence relation $a_n = a_{n-1} + a_{n-2}$ with $a_1 = 1, a_2 = 2$. **6**
- b) Show that if $n+1$ distinct numbers are chosen from $1, 2, \dots, 2n$, then two of the numbers must always be consecutive integers. **4**
- c) Suppose the numbers 1 through 10 are randomly placed around a circle. Show that the sum of some set of three consecutive numbers must be at least 17. **6**
7. a) State and prove the Inclusion Exclusion Principle. **8**
- b) What is the probability that if n people randomly reach into a dark closet to retrieve their hats, no person will pick his own hat ? **8**
8. a) How many ways are there to send 6 different birthday cards, denoted by $C_1, C_2, C_3, C_4, C_5, C_6$ to three aunts and three uncles, denoted by $A_1, A_2, A_3, U_1, U_2, U_3$, if aunt A_1 would not like the cards C_2 and C_4 ; if A_2 would not like the cards C_1 or C_5 ; if A_3 likes all cards; if U_1 would not like the cards C_1 and C_5 ; if U_2 would not like C_4 ; and if U_3 would not like C_6 ? **6**
- b) How many positive integers ≤ 70 are relatively prime to 70 ? **5**
- c) How many n digit decimal sequences are there in which the digits 1, 2, 3 all appear ? **5**
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M.A./M.Sc. (Semester – IV) Examination, 2011
MATHEMATICS
MT – 802 : Hydrodynamics (Old Course)

Time : 3 Hours

Max. Marks : 80

N.B.: 1) Attempt **any five** questions.
2) **Each** question carry **equal** marks.

1. a) Derive Bernoulli's equation. 8
b) Derive equation of mass conservation in Eulerian description. 6
c) Write a note on continuum hypothesis. 2
2. a) A two dimensional incompressible flow field has the x-component of velocity given by $u = \frac{x}{(x^2 + y^2)^{3/2}}$. Determine y-component of velocity. Is this flow irrotational ? Justify your answer. 8
b) For steady irrotational flow in two dimensions derive the relation between velocity potential and stream function in polar co-ordinate system. 8
3. a) If vorticity is zero, circulation is zero. Is the converse true ? Justify your answer. 10
b) A three dimensional velocity field is given by $u = xy^2, v = \frac{y^3}{3}, w = \frac{1}{2}xyz^2$. Determine acceleration. 6
4. a) State and prove circle theorem and hence obtain the image of a source in a circle. 10
b) Given the stream function $\psi = \frac{y^3}{3} - x^2y$
 - i) What is the velocity vector that describes the flow ?
 - ii) Find velocity potential. 6



5. a) State and prove Blasius theorem. **10**
- b) Discuss the flow for which complex potential is $W = Uz^n$ where U is constant and $n > 0$, a real number. **6**
6. a) Two point vortices each of strength K are situated at $(\pm a, 0)$ and a point vortex is of strength $-\frac{k}{2}$ is situated at the origin. Show that the liquid motion is stationary. Determine stagnation points. **8**
- b) Obtain the relation between stress and rate of strain components. **8**
7. a) When a cylinder of any shape is placed in a uniform stream of speed U , show that the resultant thrust on the cylinder is a lift of magnitude $K\rho U$ per unit length and is at right angles to the stream where K is circulation around a cylinder. **10**
- b) Show that stress tensor is symmetric. **6**
8. a) Write a note on Karman vortex street. **6**
- b) Three parallel rectilinear vortices of the same strength K and in the same sense meet any plane perpendicular to them in an equilateral triangle of side a . Show that the vortices all move around the same cylinder with uniform speed in time $\frac{2\pi a^2}{3K}$. **10**



[4023] – 403

M.A./M.Sc. (Semester – IV) Examination, 2011
MATHEMATICS
MT-803 : Differential Manifolds (New)
(2008 Pattern)

Time : 3 Hours

Max. Marks : 80

N.B.: 1) Attempt **any five** questions.
2) Figures to the **right** indicate **full** marks.

1. a) Let W be a linear subspace of \mathbb{R}^n of dimension K . Prove that there is an orthogonal transformation $h : \mathbb{R}^n \rightarrow \mathbb{R}^n$ that carries W onto the subspace $\mathbb{R}^K \times O$ of \mathbb{R}^n . 8
- b) If $X = \begin{pmatrix} 1 & 0 \\ 0 & 1 \\ a & b \end{pmatrix}$, then find $V(X)$. 4
- c) Give an example of a 1-manifold in \mathbb{R}^3 . 4
2. a) Justify whether **true** or **false** :
- If U is open in H^K and if $p = \alpha(x_0)$ for $x_0 \in H_+^K$, then p is an interior point of M . 6
- b) If $f(X, Y) = x_2y_3 - y_2x_3$, then is f an alternating tensor on \mathbb{R}^4 ? 5
- c) Find the length of the parametrized curve $\alpha(t) = (a \cos t, a \sin t)$ for $0 < t < 3\pi$. 5
3. a) Let U be an open set in \mathbb{R}^n and $f : U \rightarrow \mathbb{R}$ be of class C^r . Let $N = \{x \in \mathbb{R}^n : f(x) \geq 0\}$. Show that N is an n -manifold in \mathbb{R}^n . 6
- b) Let $X, Y, Z \in \mathbb{R}^5$. If $F(X, Y, Z) = 2x_2y_2z_1 + x_1y_5z_4$, then write AF in term of elementary alternating tensors. 6
- c) Show that the upper hemisphere of $S^{n-1}(a)$, defined by the equation $E_+^{n-1} = S^{n-1}(a) \cap H^n$ is an $(n - 1)$ manifold. 4

P.T.O.



