MODEL-ANSWER

MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE
SEMESTER END EXAMINATION

B.Sc.(Hons) Agriculture

Semester : III (New)	Term :I	Academic Year : 2021-22
Course No. AGRO-234	Title:-Crop Production Technology – I (Kharif crops)	2022-23
Credits: 2(1+1)		Total Marks:40

Note:- 1. Solve ANY EIGHT questions from SECTION 'A'
2. All questions from SECTION 'B' are compulsory.
3. All questions carry equal marks.
4. Draw neat diagrams wherever necessary.

SECTION 'A'

Q.1 Describe the cultivation practices of maize on the following points. ...(5)

a) **Seed:-** Maize is a non tillering crop. It is therefore necessary to maintain optimum plant population for getting maximum yield. Seed rate and spacing depends upon growing season, variety size and weight of seed. Maize is usually sown in rows 60-75 cm row to row apart with a spacing of 20-25 cm between plant. A plant population of 65,000 to 70,000 per ha is consider seed rate 20-25 kg seed for hybrids and 18-20 kg for composites is enough to cover a ha area.

Sowing:- The sowing of maize is done on the onset of rains. If irrigation is available sowing can be done a fort night before rain starts. Early sowing reduces the weed problem. It also reduces disease and pest incidence. The crop matures earlier and field becomes free for rabi season. Delay in sowing reduces the yield.
The optimum sowing time for Kharif in different agro climatic region is as follow.

Agro climatic regions	**Sowing time**
North-Easterns hills	Early march (1st week)
North-Western hills	April to early may
Peninsular India	May-June
Indo-Gangetic plains	15th June-15th July

b) **Nutrient Management:-**
Maize is a exhaustive crop. The recommended dose is 120 kg N, 60 kg P_2O_5 and 40 kg K_2O per ha for composites. Nitrogen is subjected to leading and therefore applied in three split applications and full quantity of P & K. 1/3rd of nitrogen may be given at sowing time and remaining 1/3rd at knee-height stage about 35 to 40 days after sowing and the rest 1/3rd at tasseling stage. When the maize is grown in zinc deficient soil it is necessary to apply 20 to 25 kg $ZnSO_4$ per ha at sowing time. In latter stage of crop growth zinc deficiency may be corrected by foliar application of $ZnSO_4$ dissolved in water with half the quantity of lime (5% $ZnSO_4$ + 2.5% hydrated lime)

c) **Weed management:-**
Maize is sensitive to weed competition during early growth period due to slow growth in first 3-4 weeks. The crop should be kept weed free for 30 to 45 days after sowing. Two or three hoeing followed by weedings depending upon weed infestation. The chemical weed control as followed.
1) Pre emergence application of Simazine or Atrazine at the rate of 1 to 1.25 a.i. kg/ha of 50% w.p. should be done the but field must be free from all established weeds.
2) If the board leaved weeds are posing problems a post emergence application of 2-4-D or Banvel-D (Dicamba) should be done at the rate of 1.5 to 2.0 a.i. kg/ha.

d) **Harvesting:-**
Maize is harvested when cob sheath turns brownish and grains become hard containing less than 20% moisture. In hybrids and composites sheath becomes brown loose and silk dried

completely. In most of the varieties plant remain green at full maturity. Maize is harvested by plucking the cobs from the standing plant or by cutting the stalk and the plucking the cobs the plant . The cobs are dried in sun for 7-8 days.

Yield:-

Under rainfed situation maize yield 20-25 q/ha for hybrids and 15-20 q/ha for composites. However under irrigation hybrids and composites yielded 50-60 and 45 to 50 q/ha respectively.

Q.2 Explain in detail the cultivation practices of low land Rice on the following points. ... (4)

a) Soil and climate:

Soil- Rice is a semi-acquatic crop grown on wide variety of soils including alluvial, red, red & yellow, lateritic , black mixed red and black, greyish brown, brown hill soils sub mountaineous, saline alkaline acidic peaty and saline-peaty soils clay loams are most suited for rice. It grows well in soil having pH range between 5.5 and 6.5.

