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UNIVERSITY OF MYSORE



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No.AC.2(S)/384/14-15

Dated: 10-06-2015

NOTIFICATION

Sub: Introduction of PG Diploma in Organic Horticulture from the academic year 2015-16.

Ref: 1. Proceedings of Faculty of Science & Technology Meeting held on 02-02-2015,
2. Proceedings of the Meeting of Academic Council held on 27-03-2015.

The Board of Studies in **Sericulture Science (PG)** at its meeting held on 19-11-2014 has resolved to commence a PG Diploma programme with a nomenclature of "Organic Horticulture" from the academic year 2015-16.

The Faculty of Science and Technology and the Academic Council at their meetings held on 02-02-2015 and 27-03-2015 respectively have approved the above proposals and the same is hereby notified.

The curriculum of PG Diploma in Organic Horticulture is annexed ~~herewith~~.

DRAFT APPROVED BY THE REGISTRAR

[Handwritten signature]
REGISTRAR 16/6
10/06/15
12/6

To

1. The Registrar (Evaluation), University of Mysore, Mysore.
2. The Chairperson, BOS/DOS in Sericulture Science, MGM.
3. The Dean, Faculty of Science & Technology, DOS in Earth Science, MGM.
4. The Director, College Development Council, UOM, Mysore.
5. The Coordinator, Online & Outreach programme, Parakalamatta, MGM.
6. The Deputy/Assistant Registrar (Evaluation), University of Mysore, Mysore.
7. The Supdt, A.B., Academic Section / PMEB, UOM., Mysore.
8. The P.A. to the Vice-Chancellor/Registrar/Registrar (Evaluation), UOM., Mysore.
9. The Case Worker, AC.7, Academic Section, University of Mysore, Mysore.
10. The Section Guard File(Supdt.AC.2), A.B., A.C., UOM.
11. The Schedule File.



UNIVERSITY OF MYSORE

POST GRADUATE DIPLOMA

IN

ORGANIC HORTICULTURE

**DEPARTMENT OF STUDIES IN SERICULTURE SCIENCE
MANASAGANGOTRI
MYSORE – 570 006**

2015 - 16

UNIVERSITY OF MYSORE
DEPARTMENT OF STUDIES IN SERICULTURE SCIENCE
MANASAGANGOTRI, MYSORE – 570 006.

POST-GRADUATE DIPLOMA IN ORGANIC HORTICULTURE

PREFACE

The Department of Studies in Sericulture has been offering Post-graduate course in 'Sericulture' since 1989. The course has been renomenclatured as 'Sericulture and Seribiotechnology' from the academic year 2009-10. In recent years, the employment opportunities to the Post-graduates in Sericulture and Seribiotechnology have declined considerably with concomitant decline in the admission to this course. Keeping this in view and the expertise of the faculty in the department, the departmental council in its meeting held on 17-11-2014 has unanimously decided to commence a programme entitled "**POST-GRADUATE DIPLOMA IN ORGANIC HORTICULTURE**".

As Sericulture is an agro-based cottage industry, the food plants of silkworms are multipurpose plants closely related to horticulture plants. The faculty in the department have been involved in teaching biology, propagation, farm management, cultivation, protection, physiology, breeding and utilization of these plants *vis-a-vis* soils, integrated management of nutrients, diseases and pests, irrigation, intercropping, mulching and crop physiology of various other horticultural plants.

The subject of introduction of POST-GRADUATE DIPLOMA IN ORGANIC HORTICULTURE was discussed at length in the meeting of BOS in Sericulture (PG) held on 19-11-2014 and it was unanimously consented by the members to commence the course from 2015-16, so that the trained graduates will cater to the needs of organic horticulture industries in the country.

INFRASTRUCTURE FOR THE COURSE IN THE DEPARTMENT

The department is in possession of five acres of fenced land area of which about three acres of land is developed for cultivation. Further, the service oriented project entitled 'Bio-waste Management through Composting and Vermicomposting' undertaken by Dr. Basavaiah, Professor, in the department, will provide the additional support to run this diploma programme.