4. a) State and prove Green's theorem. 8

b) Define differential of a K-form and prove that $d(dw) = 0$. 8

5. a) If α is an l -form in \mathbb{R}^n , prove that $\alpha^*(dw) = d(\alpha^*w)$. 6

b) Let $A = \mathbb{R}^2 - 0$; consider the 1-form in A defined by

$$w = \frac{x \, dx + y \, dy}{x^2 + y^2}$$

Show that w is closed. 6

c) If $\alpha : \mathbb{R}^2 \rightarrow \mathbb{R}^3$ is given by $\alpha(u, v) = (u, u + v, v^2)$ and $w = xy \, dx + zz \, dy - y \, dz$, then compute $\alpha^*(dw)$. 4

6. a) Define an oriented K -manifold. For $K > 1$, if M is an orientable K -manifold with non-empty boundary, then prove that ∂M is also orientable. 6

b) Let $M = \{X \in \mathbb{R}^3 : x_1^2 + x_2^2 + x_3^2 = 1\}$.

Find the tangent space $T_p(M)$ at $p = \left(\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}} \right)$. 5

c) Consider $w = xy \, dx + 3 \, dy - yz \, dz$ and $\eta = x \, dx - yz^2 \, dy + 2x \, dz$. Verify that $d(w \wedge \eta) = (dw) \wedge \eta - w \wedge d\eta$. 5

7. a) Define the term 'induced orientation'. 4

b) State generalized Stokes's theorem. 4



c) Let $A = (0, 1)^2$. Let $\alpha : A \rightarrow \mathbb{R}^3$ be given by $\alpha(u,v) = (u,v, u^2 + v^2 + 1)$. Let Y be the image set of α . Evaluate

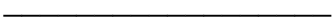
$$\int_{Y_\alpha} x_2 dx_2 \wedge dx_3 + x_1 x_3 dx_1 \wedge dx_3 . \quad 8$$

8. a) Let A be an open set in \mathbb{R}^K and $\alpha : A \rightarrow \mathbb{R}^3$ be of class C^∞ . If w is an l -form defined in an open set of \mathbb{R}^n containing $\alpha(A)$, then prove that $\alpha^*(dw) = d(\alpha^*w)$. 8

b) Show that the n -ball $B^n(a)$ is an n -manifold in \mathbb{R}^n of class C^∞ . 4

c) Justify whether **true** or **false** :

The 2-sphere S^2 is a 2-manifold in \mathbb{R}^3 . 4





[4023] – 405

M.A./M.Sc. (Sem. – IV) Examination, 2011
MATHEMATICS
MT-805 : Lattice Theory (New)
(2008 Pattern)

Time : 3 Hours

Max. Marks : 80

*N.B. : 1) Attempt **any five** questions.
2) Figures to the **right** indicate **full** marks.*

1. a) Let A be the set of all subgroups of a group G ; for $X, Y \in A$, set $X \leq Y$ to mean $X \subseteq Y$. Prove that $\langle A; \leq \rangle$ is a lattice. 5
- b) Let L be a lattice. Then prove that I is a proper ideal of L if and only if there is a onto join-homomorphism $\phi: L \rightarrow C_2$ such that $I = \phi^{-1}(0)$. 5
- c) Define a congruence relation on a lattice L and if θ is a congruence relation of L then prove that for every $a \in L$, $[a]\theta$ is a convex sublattice. 6
2. a) If a lattice L is finite, then prove that $L \simeq \text{Id}(L)$, the ideal lattice of L . 4
- b) Let L be a lattice. Then prove that a homomorphic image of L is isomorphic to a suitable quotient lattice of L . 7
- c) Show that an ideal P is a prime ideal of a lattice L if and only if $L \setminus P$ is a dual ideal. 5
3. a) Prove that every distributive lattice is modular, but not conversely. Find the smallest modular but not distributive lattice. 4
- b) Let L be a distributive lattice with 0 . Show that $\text{Id}(L)$, the ideal lattice of L , is pseudocomplemented. 4
- c) Prove that a lattice is modular if and only if it does not contain a pentagon (N_5) as a sublattice. 8

P.T.O.



4. a) Prove that a lattice L is a chain if and only if its every ideal is a prime ideal. **6**
- b) Show that the following inequalities hold in any lattice. **4**
- 1) $(x \wedge y) \vee (x \wedge z) \leq x \wedge (y \vee z)$;
 - 2) $(x \wedge y) \vee (x \wedge z) \leq x \wedge (y \vee (x \wedge z))$.
- c) Prove that a lattice L is distributive if and only if for any two ideals I, J of L ,
 $I \vee J = \{i \vee j \mid i \in I, j \in J\}$. **6**
5. a) Let L be a pseudocomplemented lattice. Show that $a^{**} \vee b^{**} = (a \vee b)^{**}$. **5**
- b) Prove that every meet homomorphism is isotone. Is the converse true ? Justify. **4**
- c) State and prove Nachbin theorem. **7**
6. a) Let L be a finite distributive lattice. Then show that the map $\phi : a \mapsto r(a)$ is an isomorphism between L and $H(J(L))$, the hereditary subsets of the set of join-irreducibles of L . **8**
- b) Let L be a distributive lattice, let I be an ideal, let D be a dual ideal of L , and let $I \cap D = \phi$. Then prove that there exists a prime ideal P of L such that $P \supseteq I$ and $P \cap D = \phi$. **8**
7. a) State and prove Jordan- Hölder Theorem for semimodular lattices. **8**
- b) Prove that every modular lattice is semimodular but not conversely. **5**
- c) Prove that every complete lattice is bounded. Is the converse true ? Justify your answer. **3**
8. a) State and prove Fixed-Point Theorem for complete lattices. **6**
- b) Prove that any lattice can be embedded into its ideal lattice. **4**
- c) Let L be a lattice, let P be a prime ideal of L , and let $a, b, c \in L$. Prove that if $a \vee (b \wedge c) \in P$ then $(a \vee b) \wedge (a \vee c) \in P$. **6**



[4033] – 201

M.A./M.Sc. (Semester – II) Examination, 2011
GEOGRAPHY
Gg – 201 : Quantitative Techniques in Geography
(2008 Pattern)

Time : 3 Hours

Max. Marks : 80

- N.B. :** 1) Attempt **any four** questions.
2) Use of calculator and statistical table are **allowed**.
3) The figures in the **right** hand side bracket indicate **full** marks.