Climate:- Rice is a short day thermo sensitive plant. It is grown from 8^0 to 35^0 north latitude from sea level to mountaineous regions upto 3000 meters. Annual rainfall ranging from 1000 mm to 1500 mm. The average temperature required throughout the life period of the crop ranges from 21 to 37^0 C. For germination minimum temperature of 10^0c and for flowering 22-25^0C is considered as an optimum. Grain formation take place at 20-21^0 C temperature. At ripening th(temperature should be between 20-25^0 C. Low temperatur before heading causes considerable loss in grain yield due to sterile spikelets.

b) Seed Treatment:-

The seed is to be treated for quick germination and to control diseases and pest infestation

i) The seed is dipped in 3 % brine solution to prevent the crop from diseases. Seed floating on surface of water is removed and seed settled at the bottom is used for sowing after wash with clean water and drying in shaded place.

ii) To control blast brown leaf spot, sheath blight, rust and wilt the seed is treated with Agrosan or captain @ 2-3 g/kg seed.

iii) To control bacterial blight soak the seed for 12 hours in a mixed solution of streptocycline and serasan followed by hot water treatment at 45^0C for 30 minutes .

c) Weed Management:-

For and effective control of weeds either mechanical or chemical measures are recommended mechanical weeding through paddy weeder can be practiced for control weeding or 1 to 2 hand weeding can be practiced. For chemical control of weed is less time consuming less expensive and more convenient application of matchate, (butachlor) @ of 4-4.5 liter /ha after transplanting of 4-5 days.

d) Harvesting:- The rice is harvested when grain on lower part of the panicle are in hard dough stage and where the grains contains 18-22 percent moisture. Optimum time of harvest of low land rice is between 24-28 days after heading during dry season and 34-38 after heading during hot season. Timely harvested ensures good grain quality as less grains are broken during milling. If harvesting delays, grain may be lost due to shattering, lodging, rats, birds and insects. Harvesting is carried out by manual labour .Plant is cut with a sickle leaving 10-15 cm stubble and dried in the field for 2-3 days later on taken to the threshing yard for threshing.

Yield:- Mid late duration varities of rice yield 50 to 60 q/ha and yield in short duration varities 35 to 40 q/ha grain yield.

Q.3 Explain in detail cultivation practices of Kharif Sorghum on the following points. ... (4)

a) **Soil:-**

Sorghum is grown on wide range of soils but medium to deep soils having good water retention capacity are best suited for growing sorghum. It may tolerate mild acidity to mild salinity with wide range pH 5.5 to 8.5. The black cotton soils of central India are very good for cultivation of sorghum.

Climate.

Sorghum required warm climate with wide range of climatic condition. It needs about 26-30 ^{0}C temperature for optimum growth. The minimum temperature for germination is 7-10 ^{0}C. However, the yield is adversely affected when the mean temperature exceeds 26 ^{0}C during heading period. The annual rainfall required ranging from 400-1000 mm. It can tolerate drought condition very well as its remain dormant during moisture stress. It can also tolerate water logging. Sorghum at boot leaf stage is very sensitive to temperature but less sensitive to soil stress during flowering.

b) **Seed:-**

Seed rate largely depend on cultivar used straight varieties required less seed rate than hybrid sorghum. Seed rate of 8-10 kg/ha found optimum for varieties and 10-12kg/ha for hybrids. A spacing of 40-45cm between the rows and 15-20 cm between the plant.

Sowing:- Crop is sown during 25 June to 10 July either by broadcasting or drilling the seeds behind the plough. Seeds of hybrids and varieties always be sown in rows for getting maximum yield. The sowing is therefore done in sunrise and sunset direction.

c) **Nutrient management:-**

Sorghum is an exhaustive crop and it depletes soil fertility very fast. Rainfed sorghum required 60-80 kg N, 50 kg P_2O_5 and 40 kg K_2O per ha. However high yielding varieties under irrigation need 120-150 kg N, 50 kg P_2O_5 and 40 kg K_2O per ha. Half dose of nitrogen and entire quantity of phosphors and potash should be applied at sowing. The remaining half quantity of nitrogen should be top dressed after 30-35 days of after sowing. In zinc deficient soil application of 25-30 kg/ha of zinc sulphate at the time of sowing is recommended.

d) **Harvesting:-**

Sorghum matures in 100-115 days. Harvesting should be done when the grains have become hard and contain 15-20 % moisture. Do not wait for stalks and leaves to dry as stalks and leaves remain green and succulent in most of the cultivars even after maturing grain. Harvesting is done by cutting the entire plant or removing the cobs first and cutting down the plant later on. Harvested ear heads are dried in sun for a day or until grain moisture contain drops to around 12%.