The following teaching and non-teaching posts which have been created in the department are considered as regular posts in the university:

POST	No. OF POSTS
1) Professor	04
2) Assistant Professor	04
3) Typist-cum-clerk	01
4) Peon-cum-watchman	02
5) Field-cum-lab. Assistant (FCLA)	05
6) Skilled assistant	04
7) Gardner-cum-peon	08

At this juncture, It is worth mentioning that the infrastructural facilities currently available in the department could also be made use of for running the proposed diploma course. Obviously, it is felt that there won't be any serious financial implications on the part of the university to take up this programme.

In the backdrop of the above, it is felt that commencement of the proposed diploma course in the department would prove to be a suitable supportive programme to the existing PG programme in Sericulture and Seri-biotechnology. Above all, commencement of the proposed diploma course is expected to utilize the available resources, including human resources, more effectively.

PREAMBLE TO THE COURSE

Organic farming is a socially and environmentally conscious approach to agriculture. The organic horticultural practices are helpful in creating integrated, humane, environmentally and economically sustainable production systems to produce high quality, nutritious horticultural produce. India is fast becoming a major base for production and supply of organically produced horticultural products to the world market. The said course has been designed for meeting the growing demand for experts in the fields of organic production of fruits, vegetables, flowers, medicinal plants, *etc.* The course has oriented to impart practical knowledge and proficiency in organic and sustainable production practices of horticultural crops, certification process and marketing of organically raised horticultural produce and also to promote self-employment in horticulture.

ELIGIBILITY CRITERIA FOR ADMISSION

- (1) Candidate with a Bachelor's Degree in Science from a recognized university.
- (2) The candidate must have scored a minimum of 45% marks in aggregate at graduation. (Relaxable to 40% for SC & ST candidates or as per University Rules and Regulations).

DURATION OF THE COURSE: One year (Two Semesters)

ADMISSIONS: The intake for the course shall be 20 (twenty). The reservation of seats shall be decided by the University from time to time.

FEE STRUCTURE: Rs. 7500/= (Rupees Ten thousand) for the course. The fee structure of the course shall be decided by the University from time to time.

SELECTION OF CANDIDATES: The selection of eligible candidates for admission to the course shall be purely on merit.

COURSE STRUCTURE

I SEMESTER						
Paper Code	Title of the Paper	No. of Hours / Week	Total No. of Hours	Internal Assessment	Theory / Practical Final Exam)	Total Marks
PGDOH 1.1	Introduction to Organic Horticulture	03	48	30	70	100
PGDOH 1.2	Farm Management in Organic Horticulture	03	48	30	70	100
PGDOH 1.3	Organic Fruits and Plantation Crops Production	03	48	30	70	100
PGDOH 1.4	Propagation, Organic Inputs and Fruit Production Practices (Practical - I)	03	48	10	40	50
Total Marks for I Semester						350
II SEMESTER						
PGDOH 2.1	Organic Vegetables and Flowers Production	03	48	30	70	100
PGDOH 2.2	Certification and Marketing of Organic Horticultural Produce	03	48	30	70	100
PGDOH 2.3	Production Practices of Organic Vegetables and Flowers (Practical - II)	03	48	10	40	50
PGDOH 2.4	Project work	03	48	30	70	100
Total Marks for II Semester						350
Grand Total of Marks for the Course: 700						

SCHEME OF EXAMINATION

I SEMESTER				
Paper code	Title of the paper	Internal Assessment (30 Marks)		Final Examination
		C1	C2	
PGDOH 1.1	Introduction to Organic Horticulture	15	15	70
PGDOH 1.2	Farm Management in Organic Horticulture	15	15	70
PGDOH 1.3	Organic Fruits and Plantation Crops Production	15	15	70
PGDOH 1.4	Propagation, Organic Inputs and Fruit production Practices (Practical - I)	Practical Record: 10 Marks		40
II SEMESTER				
PGDOH 2.1	Organic Vegetables and Flowers Production	15	15	70
PGDOH 2.2	Certification and Marketing of Organic Horticultural Produce	15	15	70
PGDOH 2.3	Production Practices of Organic Vegetables and Flowers (Practical - II)	Practical Record: 10 Marks		40
PGDOH 2.4	Project work	15	15	70 (Internal and External Examiners)