1. a) Write a short note on grouped and ungrouped data. (6)
b) The following table represents grouped data of number of farms (frequency) in particular farm size (Class). Calculate skewness and comment. (14)

C	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80
f	1	3	4	6	11	9	10	9
C	81-90	91-100	101-110	111-120	121-130	131-140	141-150	
f	6	8	3	2	2	1	1	

2. a) Write meaning and description of mean. (6)
b) The average annual rainfall at Derby is 25.3 inches with the standard deviation 4.3 inches. Assuming that the rainfall is normally distributed what is the probability of rainfall ? (14)
a) Between 24 and 26 inches
b) More than 32 inches
c) Less than 28 inches
d) Exactly 18 inches
3. a) Write a note on Central limit theorem. (6)
b) The following table gives decadal population (in millions) of North America between 1920 and 1960. Using least-square method obtain best fit equation. What was the estimated population for 1970 ? (14)

Year	1920	1930	1940	1950	1960
Population	117	134	144	166	199

P.T.O.



4. a) What is time series ? What are its trends and periodicity ? (6)

b) Obtain the regression equation for the following data. Plot the regression line and scatter gram. The data represents annual rainfall in mm and runoff in 100 cumecs. (14)

Rainfall (X)	540	714	720	900	780	745	710	660	775
Runoff (Y)	6.0	5.3	5.1	10.0	9.5	12.5	12.5	13.5	10.5

5. a) Describe concept of bivariate correlation. (6)

b) A survey of random samples was carried out to investigate the image or perception of the people to have of their home town. As a result of tests and exercises people are put into one of the three categories according to whether their images are mainly map-like, verbal, or pictorial. Apply the Chi-square test to find out whether there is difference between the three age groups of people in the population at large. A significance level of 0.05 is to be tested. (14)

	Map-like	Verbal	Pictorial
Young	45	30	25
Middle-aged	11	8	31
Old	10	14	26



6. The following table represents three marine ecosystems: the open ocean (OC), continental shelf (CS) and tidal estuaries (TE) and their annual rate of production of organic matter ($\text{g/m}^2/\text{year}$). Perform the analysis of variance (ANOVA) (F Test) to test whether the marine ecosystems are significantly different with regard to annual rate of production of organic matter. Test the hypothesis at 0.05 level of significance. (20)

OC	108	24	138	158	165	267	147	55	149	389
CS	279	234	504	348	198	364	602	343	-	-
TE	1694	1278	624	529	3222	1503	-	-	-	-

7. Write notes on **any two** : (20)
- a) Interval and ratio scales of measurement
 - b) Moving averages
 - c) Parametric and non-parametric tests.



[4033] – 403

M.A./M.Sc. (Semester – IV) Examination, 2011
GEOGRAPHY
Gg – 421 : Geography of Water Resources
(2008 Pattern) (New)

Time : 3 Hours

Max. Marks : 80

*Instructions :1) Attempt **any four** questions.*

*2) **All** questions carry **equal** marks.*

*3) **Use of map stencils is allowed.***

1. Give an account of distribution of worlds surface water resources with respect to lakes and reservoirs.
 2. Give an account of hydrological cycle in detail.
 3. Discuss soil-water and crop relationship and explain moisture surplus and deficit regions of the world.
 4. Write an elaborative note on ‘Municipal demand and use of water’.
 5. Give an account of floods and droughts as problems of water resources.
 6. Give an account of watershed management.
 7. Write notes on **any two** :
 - a) Agricultural cropping pattern
 - b) Water balance and drought
 - c) Interstate water disputes.
-



[4033] – 405

M.A./M.Sc. (Semester – IV) Examination, 2011
GEOGRAPHY
Gg. 423 : Geography and Ecosystem
(2008 Pattern) (New)

Time : 3 Hours

Max. Marks : 80

*Instructions :1) Attempt **any four** questions.*

*2) **All** questions carry **equal** marks.*

*3) Use of map stencils is **allowed**.*

1. Explain the concept of ecosystem and describe its various components.
 2. Describe biogeochemical cycles with reference to nitrogen and oxygen.
 3. Describe forest ecosystems of the world.
 4. Giving suitable examples correlate population growth and carrying capacity of the Earth.
 5. Discuss resources use and ecological imbalance with respect to soils, forests and energy resources.
 6. Discuss the importance of biodiversity and its conservation.
 7. Write notes on **any two** :
 - a) Energy transfer in an ecosystem
 - b) Environmental laws in India
 - c) The Earth summit.
-



[4033] – 407

M.A./M.Sc. (Semester – IV) Examination, 2011

GEOGRAPHY

**Gg-430 : Social and Cultural Geography
(2008 Pattern) (New)**

Time : 3 Hours

Max. Marks : 80

*Instructions :1) Attempt **any four** questions.*

*2) **All** questions carry **equal** marks.*

*3) **Use of map stencils is allowed.***

1. Define social and cultural geography and explain the trends and development of social and cultural geography.
2. Explain phenomenism, existentialism, structuralism and radicalism in social and cultural geography.
3. Describe various theoretical space, structure and processes of social patterns.
4. Explain the concepts of industrialization, urbanization, globalization and sanskritization.
5. Give a detailed account of cultural regions of India.
6. Give an account of redistribution of resources with reference to social justice, equality and welfare.
7. Write notes on **any two** :
 - a) Patterns of social well-being in India
 - b) Interaction and social relations
 - c) Regional indicators of social well-being.



