

AS-2943

B.Sc. (Fifth Semester) Examination, 2013

Forestry, Wildlife and Environmental Sciences

Guru Ghasidas Vishwavidyalaya University, Bilaspore (C.G)

Silvicultural System

Time allowed: Three hours

Maximum Marks: 60

I. Answer the following questions

(20 X 1 = 20)

True or false

1. The wavy profile of the canopy obtained in group system is called as Gayer's line
Answer: True
2. Andaman canopy lifting system is an example for clear felling system
Answer: False
3. Irregular shelter wood system is a compromise between selection system and shelter wood group system
Answer: True
4. Light demanding species have shorter regeneration period
Answer: True
5. Casuarina plantations are commonly grown in Himalayan region
Answer: False
6. Selection system is suitable for Eucalyptus plantation
Answer: False
7. In selection system regeneration felling is done in compartment or sub compartment
Answer: False
8. In shelter wood strip system felling is done against the direction of wind
Answer: True
9. Silvicultural system for bamboo forest is selection cutting
Answer: True
10. Floating periodic block is also known as single periodic block
Answer: True

Fill in the blanks

11. Silvicultural system for bamboo forest is -----
Answer: Selection cutting
12. The new crop produced under clear felling system is -----
Answer: Absolutely even aged
13. The felling area in selection system is -----
Answer: Coupe

14. The system in which regeneration is obtained from seed is ----- system

Answer: High forest

15. The wedge shape of strips are produced in ----- system

Answer: Eberhard Wedge system

Multiple choice questions

16. The method of raising forest plantation in combination with agricultural crops is called as

- a) Jhum cultivation b) Taungya cultivation
c) Shifting cultivation d) Wood-ash cultivation

Answer: b) Taungya cultivation

17. A felling area, usually one of an annual series is called as

- a) Compartment b) Coupe
c) Cutting section d) Periodic block

Answer: b) Coupe

18. Improvement felling includes removal of the following

- a) Dead, dying and diseased trees b) Unsound over mature trees
c) Undesirable under growth d) All

Answer: d) All

19. Coppice with standard system

- a) Protects the soil against erosion but over exploits the soil
b) Net return obtained is higher c) Both d) None

Answer: c) Both

20. The character of the new crop produced in bamboo forest is

- a) Even aged b) Uneven aged c) Uniform age d) Irregular aged

Answer: b) Uneven aged

II. Answer any four of the following questions

(4 X 10 = 40)

1. Define conversion and write about concept and techniques followed in conversion with suitable example?

Conversion

Conversion refers to the changing of one silvicultural system or species to another because of its added advantage under the given environmental conditions.

Concept

- To increase the yield from the forest by replacing the inferior tree species with higher yielding one.
- To meet the increasing demands of the industry.

Conversion technique

- First part of the forest is taken for the current working plan period
- The remaining area is progressed as per the schedule
- Based on the success, the second revision onwards the conversion progressed to the whole of the forest.
- For this purpose the allotment of PB and its treatments needs suitable modification.

Speed of conversion

The conversion period depends on the followings;

- The **sacrifice of immature crop** is higher when the length of conversion is smaller and vice versa.
- In case larger **proportion of mature trees** in the forest, the length of conversion is shorter and vice versa.
- The age of first converted crop is considered along with time required to reach the exploitable diameter. Both should be more or less equal. Difference will create problem in fixing rotation. This can be suitably managed by fixing the rotation first. Thereafter conversion period is fixed accordingly.

The **change in silvicultural system** is advisable under the following conditions;

- Advantages of particular system over current system in terms of yield, quality of produce, ease of working, etc. Example: Fir, spruce, sal, chir and teak is changed to uniform system from the Indian irregular shelter-wood system.
- In case of failure of an existing system, changing of crop is inevitable. Example: failure of uniform system in deodar. This may be converted into Indian irregular shelter-wood system.
- The advancement of silvicultural knowledge and techniques also necessitates changing of crop.
- Development of communication and market demand necessitates replacement of old system (selective system) with the modern systems (clear felling system).

2. Write the following questions

a) Seeding felling

This is the first step in shelter-wood felling system. It refers to the opening up of canopy of a mature stand to provide conditions for securing regeneration from the seeds.

b) Final felling

Final felling is the removal of the last seed or shelter trees after regeneration has been effected under shelterwood system. This is the final

stage in regeneration felling which varies to species, climate and biotic factors.

c) Wolf tree

A vigorous tree usually of bad form, occupying more space than its future value warrents and threatening potentially better neighbours; usually broad-crowned dominant.

d) Selection system

It is a silvicultural system in which felling and regeneration are distributed over the whole area and the resultant crop is uneven aged. It differs from other systems in the following ways;

- Regeneration felling is distributed over the whole area
- The crop obtained is irregular
- Regeneration operations are carried out through out the life of the crop.

e) Accessory system

Accessory systems are those high forest systems which originates from other even aged systems through slight modifications that resulting in an irregular or two storeyed high forests. The different types of this system are as follows;

- Two storeyed high forest system
- High forest with reserves system
- Improvement felling