POSTGRADUATE DIPLOMA IN ORGANIC HORTICULTURE

SYLLABUS

FIRST SEMESTER

Paper PGDOH 1.1: Introduction to Organic Horticulture

Theory

48 hours

UNIT - I		
1	Importance of Horticulture; overview of horticultural production; export and import.	2 h
2	Alternative farming systems - conventional, organic, natural - history, concept and initiatives in India and Karnataka.	3 h
3	Classification of horticultural crops, major horticultural crops grown in different agro-ecological regions of India and Karnataka.	3 h
4	Organic horticulture – definition, merits and demerits; Scope of organic horticulture in India and Karnataka; present status and development.	4 h
UNIT - II		
5	Principles of organic horticulture - tools and practices, planned crop rotation, intercropping and multiple cropping. Biodynamic horticulture.	4 h
6	Requirements for organic horticulture; organic norms - national and international.	4 h
7	Agencies and institutions related to organic farming and horticulture; government schemes and other financial resources.	4 h
UNIT - III		
8	Plant propagation: Classification of propagation methods, sexual propagation and its importance; seed structure, characteristics of good seeds, viability tests, seed germination, pre-germination treatments.	4 h
9	Asexual propagation and its importance, propagation by cuttings, types and preparation of cuttings. Propagation through layerage, methods of layerage, factors affecting.	4 h
10	Propagation by grafting, types of grafting, importance, selection of stock and scion, graft union.	2 h
11	Micro-propagation: Technique, advantages and disadvantages.	2 h
UNIT - IV		
12	Soils for horticulture: Soil profile and types; Physical, chemical and biological properties of soil; Soil health and soil food web.	4 h
13	Soil fertility and productivity. Soil colloids, ion exchange, soil organic matter, humus; soil sampling and testing.	4 h
14	Selection of site for establishing an orchard; orchard plan, systems of planting.	2 h
15	Establishment of an orchard; Soil tillage, land preparation, buffer zone, mulching.	2 h

Paper PGDOH 1.2: Farm Management in Organic Horticulture

Theory

48 hours

UNIT-I		
1	Scope of farm management, farm management problems, farm components for an organic farm, farm designing.	4 h
2	Farm management decisions, principles involved, requirements in farming profession.	4 h
3	Farm budgeting, farm business analysis, farm records.	4 h
UNIT-II		
4	Farm financial management, farm labour and farm machinery management.	4 h
5	Income generation activities; Livestock management, apiculture, mushroom production, terrace gardening, kitchen garden, Bonsai and flower arrangement. Organic silk; horticultural importance of food plants of silkworms.	5 h
6	Nutrient management of Horticultural plants: Essential plant nutrients, identification of deficiency symptoms and remedial measures. Contamination control in organic farm.	3 h
UNIT-III		
7	In-situ manuring: methods; by animal- advantages and limitations. Green manures- methods of planting, advantages and limitations, mulches and mulching; sustainability.	3 h
8	Ex-situ manuring: Organic resources, direct incorporation of organic wastes; organic manures- types, method and time of application; organic liquid nutrient preparations, organic soil amendments; Standards for organic inputs of nutrients- fertilizers; Integrated Nutrient Management.	4 h
9	Composting - principles, stages, types and factors; methods; vermicomposting, sludge's and biogas.	2 h
10	Bio-intensive nutrient management: Bio-fertilizers - types, methods of application, advantages and limitations.	3 h
UNIT-IV		
11	Water management: Importance of water, water resources in India, available soil moisture- distribution of soil moisture- water budgeting- rooting characteristics; soil- plant-water relationship.	4 h
12	Methods of irrigation and their significance, schedules, quality of irrigation water; assessment of irrigation requirements for different horticultural crops. Water use efficiency, fertigation.	4 h
13	Watershed management - objectives and approaches; rain water conservation, weather elements.	2 h
14	Weed management in organic horticulture – methods and their relative importance, beneficial weeds.	2 h