[4033] – 410

M.A./M.Sc. (Semester – IV) Examination, 2011
GEOGRAPHY
Gg – 433 : Natural and Manmade Hazards
(2008 Pattern) (New)

Time : 3 Hours

Max. Marks : 80

*Instructions :1) Attempt **any four** questions.*

*2) **All** questions carry **equal** marks.*

*3) **Use of map stencils is allowed.***

1. Define disaster. Discuss the risk and vulnerability assessment of disasters.
 2. Describe the probability of occurrence and effects of dust storms and lightning.
 3. Discuss the causes and effects of earthquakes.
 4. Discuss the causes and effects of forest fires.
 5. Explain the impact of oil spills on marine environment.
 6. Discuss the effects of over exploitation of resources on environment.
 7. Write notes on **any two** :
 - a) Types of manmade hazards
 - b) Effects of desertification
 - c) Structural measures in management of disaster.
-



[4033] – 415

M.A./M.Sc. (Semester – IV) Examination, 2011
GEOGRAPHY
Gg – 445 : Geography of India
(2008 Pattern) (New)

Time : 3 Hours

Max. Marks : 80

- Instructions :* 1) Attempt **any four** questions.
2) **All** questions carry **equal** marks.
3) **Use of map stencils is allowed.**

1. Describe west flowing drainage system in India.
2. Describe major climatic regions of India.
3. Describe major forest types and their distribution in India.
4. Give an account of the major hydel power projects in India.
5. Describe the impact of green revolution on socio-economic development in India.
6. Discuss the problems related to industrial development in India.
7. Write notes on **any two** :
 - a) Economic position of India
 - b) Soil conservation
 - c) Regional development of Chhota Nagpur.



[4033] – 202

M.A./M.Sc. (Semester – II) Examination, 2011

GEOGRAPHY

Gg – 210 : TROPICAL GEOMORPHOLOGY

(2008 Pattern)

Time: 3 Hours

Max. Marks : 80

Instructions : 1) All questions carry equal marks.

2) Attempt any four questions.

3) Use of calculator and statistical table is allowed.

1. Define tropical environment and discuss the peculiarities of the tropical climate.
2. Explain the nature and development of the deep weathering profile in the tropics.
3. Discuss the theories of origin of laterites and distribution of laterite in India.
4. Write in detail about the slope and valley forms in the tropics.
5. Define planation surface. Discuss the formation and types of planation surfaces.
6. Discuss the role of tectonics in the development of tropical landforms.
7. Write notes on **any two** :
 - i) Morphogenetic regions.
 - ii) Mobility of minerals in the tropics.
 - iii) Process of chemical denudation.



[4033] – 203

M.A./M.Sc. (Semester – II) Examination, 2011
GEOGRAPHY
Gg 211 : Synoptic Climatology
(2008 Pattern)

Time : 3 Hours

Max. Marks : 80

- Instructions :* 1) Attempt **any four** questions.
2) **All** questions carry **equal** marks.
3) Use of stencils is **allowed**.

1. Explain the nature and scope of synoptic climatology.
2. Elaborate the formation and characteristics of Easterly waves.
3. Give an account of the development and occurrences of tornados.
4. Define fronts and explain various types of fronts with help of diagrams.
5. Describe idealized weather of a wave cyclone with suitable examples.
6. Write a comparative account of convective and orographic precipitation.
7. Write notes on **any two** :
 - a) Analytical approach of synoptic climatology
 - b) Methods of forecasting
 - c) Importance of forecasting in marine activities.



[4033] – 204

M.A./ M.Sc. (Semester – II) Examination, 2011

GEOGRAPHY

**G-g-212 : Agricultural Geography
(2008 Pattern)**

Time : 3 Hours

Max. Marks : 80

Instructions :1) Attempt any four questions.

2) All questions carry equal marks.

3) Use of map stencils is allowed.

1. Define agricultural geography and explain various approaches to the study of agricultural geography.
2. Explain the significance of agriculture in the world economy.
3. Discuss the influence of physical and economic factors on agricultural patterns with suitable examples.
4. Write elaborative account of commercial agriculture.
5. Describe the role of irrigation, problems and prospects of dry farming in arid regions.
6. What is agricultural regionalization ? Describe method of agricultural regionalization suggested by Weaver.
7. Write notes on **any two** :
 - a) Influence of technological factors in agricultural patterns.
 - b) Nature of agricultural geography.
 - c) Mix farming.



[4033] – 205

M.A./M.Sc. (Semester – II) Examination, 2011
GEOGRAPHY
Gg – 213 : Population Geography
(2008 Pattern)

Time : 3 Hours

Max. Marks : 80

Instructions : 1) Attempt **any four** questions.
2) **All** questions carry **equal** marks.
3) **Use of map stencils is allowed.**

1. Define population geography and explain its nature and scope.
2. Give an account of spatio-temporal variations in world population growth.
3. Critically examine the Demographic Transition Theory.
4. Explain the factors influencing levels and trends of fertility.
5. Explain the causes and consequences of migration.
6. Explain the importance of population projections in industrial and agricultural development.
7. Write notes on **any two** :
 - a) Influence of physical factors on population distribution
 - b) Urban and Rural composition of population
 - c) Population policies in India.



[4033] – 206

M.A./M.Sc. (Semester – II) Examination, 2011
GEOGRAPHY
Gg – 214 : Geoinformatics – I
(2008 Pattern)

Time : 3 Hours

Max. Marks : 80

Instructions : 1) Attempt **any four** questions.
2) **All** questions carry **equal** marks.
3) **Use of map stencils is allowed.**

1. Discuss various GIS applications in hydrological and natural resource management studies.
2. Explain spatial, functional and logical relationship in spatial database.
3. Give an account of structuring of spatial data.
4. What is SQL ? Explain data analysis operations from algebraic and set theory.
5. Discuss raster and vector data models giving suitable examples.
6. Explain with suitable examples grid operations in GIS.
7. Write notes on **any two** :
 - i) Hardware and software requirement of GIS
 - ii) Digitization
 - iii) Topology building.