3. Differentiate the following questions

a) High forest and coppice forest

High forest	Coppice forest
regeneration is of seedling origin, either natural or artificial)	Regeneration is of coppice origin.
The rotation is generally long.	The rotation of coppice is short.
High forest system is classified as follows; Systems of concentrated regeneration, Systems of diffused regeneration and Accessory systems	No such distinct classification, All subdivisions are modification of simple coppice system.
It produces bigger and larger sized	It produces small sized timber, fuel

timber	wood and pulp wood.
Genetically superior system	Genetically inferior system
Gestation period is long	Gestation period is short
Rate of growth is less	Rate of growth is high
Shoots are not liable to damaged by wind	Coppice shoots are liable to damaged by wind

b) Shelter wood group system and Irregular Shelter wood system

Irregular shelter wood system	Shelter wood group system
This is similar to Swiss and Baden system	This is similar to Bavarian system
Natural and artificial rings are created in Swiss system but only natural rings are created in Baden system.	Natural and artificial rings are created
First group is made in one portion of the compartment and gradually proceeding to all portion of the compartment	Groups are scatted over the compartment
During final felling seed trees are removed in strips	During final felling seed trees are removed in scattered manner
Un-even aged crop is produced	Even aged crop is produced
Regeneration period is 50-60 years	Regeneration period is 20-30 years

4. Write short notes on the following questions

a) Allappalli technique for teak

- This is an example for clear felling followed by artificial regeneration done by forest department people.
- The coupe is demarcated and inspected by a gazetted officer to prepare a treatment map.
- The treatment map is having workable and un-workable areas. The un-workable area includes very steep slopes and 20m wide strips along nalas. In these areas only dead and diseased trees are marked for felling. From the rest of the coupe all trees are felled.

- The activities start in the coupe 2 years before it is taken up for plantation. In the first year valuable timbers are extracted. In the second year miscellaneous timber and fire woods are extracted.
- Felling and logging operation is completed by the end of December. Felling debris is burnt in March to April.
- The area is stacked with teak stumps at 2m x 2m after onset of rains. Three weedings are done in first year, two weedings are done in second year and one weeding is done in third year.
- From fourth year onwards cleaning and singling of shoots are done. Mechanical thinning is done in the 5th and 10th year. Silvicultural thinning is done in 18th year. Thinning formula is $D = 1.5 (d + 3)$, where D stands for distance in feet and d for average diameter in inches.

b) Sukna technique for sal

- This is an example for clear felling followed by artificial regeneration by taungya system
- Complete failure of sal natural regeneration, due to dense evergreen undergrowth developed as a result of continued fire protection, led to the adaptation of this system from 1919.
- Sal is sown in lines which are 2m apart. After every 9 lines of sal, 3 lines of miscellaneous species such as *Chukrassia tabularis*, *Schima wallichii*, *Terminalia* etc, are raised.
- *Michelia champaca* is grown in 8m x 8m and semal is raised at 16m x 16m all over the area for frost protection.
- Inter-cultivation is done for the first two years with sesamum, maize etc., by villagers or by the department. From third year onwards cultivation of turmeric is taken up by Minor Forest Produce Division.

5. Differentiate the following

a) List out high forest and coppice forest

High forest system

A. System of concentrated regeneration

I. Clear felling system

- The clear felling system
- The clear strip system
- The alternate strip

II. Shelterwood system

- The uniform system
- The group system
- The shelterwood strip system
- Wagner's Blender saumschlag
- Eberhard's wedge system
- The irregular shelterwood system
- The Indian irregular shelterwood system
- The strip and group system

B. System of diffused regeneration

- The selection system
- The group selection system

B. Accessory system

- Two storied with high forest system
- High forests with reserve system
- Improvement felling

Coppice forest system

- Simple coppice system
- Coppice with two rotation
- Coppice with standard system
- Coppice with reserve system
- Coppice selection system
- The pollard system

b) Coppice with standard system and coppice with reserve system

Coppice with standard system	Coppice with reserve system
It is a rigid system	It is a very elastic system
Financially immature crop is sacrificed for obtaining good coppices	Financially immature crop is reserved and not sacrificed to obtain even aged coppice
The crop is composed of two storey	Crop cannot be differentiated into storey
There are distinct treatments and rotations for each storey	No such distinction is made and the crop is treated as a whole
The standards are spaced uniformly	No uniform spacing and groups are

over the whole area with age classes distribution	irregularly distributed over the area
The object of retaining standards is production of large sized timber	The object of reserving trees is protection of soil, maintenance of soil fertility, etc
The standards are of two or more valuable species	The reserves are of several species for maintenance of site quality
Regeneration is mainly on coppice	Regeneration is obtained by coppice along with advance growth and from seeds

c) List out the advantages and disadvantages of the following system

a) Selection system

Advantages of the selection system

- It utilizes the site fully as it maintains continuous canopy cover in all storey.
- This facilitates conservation of soil moisture.
- Selection forest is resistant to injuries by insect, diseases and adverse climatic factors due to the mixed composition.
- It prevents invasion of grasses and weeds.
- Natural regeneration comes up well with out difficulty.
- It produces more growing stock per unit area.
- Selection forest is superior biologically.
- It enhances the aesthetic and scenic value of forests.

Disadvantages

- It requires skill in marking and felling.
- Cost of logging is higher
- Damage occurs to the young crop when felling mature crop.
- Inherent quantities of timber of young crop are not high.
- The forest is closer for grazing for longer period. It creates management complications.
- Damage due to fire is also more.
- Success or failure due to regeneration is difficult to assess.
- The selection forest has lower number of valuable species.

a) Simple coppice system

Advantages of simple coppice system

- It is easy to apply
- It requires less skill.
- Regeneration is certain
- Coppice shoots grow faster
- Cost of weeding, clearing and protection is less
- Relatively give higher yield and net return.

Disadvantages of simple coppice system

- It produces small sized timber
- It exploits maximum available nutrients from the soil.
- It is not a permanent one because the trees cannot keep on coppicing.
- Coppice shoots are liable to damage by frost and wind
- This system is not desirable from aesthetic point of view.