Paper PGDOH 1.3: Organic Fruits and Plantation Crops Production

Theory

48 hours

UNIT -I		
1	Pomology, structure and development of fruits. Importance of fruits in nutrition, quality of organic fruits, production status of fruits in India.	3 h
2	Area, production, importance, origin, climate, soils, species and varieties, planting methods, training and pruning, flowering, fruit set and organic production practices of fruit crops – banana, citrus, grape, guava, mango, mulberry, papaya, pineapple, pomegranate, and sapota.	9 h
UNIT -II		
3	Organic protection practices in above said fruit crops; preparation and application of bio-pesticides, botanicals; bio-control agents, IPM and IDM.	5 h
4	Role of growth regulators in seed dormancy, juvenility, maturity, senescence; photoperiodism, flowering, fruit set and fruit ripening; parthenocarpy.	3 h
5	Packing methods and transport, principles and methods of preservation, processing, canning, fruit juices, beverages, pickles, jam, jellies, candies. Dried and dehydrated products, fermented fruit beverages, food safety standards.	4 h
UNIT -III		
6	Origin, distribution, classification, varieties, propagation, selection of planting material, climate, soil, planting details and time of planting, organic production practices of plantation crops – arecanut, betelvine, cashewnut, coconut, coffee and tea.	6 h
7	Organic protection practices in above said plantation crops; preparation and application of bio-pesticides, botanicals; bio-control agents, IPM and IDM.	4 h
8	Commercial uses of plantation crops. Processing of produce from plantation crops.	2 h
UNIT-IV		
9.	Origin, importance, varieties, climate, soils, propagation and planting, organic production practices, pest and disease management of spice and condiment crops – cardamom, coriander, cumin, ginger, pepper and turmeric.	6 h
10	Commercial uses of spices and condiment crops. Processing of major spices and condiments; export potentials.	2 h
11	Organic production practices for <i>Aloe vera</i> , <i>Andrographis paniculata</i> Aswagandha, <i>Coleus</i> , <i>Dioscorea</i> sp., Glory lily, Isabgol, <i>Ocimum</i> sp., Periwinkle, <i>Phyllanthus amarus</i> , Poppy, Safed musli, Sarpagandha, Senna and <i>Stevia rebaudiana</i> . Quality standards in herbal products.	4 h

Paper PGDOH 1.3: Propagation, Organic Inputs and Fruit Production Practices

Practical

48 hours

1.	Propagation media and containers
2.	Propagation by seeds, seed treatment and viability test.
3.	Vegetative propagation – cutting, budding, layering and grafting.
4.	Seed beds – nurseries and maintenance.
5.	Farm tools and implements.
6.	Soil sampling and testing.
7.	Composting and vermicomposting techniques – application.
8.	Organic manures and green manures – application.
9.	Bio-fertilizers – types and methods of application.
10.	Weed management in organic horticulture.
11.	Study of irrigation practices in fruits and plantation crops.
12.	Study of diseases and pests of fruit crops and bio-pesticides.
13.	Visit to a commercial horticultural nursery.
14.	Visit to an organic farm of plantation crops.
15.	Visit to an organic farm of fruit crops.
16.	Visit to a tissue culture laboratory to study micro-propagation.

Paper PGDOH 2.1: Organic Vegetables and Flowers Production

Theory

48 hours

UNIT -I		
1	Olericulture: Importance of vegetables, classification of vegetables, types of vegetable gardens.	2 h
2	History, origin, area and production, varieties, soil, climatic requirements, organic production practices of vegetable crops – amaranthus, brinjal, beetroot, cabbage, carrot, cauliflower, chillies, cluster bean, coccinia, cow pea cucumber, drumstick, garlic, guards, melons, menthe, onion, palak, potato, pumpkin, radish, spinach , tapioca and tomato.	7 h
3	Organic protection practices of above said vegetable crops, integrated pest and disease management.	3 h
UNIT-II		
4	Greenhouse production technology of organic vegetables. Problem of growing vegetables in protected structures and their remedies.	3 h
5	Importance and scope of vegetable preservation. Principles and methods of preservation of organic vegetables. Microorganisms associated with spoilage of vegetable products.	3 h
6	The role of plant growth regulators in vegetable production; morphogenesis and tissue culture techniques in vegetable crops.	3 h
7	Agro-techniques for seed production in major vegetable crops; vegetatively propagated vegetables.	3 h
UNIT-III		
8	Floriculture: Structure and development of flowers, importance and classification of flowers.	2 h
9	Origin, distribution, classification, climatic conditions, species and varieties, propagation and organic production practices of commercial flower crops – anthurium, carnations, china aster, chrysanthemum, dahlia, gerbera, gladiolas, jasmine, marigold, orchids and rose.	8 h
10	Organic protection practices of above said flower crops, integrated management of pests and diseases.	2 h
UNIT-IV		
11	Control of environmental factors influencing the growth i.e., light, temperature, moisture and relative humidity in glass house and green house.	3 h
12	Flower forcing and year round flowering through physiological interventions, environmental manipulation.	2 h
13	Cut flower standards and grades, harvest indices, harvesting techniques, post-harvest handling, Methods of delaying flower opening, Pre-cooling, pulsing, packing, Storage and transportation, marketing, export potential, institutional support, Agri Export Zones.	4 h
14	Landscaping; Lawns- Establishment and maintenance; special types of gardens- vertical garden, roof garden, bog garden, sunken garden, rock garden, clock garden, temple garden, sacred groves.	3 h