[4033] – 207

M.A./M.Sc. (Semester – II) Examination, 2011
GEOGRAPHY
Gg – 220 : Fluvial Geomorphology
(2008 Pattern)

Time : 3 Hours

Max. Marks : 80

Instructions: i) Attempt **any four** questions.
ii) **All** questions carry **equal** marks.
iii) *Use of map stencils is **allowed**.*

1. What do you understand by drainage composition ? Explain the Horton's law of drainage composition.
2. Explain regimes of flow. How do you distinguish between laminar flow and turbulent flow ?
3. Discuss the flow and channel characteristics of meandering river.
4. Explain the types of fluvial erosion and elaborate different erosive processes.
5. Elaborate the concept of grade.
6. What is river metamorphosis ? Explain long term and short term adjustments of a river.
7. Write notes on **any two** :
 - a) Horton's overland flow.
 - b) Downstream hydraulic geometry.
 - c) River terraces.



[4033] – 208

M.A./M.Sc. (Semester – II) Examination, 2011
GEOGRAPHY (2008 Patter)
Gg 221 : Monsoon Climatology

Time : 3 Hours

Max. Marks : 80

Instructions : 1) Attempt **any four** questions.
2) **All** questions carry **equal** marks.
3) *Use of map stencils is allowed.*

1. Define Monsoon climatology and describe its aerological concepts in detail.
2. Give a comparative account of Monsoon of East Asia and South Asia.
3. Explain in brief the theories of summer and winter monsoons.
4. Discuss the driving mechanism of the monsoon.
5. Give a comparative account of on-set and withdrawal of monsoon.
6. Write an account of monsoon rainfall variability in the Indian sub-continent.
7. Write notes on **any two** :
 - a) Development of monsoon climatology
 - b) Droughts and floods
 - c) Features of the predictors.

B/II/11/165



[4033] – 209

M.A./M.Sc. (Semester – II) Examination, 2011
GEOGRAPHY (2008 Pattern)
Gg 222 : Industrial Geography

Time : 3 Hours

Max. Marks : 80

*Instructions : 1) Attempt **any four** questions.*

*2) **All** questions carry **equal** marks.*

*3) **Use of map stencils is allowed.***

1. Explain the place of manufacturing in regional economics.
2. Explain with suitable examples how geographical and political factors are influencing on location of industry.
3. Critically examine the Losch's model.
4. Write a detail account of the distribution and changing pattern of automobile and chemical industries in India.
5. Discuss the distribution, problems and prospects of any two industrial regions in Japan.
6. Give an account of regional development of industries in India.
7. Write notes on **any two** :
 - a) Changing pattern of cotton textile industry in India
 - b) Nature of software industry in India
 - c) Problems and prospects of IT industry.



[4033] – 210

M.A./M.Sc. (Semester – II) Examination, 2011
GEOGRAPHY
Gg-223 : Geography of Rural Settlements
(2008 Pattern)

Time : 3 Hours

Max. Marks : 80

Instructions: 1) Attempt any four questions.
2) All questions carry equal marks.
3) Use of map stencils is allowed.

1. Describe how dequence of occupance from neolithic to modern period has influenced on rural settlements.
2. Elaborate vairous factors affecting site, situation and location of settlements.
3. Critically examine Central Place Theory.
4. Discuss causes and consequences of rural-urban migration in India.
5. Describe various factors affecting rural house types with examples.
6. Dicuss environment and water resources are the important aspects of rural development planning.
7. Write notes (**any two**) :
 - a) Ricardo's rent theory.
 - b) Settlement patterns in Maharashtra.
 - c) Rural transformation.

B/II/11/175



[4033] – 211

M.A./ M.Sc. (Semester – II) Examination, 2011

GEOGRAPHY

Gg-224 : Geoinformatics – II
(2008 Pattern)

Time : 3 Hours

Max. Marks : 80

Instructions : 1) Attempt **any four** questions.
2) **All** questions carry **equal** marks.
3) Use of map stencils is **allowed**.

1. Explain various data sources in Geoinformatics.
2. Define Remote Sensing. Give a historical development of remote sensing.
3. Explain the interaction of EMR with respect to Earth's surface.
4. Describe spherical and chromatic aberrations and astigmatism as optical aspects of an aerial camera.
5. Describe the methods for measurement of scale and height in a use of aerial photograph.
6. Describe geosynchronous and sun synchronous satellites and their functions giving suitable examples.
7. Write notes on **any two**.
 - i) Spectral signatures.
 - ii) Components of an aerial camera.
 - iii) GPS signals.

B/II/11/185



[4033] – 301

M.A./M.Sc. (Semester – III) Examination, 2011
GEOGRAPHY
Gg 301: Theoretical and Applied Geography
(2008 Pattern) (New)

Time : 3 Hours

Max. Marks : 80

- N.B :* 1) Attempt **any four** questions.
2) **All** questions carry **equal** marks.
3) Use of map stencils is **allowed**.

1. Discuss the contribution of Alexander Von Humboldt in the advancement of geographical thought.
2. Give an account of system approach in geography with suitable examples.
3. What is the meaning of quantification ? Explain the application of statistical techniques in the study of geography.
4. Give a brief account of French and British school of thought in the development of geographical thought.
5. Explain the application of geographical concepts and techniques in environmental management.
6. Discuss the application of GIS and remote sensing techniques in recent geographical studies.
7. Write notes on **any two** :
 - a) Application of geographical techniques in land use planning
 - b) Determinism
 - c) Significance of models.



[4033] – 302

M.A./M.Sc. (Semester – III) Examination, 2011
GEOGRAPHY Special Paper – I)
Gg 310 : Coastal Geomorphology
(2008 Pattern) (New)

Time : 3 Hours

Max. Marks : 80

- N.B.:* i) Attempt **any four** questions.
ii) **All** questions carry **equal** marks.
iii) Draw figures/maps **wherever** necessary.
iv) **Use of map stencils is allowed.**

1. Give an account of components of coastal system.
2. What are shore currents ? Explain different types of currents.
3. Explain the mechanism of sea level changes.
4. Explain morphodynamics of a delta and describe its morphology in detail.
5. What is a shore platform ? Explain its morphology and formation.
6. Give an account of salt intrusion and subsidence of coastal aquifers as the coastal issues.
7. Write notes on **any two** :
 - a) Types of breakers.
 - b) Clastic and biogenic sediments.
 - c) Estuaries and mud flats.