Yield:-

Sorghum yields 25-30 qt of grain and 80-100 qt dry stalks per ha from rainfed crop and under irrigation grain yields 40-45 qt per ha & stalks 100-125 qt per ha.

b)

Q.4 Describe in detail the cultivation practices of Pigeonpea on the following points. ---(4)

a) Seedbed preparation:-

Pigeonpea is deep rooted crop its required deep well pulverized and well drained seed bed. Deep ploughing to a depth of 15cm with mould board plough followed by 2-3 harrowing are enough to bring soil in good tilth. If necessary leveling should be done to avoid stagnation of water to ensure uniform irrigation and proper drainage.

b) Seed:-

The treated seeds of suitable variety having standard germination. Long duration full season crop has low plant density. However short duration varieties are more responsive to higher plant population. Pigeonpea is sown at a row spacing of 60-75 cm and plant spacing of 15-20 cm using seed rate of 12 to 15 kg per ha.

Sowing:-

Rainfed crop is sown in the last week of june to early july. However with early sowing, it is possible to take second crop after pigeonpea. Sowing beyond july reduces growth and yield of crop. Late sown crop is more likely to be damaged by cold wind wave in northern parts of the country.

c) Nutrient management:-

Pigeonpea as legume crop its utilizes atmospheric nitrogen through symbiotic nitroge fixation. Crop required nitrogen 25 kg/ha, phosphorus 50 kg/ha and potassium 20-30 kg/ha. All the fertilizer should be applied at the time of sowing. Zinc deficient plant show stunted growth reduced leaf size yellowing and development of brown spot on leaves. Zinc sulphate @ 20 kg/ha may be applied of the time of sowing. In standing crop deficiency symptoms are noticed then spray of 5 kg zinc sulphate and 2.5 kg lime dissolved 800-1000 liter of water should be done.

e) **Harvesting:-**

Pigeonpea with an intermediate growth habit and the growth is continued with reproductive phase. The harvesting is done when 75 % pods turn brown. Extra early matures in 110-115 days, early varieties in 135-160 days, medium late varieties in more than 200 days. The harvesting is done with sickle by cutting from 7.5 to 25 cm above the ground level and harvested plant are left in the sun for drying.

Yield:-

The grain yield of pigeonpea ranges from 15-20 qt/ha but with improve technology 20-25 qt/ha and 50-60 qt/ha sticks can be obtain.

Q.5 Explain in detail cultivation practices of Groundnut on the following points. ...(4)

a) **Soil:-**

Groundnut thrives best on well drained sandy, sandy loam light, soils with sufficient calcium and moderate organic matter. Light soil helps in easy penetration of pegs, their development and harvesting of pods. Clay or heavy soils are not suitable as they interfere in penetration of pegs, development and harvesting of pods becomes difficult. Groundnut grows well on soils having pH range between 6.0-6.5.

Climate:-

Groundnut is a tropical crop requires a long and warm growing season. The crop grows successfully in the area receiving a minimum of 500 mm & maximum of 1250 mm rainfall. The optimum temperature for vegetative growth is between 27-30 ^{0}C depending on the cultivar. Reproductive growth is maximum at 24-27 ^{0}C with growth rate of pods is maximum between 30-34 ^{0}C.

b) **Seed:-**

The seed must be pure, viable uniform in size and free from the seed borne disease. The seed should not be broken or damage by any means. The seed rate required 100 to 125 kg/ha with spacing 30x10 cm depend on varieties and spacing.