Paper PGDOH 2.2: Certification and Marketing of Organic Horticultural Produce

Theory

48 hours

UNIT -I		
1	Organic food – Importance, economic viability and policy issues, demand and supply, quality and guarantee of organic products.	3 h
2	Farm inspection and certification procedures, IFOAM and certification, IFOAM and accreditation, organic foods certification in India, certification trademarks.	4 h
3	Organic standards and regulations, international standards for various horticultural commodities. Export and import codes and procedures for license in India.	5 h
UNIT-II		
4	Record keeping, marketing and export potential for organic horticultural products, socio-economic impacts.	4 h
5	National programme for organic production (NPOP) - operational structure of NPOP - accreditation agencies, certification agencies	4 h
6	National standards for organic products (NSOP) - inspection and certification procedures – internal control system, participatory guarantee system.	4 h
UNIT-III		
7	Marketing: Approach and essence; market assessment – demand; steps involved in market study, marketing channels and agencies involved in marketing of horticultural produce.	5 h
8	Organic market information, National and international marketing trends in organic horticultural products; export markets, the role of co-operatives	4 h
9	Entrepreneurship development programme (EDP): Emergence and objectives of EDP, essential qualities to become an entrepreneur; selection of a potential entrepreneur.	3 h
UNIT-IV		
10	Planning for EDP: Objectives, selection of a center, purpose of pre-training promotional work.	4 h
11	Project formulation (project appraisal): Meaning and purpose, personnel / agencies interested in project appraisal, market feasibility of the project, technical and market analysis, means of finance, profitability, risk analysis and liquidity management; agencies supporting horticultural projects.	8 h

Paper PGDOH 2.3: Production Practices of Organic Vegetables and Flowers

Practicals

48 hours

1.	Layout and planting of vegetable crops – intercropping.
2.	Cultural operations of vegetable crops.
3.	Study of hybrid seeds of vegetables – seed viability test and treatments.
4.	Diagnosis of nutritional and physiological disorders in vegetable and flower crops.
5.	Study of important diseases and pests of vegetable crops.
6.	Application of PGRs in vegetable production and flower crops.
7.	Study of machinery and equipment's used in processing of horticultural produce.
8.	Study of processing of different spices – value added products from spices.
9.	Study of botanicals, bio-pesticides and bio-control agents.
10.	Study of organic mushroom production and organic bee keeping
11.	Preparations of Panchagavya, bio-dynamics, liquid nutrient formulations, etc.
12.	Visit to a unit of processing and packaging of horticultural produce.
13.	Visit to a commercial floriculture nursery / farm and orchidarium .
14.	Visit to an organic farm of spices and condiments (Green-house and Poly-house).
15.	Visit to an organic farm of fruit crops.
16.	Standards of organic horticultural produces – National and International.

Paper PGDOH 2.4: Project Work

48 hours

A topic for the project work will be assigned to each student and it shall be either from the syllabus or from any other topic in the field of organic horticulture as approved by the guide and department council.