B/II/11/270



[4033] – 303

M.A./M.Sc. (Semester – III) Examination, 2011
GEOGRAPHY (Special Paper – I)
Gg-311 : Applied Climatology (New)
(2008 Pattern)

Time : 3 Hours

Max. Marks : 80

- N.B. : 1) Attempt **any four** questions.
2) **All** questions carry **equal** marks.
3) **Use of map stencils is allowed.***

1. Describe different types of humidity and various forms of precipitation.
2. Explain the effect of change in weather on pests and diseases.
3. Write an explanatory note on impact of urban climate on global environmental change.
4. How does climate affect air and water transport ? Elaborate.
5. Give an account of external and internal causes of climate change.
6. Describe the impact of various climatic variables on industrial and commercial activities.
7. Write notes on **any two** :
 - a) Nature and scope of applied climatology.
 - b) Remote sensing and detection of plant stress.
 - c) Heating degree-days.

B/II/11/175



[4033] – 304

M.A./M.Sc. (Semester – III) Examination, 2011
GEOGRAPHY (Special Paper – I)
Gg – 312 : Trade and Transport Geography (New)
(2008 Pattern)

Time : 3 Hours

Max. Marks : 80

- Instructions :* 1) Attempt **any four** questions.
2) **All** questions carry **equal** marks.
3) *Use of map stencils is allowed.*

1. Explain in detail the history of development of trade and transport Geography.
2. Explain various characteristics and significance of different modes of transportation.
3. Describe how the various factors are associated with the development and distribution of waterways.
4. Discuss how the growth and development of Urban transport leads to degradation of environment.
5. What is trade ? Describe different types of trade and its significance with suitable examples.
6. Explain the problems and prospects of international trade in globalization.
7. Write notes on **any two** :
 - a) Gravity models in transport network
 - b) Physical factors affecting location of seaports
 - c) Theory of comparative advantage of trade.



[4033] – 305

M.A./M.Sc. (Semester – III) Examination, 2011
GEOGRAPHY (Special Paper – I)
Gg-313 : Urban Geography (New)
(2008 Pattern)

Time : 3 Hours

Max. Marks : 80

N.B.: i) Attempt **any four** questions.
ii) **All** questions carry **equal** marks.
iii) **Use of map stencils is allowed.**

1. Explain the behavioural, structural and demographic concepts of urbanisation.
2. Describe the general characteristics of CBD.
3. Give an account of various approaches to the urban classification.
4. Bring out the salient features of age, sex and occupational structure of urban populations.
5. Describe the various criteria used to demarcate the city region.
6. “The ever growing slums are an outcome of increasing price of land and floor space”. Discuss.
7. Write notes on **any two** :
 - a) Significance of urban geography.
 - b) Hierarchy of urban settlements.
 - c) Need of city planning.

B/II/11/300



[4033] – 306

M.A./M.Sc. (Semester – III) Examination, 2011
GEOGRAPHY (Special Paper – I)
Gg-314 : Geoinformatics – III (New)
(2008 Pattern)

Time : 3 Hours

Max. Marks : 80

Instructions : i) Attempt **any four** questions.
ii) **All** questions carry **equal** marks.
iii) **Use of map stencil and calculator is allowed.**

1. Explain in detail the grid operations required in spatial data analysis.
2. Give an account of point pattern, network and surface analysis. Give suitable examples.
3. Discuss the procedure of georeferencing and state its significance.
4. List various techniques of image enhancement and give the main characteristics of these techniques.
5. What are the probable sources of distortions in a remotely sensed imagery ? Explain any three sources of distortions.
6. Write a brief account of microwave remote sensing.
7. Write notes on **any two** :
 - a) Digital terrain model
 - b) Topological overlays
 - c) Spatial ratioing.



[4033] – 307

M.A./M.Sc. (Semester – III) Examination, 2011
GEOGRAPHY(Special Paper – II)
Gg 320 : Multivariate Statistics (New)
(2008 Pattern)

Time : 3 Hours

Max. Marks : 80

- N.B. :** i) Write *any four* questions.
ii) *All* questions carry *equal* marks.
iii) Draw figures/maps *wherever* necessary.
iv) Use of map stencils is *allowed*.

1. a) Give meaning of following terms connected with matrix, with examples.
Element, order, determinant. 4
- b) Find $[A] \times [B]$ and add the product matrix to the $[C]$. 8

$$[A] = \begin{bmatrix} 3 & 2 & 9 \\ 1 & 2 & 3 \end{bmatrix} \quad [B] = \begin{bmatrix} 1 & 1 & 4 \\ 1 & 2 & 5 \\ 7 & 3 & 3 \end{bmatrix} \quad [C] = \begin{bmatrix} 0.8 & 0.5 & 0.2 \\ 0.1 & 0.4 & 0.3 \end{bmatrix}$$

- c) Find the unknowns in the following simultaneous equations using matrix solutions. 8

$$9x + 2y + 3z = 74$$

$$2x + 2y - 2z = 42$$

$$3x + 3y + 3z = 63$$

2. Find and plot the second degree bivariate non linear regression equation for the following observations.

(x-Distance from city centre in km, y-Public park size sq.km.)

$$x = \quad 1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6 \quad 7$$

$$y = \quad 0.5 \quad 1 \quad 1.5 \quad 2 \quad 1.3 \quad 0.5 \quad 0.4$$

P.T.O.



3. Find second order multiple regression equation and its explained variance from the following data.

a	10	12	15	18	14	15
b	1	2	5	6	3	2
c	8	5	8	9	5	4

4. Find the linear trend surface equation and plot the surface to the appropriate scale (Z-Height of sand dunes in meters)

X	1	3	1	3	4	5	6	6	7
Y	1	2	5	4	6.5	3	5.5	8	9
Z	4	3	3.5	3	2	2	2.8	3	2

Determine the explained variance of the equation.

5. Find the first principal component, from the following correlations.

$ab = 0.8$, $ac = 0.8$, $ad = 0.2$, $bc = -0.4$, $bd = 0.7$ and $cd = -0.8$

Calculate eigen value and explained variance of the equation.

	X₁	X₂	X₃
X₁	1	0.8	0.7
X₂	0.8	1	0.4
X₃	0.7	0.4	1



6. Find first two factors from the following matrix of correlations. Calculate explained variance.

	a	b	c	d
a	1	0.5	0.8	0.5
b		1	0.9	0.8
c			1	0.7
d				1

7. Write explanatory notes on **any two** :

- a) Factor scores
- b) Regionalisation from factor scores
- c) Eigen vector.



[4033] – 308

M.A./M.Sc. (Semester – III) Examination, 2011
GEOGRAPHY (Special Paper – II)
Gg-321 : Political Geography (New)
(2008 Pattern)

Time : 3 Hours

Max. Marks : 80

- N.B.:*
- i) Attempt **any four** questions.*
 - ii) **All** questions carry **equal** marks.*
 - iii) Draw figures/maps **wherever** necessary.*
 - iv) Use of map stencils is **allowed**.*

1. Describe various approaches to the study of political Geography.
2. Bring out the differences between the frontiers and boundaries and describe the genetic classification of boundaries.
3. Explain the global geostrategic views of Spykman and Cohen.
4. Classify the resources and explain how power of a nation depends on resource management.
5. Explain the geopolitical significance of SAARC region.
6. Describe the interstate water and language disputes.
7. Write notes on **any two** :
 - a) Scope of political geography.
 - b) Characteristics of a state.
 - c) Problems of border states in India.



[4033] – 309

M.A. / M.Sc. (Semester – III) Examination, 2011
GEOGRAPHY (Special Paper – II)
Gg-322 : Soil Geography (New)
(2008 Pattern)

Time : 3 Hours

Max. Marks : 80

- N.B. :*** i) Attempt **any four** questions.
ii) **All** questions carry **equal** marks.
iii) Draw figures / maps **wherever** necessary.
iv) **Use of stencils is allowed.**

1. Explain the role of parent material, topography and climate in soil forming process.
2. Discuss the chemical properties of soil with reference to acidity, alkalinity, soil pH and soil colloids.
3. Write an explanatory note on genetic structure of soils.
4. Explain the United States Soil classification system.
5. Elaborate the relationship of weathering processes and soils.
6. Discuss the various problems of soil degradation.
7. Write notes on **any two** :
 - a) Human geography and soils
 - b) Soil texture and structure
 - c) Soil profile.



[4033] – 401

M.A./M.Sc. (Semester – IV) Examination, 2011

GEOGRAPHY

Gg-401 : Resource Management
(2008 Pattern) (New)

Time: 3 Hours

Max. Marks : 80

Instructions : 1) Attempt any four questions.

2) All questions carry equal marks.

3) Use of map stencils is allowed.

1. Describe the various models of resource management in brief.
2. Describe how the physical and cultural resources are subdivided according to various bases.
3. What is resource management ? Describe the management of cultural resources.
4. How are the various aspects of population important in the resource management ?
5. “An integrated view of sustainable management and development of resources is the need of the hour”. Discuss.
6. Describe the distribution and development policy of population resources of India.
7. Write notes on **any two** :
 - a) Methods of water resource conservation.
 - b) Use of remote sensing in appraisal and management of forest resources.
 - c) Indian Population Development Policy.



[4033] – 402

M.A./M.Sc. (Semester – IV) Examination, 2011
GEOGRAPHY
Gg : 420 : Regional Planning and Development
(2008 Pattern) (New)

Time : 3 Hours

Max. Marks : 80

Instructions : i) Attempt **any four** questions.
ii) **All** questions carry **equal** marks.
iii) **Use of map stencils is allowed.**

1. Explain the role of geography in regional planning.
2. What are the various types of surveys for regional planning ? Explain them in brief.
3. What do you mean by planning strategies ? Give an elaborative account of planning strategies with examples from developed and developing countries.
4. Give an account of regional policies in the Indian Five Year Plans.
5. Explain the criteria used for regionalisation for planning.
6. “Regional disparities in economic development in India is an outcome of improper planning policies”. Discuss.
7. Write notes on **any two** :
 - a) Scope of regional planning.
 - b) Types of region.
 - c) River basin as a planning unit.



[4033] – 404

**M.A./M.Sc. (Semester – IV) Examination, 2011
(2008 Pattern) (New)
GEOGRAPHY
Gg – 422 : Biogeography**

Time : 3 Hours

Max. Marks : 80

Instructions : 1) *All questions carry equal marks.*
2) *Attempt any four questions.*
3) *Use of map stencils is allowed.*

1. Write a note on ‘basic biogeography processes’.
2. Describe the biogeography patterns on the basis of altitudinal zonation.
3. Explain the concepts of speciation and extinction as basic processes in biogeography.
4. Write a note on ‘variety of island habitat’.
5. Discuss how pattern of climate is physical limitation of life.
6. Describe the features of taiga as a major biome of the world.
7. Write notes on **any two** :
 - i) Endemic
 - ii) Opportunities for adaptive radiation
 - iii) The evidence of paleomagnetism.