REFEREENCES

1. Anonymous (2000) National Programme for Organic Production Containing the Standards for the Organic Products. Department of Commerce, Ministry of Commerce and Industry, Govt. of India, New Delhi.
2. Anonymous (2002) *Guidelines for Organic Farming*. Department of Agriculture and Co-operation, Ministry of Agriculture, Govt. of India, New Delhi.
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6. Farooqui, A.A. and Sreeramu A. (2004) *Cultivation of Medicinal and Aromatic Crops*. Universities Press (India) Pvt. Ltd., Hyderabad.
7. Lampkin, N. and Ipswich (1990) *Organic Farming*. Farming Press. London.
8. Gaur, A.C. (1992). *Bulky Organic Manures, Recyclable Wastes and Bio-fertilizers*. FDCO New Delhi, pp. 36-51.
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13. Palaniappan, S.P. and Annadorai, K. (2008) *Organic Farming- Theory and Practice*. Scientific Publishing Services, Chennai.
14. Panda, H. and Hota, D. (2014) *Bio-fertilizers and Organic Farming*. Gene Tech Books New Delhi.
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16. Pradeepkumar, T., Suma, B., Jyothibhaskar and Satheesan, K.N. (2008) *Management of Horticultural Crops*. New India Publishing Agency, New Delhi.

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18. Rajan, S. and Baby, LM. (2007) *Propagation of Horticultural Crops*. New India Publ. Agency, New Delhi.
19. Rajarathnam, S. (2011) *Advances in Preservation and Processing Technologies of Fruits and Vegetables*. New India Publishing Agency, New Delhi.
20. Randhawa, G.S. and Mukhopadhyay, A. (1986) *Floriculture in India*. Allied Publishers (P) Ltd., New Delhi.
21. Sharma, A.K. (2013) *A Handbook of Organic Farming*. Agrobios (India), Jodhpur.
22. Sindhu, P.K. (2014) *Handbook of Organic Farming and Organic Food*. Centrum Press, Delhi.
23. Singh, Brahma and Balraj Singh (2014) *Advances in Protected Cultivation*. New India Publishing Agency, New Delhi.
24. Singh, H.P. (2010) *Organic Horticulture: Principles, Practices and Technologies*. Westville Pub. House, New Delhi.
25. Vasudeva Adamaru (2008) *Savayava Dhrudeekarana – Krushi Marukatteya Hosa Bharavase*. Pub. By Sahaja Samrudha, Bangalore (Kannada).
26. Veeresh, G.K. (2005) *Savayava Krishi Eke? Hege?*. APOP, Bangalore (Kannada).

USEFUL WEBSITES

1. APEDA, New Delhi: www.apeda.com
2. Biotechnology Centre, Department of Horticulture, Govt. Of Karnataka, Bangalore: <http://horticulture.kar.nic.in>
3. Coffee Board, Bangalore: www.indiacoffee.org
4. Good Agricultural Practices: www.fao.org/prods/GAP.index_en.htm
5. International Federation of Organic Agriculture Movements (IFOAM): www.ifoam.org
6. International Food Standard (IFS) Certification: www.food-care.info
7. National Horticulture Mission: www.nhm.nic.in
8. NPOP India – APEDA: www.apeda.com/organic/index.html
9. Regional Centre for Organic Farming, Ministry of Agriculture and Co-operation, Govt. of India, Bangalore: <http://dacnet.nic.in>
10. Spices Board, Cochin: www.indianspices.com

PATTERN OF QUESTION PAPER FOR THE THEORY (EXTERNAL) EXAMINATION

POST GRADUATE DIPLOMA IN ORGANIC HORTICULTURE

PART I: Objective type questions

Instructions: To be marked in question paper in first 30 minutes of examination.

Time 30 minutes

Max. marks: 20

- | | | |
|---|----------------|---------------|
| IA. CHOOSE THE APPROPRIATE ANSWER
(Question Nos. 1-10) | - 10 questions | (10 x 1 = 10) |
| IB. STATE TRUE OR FALSE
(Question Nos. 11-20) | - 10 questions | (10 x 1 = 10) |
-

PART II: Descriptive type questions

Time: 2 h. 30 mins.

Max. Marks: 50

Instructions: Answer all the questions.

- | | |
|---|---------------|
| IIA. Write brief answers on any FIVE (out of 8 questions)
(Question Nos. 21-28) | (5 x 2 = 10) |
| IIB. Write explanatory notes on any FOUR (out of 6 questions)
(Question Nos. 29-34) | (4 x 5 = 20) |
| IIC. Answer any TWO (out of 3 questions)
(Question Nos. 35-37) | (2 x 10 = 20) |
-