[4033] – 406

M.A./M.Sc. (Semester – IV) Examination, 2011
GEOGRAPHY
Gg 424 : Research Methodology
(2008 Pattern) (New)

Time : 3 Hours

Max. Marks : 80

Instructions : 1) *All questions carry equal marks.*
2) *Attempt any four questions.*
3) *Use of map stencils is allowed.*

1. Discuss the importance and types of survey.
 2. Describe the major elements of interpretation of SOI Toposheet.
 3. Discuss the data base creation from aerial photograph and satellite images.
 4. Describe the use of GIS in spatial data analysis and modelling.
 5. “Field work is essential part of geographical research”. Discuss.
 6. Explain the significance of review of Literature and methodology applied in geographical research.
 7. Write notes (**any two**) :
 - a) Indexing system of SOI Toposheet
 - b) ‘Chi’ square and ‘T’ tests
 - c) Concept of stereoscopic view.
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[4033] – 408

M.A./M.Sc. (Semester – IV) Examination, 2011
GEOGRAPHY
Gg – 431 : Computer Geography
(2008 Pattern) (New)

Time : 3 Hours

Max. Marks : 80

Instructions : 1) *All questions carry equal marks.*
2) *Attempt any four questions.*
3) *Use of calculator and statistical table is allowed.*

1. Discuss the application of computers in Physical Geography.
2. Write an account of types of computers.
3. Discuss in detail cartographic application of paint in map making.
4. Explain the re-sampling, cropping and enhancement function of CorelDRAW.
5. State the importance of GIS in geographical studies.
6. Explain the use of MS EXCEL in data analysis.
7. Write notes on **any two** :
 - a) Computer languages
 - b) Menus in Ms-Word
 - c) Digitisation.



[4033] – 409

M.A./M.Sc. (Semester – IV) Examination, 2011

GEOGRAPHY

**Gg – 432 : Oceanography
(2008 Pattern) (New)**

Time : 3 Hours

Max. Marks : 80

Instructions : i) Attempt **any four** questions.
ii) **All** questions carry **equal** marks.
iii) **Use of map stencils is allowed.**

1. Define oceanography and discuss the contribution of oceanographers in the subject.
 2. Discuss sea floor spreading with reference to origin of ocean basins.
 3. Explain the properties of sea water with reference to temperature and salinity.
 4. Explain types and characteristics of sea waves.
 5. Discuss the factors responsible for formation of ocean currents.
 6. Give an account of sediments on the ocean floor.
 7. Write notes on **any two** :
 - a) Ocean ridges and rises
 - b) Factors affecting density of ocean water
 - c) Equilibrium theory of tides.
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B/II/11/120



[4033] – 411

M.A./M.Sc. (Semester – IV) Examination, 2011
GEOGRAPHY
Gg – 441 : Regional Geography of Europe
(2008 Pattern) (New)

Time : 3 Hours

Max. Marks : 80

Instructions : i) Attempt **any four** questions.
ii) **All** questions carry **equal** marks.
iii) *Use of map stencils is allowed.*

1. Explain major soil types and distribution in Europe.
2. Give an account of energy resources of Europe.
3. Explain problems and prospects of industrialization in Europe.
4. Give an account of development of transportation in Europe.
5. Give an account of population resources of Europe.
6. Discuss the process of urbanization in Europe.
7. Write notes on **any two** :
 - i) Geological setting of Europe.
 - ii) Salient features of agriculture of Europe.
 - iii) Euro-currency.

B/II/11/100



[4033] – 412

M.A./M.Sc. (Semester – IV) Examination, 2011
GEOGRAPHY
Gg-442 : Regional Geography of South East Asia
(2008 Pattern) (New)

Time : 3 Hours

Max. Marks : 80

Instructions : i) Attempt **any four** questions.
ii) **All** questions carry **equal** marks.
iii) Use of map stencils is **allowed**.

1. Explain major soil types and distribution in South East Asia.
2. Discuss the problems and prospects of agriculture in South East Asia.
3. Discuss the problems and prospects of industrialization in South East Asia.
4. Explain development of transportation in South East Asia.
5. Discuss the problems of urbanization in South East Asia.
6. Explain development and importance of tourism in South East Asia.
7. Write notes on **any two** :
 - i) Significance of location of South East Asia
 - ii) Internal trade in South East Asia
 - iii) Singapur as a tourist attraction.

B/II/11/100



[4033] – 413

M.A./M.Sc. (Semester – IV) Examination, 2011
GEOGRAPHY
Gg 443 : Regional Geography of North America
(2008 Pattern)(New)

Time : 3 Hours

Max. Marks : 80

Instructions: i) Attempt any four questions.

ii) All questions carry equal marks.

iii) Use of map stencils is allowed.

1. Divide North America into major physiographic units and describe the Western cordillera region in detail.
2. Describe the characteristics features of agriculture in North America and comment on the problems and prospects of agriculture.
3. Give an account of the development of industrial activities and evolution of industrial regions in North America.
4. Write an essay on ‘The development of transportation in North America’.
5. Give an account of problems of urbanization and development of megalopolis in North America.
6. Describe North America’s membership in various international organizations.
7. Write notes on **any two** :
 - i) Energy resources in North America.
 - ii) Migration in North America.
 - iii) Tourist Centres in North America.



[4033] – 414

M.A. / M.Sc. (Semester – IV) Examination, 2011

GEOGRAPHY

Gg.444 : Geography of Japan

(2008 Pattern) (New)

Time : 3 Hours

Max. Marks : 80

*Instructions : 1) Attempt **any four** questions.*

*2) **All** questions carry **equal** marks.*

*3) **Use of map stencils is allowed.***

1. Describe relief characteristics and its influence on drainage pattern of Japan.
2. Give an account of mineral resources of Japan.
3. Bring out the importance of fishing industry of Japan.
4. Write a geographical account of International Trade of Japan.
5. Write a geographical essay on population structure and composition of Japan.
6. Explain the role of national and international policies in the development of Japan.
7. Write notes on **any two** :
 - a) Geographical location of Japan
 - b) Natural hazards in Japan
 - c) Agricultural regions of Japan