Sowing:-

The crop is grown as rainfed and sowing is done in last week of june to first week of july. Groundnut is mostly sown under rainfed condition with a bullock drawn seed drill. Soil depth should be 4-5 cm in heavier soil, however light soil depth should be at 5-7 cm. After sowing seeds should be covered with light harrowing.

c) Nutrient management:-

Application of 10-15 tons farm yard manures or compost should be applied before last harrowing. The crop is to be fertilize with 20-40 kg N, 50-60 kg P_2O_5 and 30-40 kg K_2O per ha. Nitrogen is to be given through ammonium sulphate as it provides sulphers . Phosphors is to be given through the SSP. Besides for Ca & S give 125 kg/ha gypsum. Full nitrogen, phosphors and potash should be applied at the time of sowing. The gypsum and sulphur should be applied at flowering and pod formation stage, respectively. Application of zinc @ 25 kg/ha also required once in two years in zinc deficient soils. Boron deficiency can be corrected with application of Boron 5-10 kg/ha. For optimum yield fertilizers should be applied after carrying out soil test.

Inter- cultivation:-

One manual hoeing followed by hand weeding should be done. First hoeing should be done 2 weeks after sowing and second hoeing in 3rd weeks before commencement of flowering. Soil should not be disturbed when pegging start. Earthing up is a special type of operation carried out in this crop. The earthing up should be done by tying string with the two tines of the hoe. Earthing up promotes easy penetration of pegs.

Q.6 Describe the cultivation practices of Soybean on the following points. ... (4)

a) Seed:-

Seed rate depends upon size of seed, test weight, spacing. Optimum seed rate for soybean with 80 % germination is 75 kg/ha with spacing 45x5cm.

Sowing:- Time of sowing is onset of monsoon or last week of june to first week of july. But in case of irrigated conditions sowing of crop by mid of june. Sowing is done by drilling the seeds in the soil with the help of seed drill or behind the plough. The depth of sowing should not be more than 2-3 cm in heavy and 4-5 cm in light soil. Planking should be done after sowing to cover the seed for better soil contact.

b) Nutrient management:-

For obtaining good yield of soybean 15-20 tons of FYM or compost should be applied to field before the last harrowing. The application of 30 kg N, 70-80 kg P_2O_5 and 50-60 K_2O kg per ha, required for soybean crop. All the fertilizer should applied at the time of sowing. The fertilizers should be placed 5-7 cm away from the seed at of 5-7 cm depth. If zinc deficient soil application of 20 kg/ha $ZnSO_4$ and sulphur deficient 10 kg/ha sulphur application. Zinc deficiency can also be corrected with spraying 5 kg zinc + 2.5 lime in 1000 liter of water.

c) Weed management:-

Soybean crop is sensitive to weed competition particularly in early growth phases. The most critical period for crop weed interference is initial 15-45 days. Weeds emerged after this period are suppressed by smothering action of crop. Hoeing and weeding one at 20-22 DAS and other at 40-45 DAS keep the weeds under control. In chemical weed control herbicide use of fluchloraline pre emergence applied to soil @ 1kg a.i/ha in 800-1000 liters of water. Metribuzin is effective against annual grasses and broad leaves weeds. It is used as pre emergence application @ 1 kg a.i/ha in 800-1000 liters of water. Post emergence herbicides like 2-4-D at the rate of 0.2 kg/ha chloroxuron at the rate of 1.1 to 1.7 kg a.i /ha. Dinoseb at the rate of 1.7 kg a.i /ha

d) Harvesting:-

Soybean matures in 90-140 days depending upon the variety.The yellowing of leaves, dropping of leaves and drying of pods are the symptoms of maturity. Harvesting is done by cutting the plant with sickles then it is sun dried.

Yield:- A good crop of soybean yields 20-25 qt/ha grain

Q.7 Describe the cultivation practices for irrigated Hybrid Cotton on the following points. ... (4)

a) Soil:-

Cotton needs a soil with an excellent water-holding capacity and aeration and good drainage as it cannot with stand excessive moisture and water logging. Cotton is grown on the alluvial soils. black cotton soils, red sandy loam soils. Alkaline soil is not good for cotton cultivation but a soil with 5 to 8.5 pH can be suitable for cultivation.

Climate:-

Cotton is a crop of tropical to subtropical climate. An annual rainfall required 50-65 cm. the cotton in found to have minimum germination of 16^{0}C, Optimum at 34^{0}C and maximum at 39^{0}C temperature. However above 35^{0}C temperature is harmful for growth while below 21^{0}C is not conducive for flower bud temperature. The boll and fibre development has been found to be

optimum at a mean temperature of 22-27^{0}C. For boll development and boll bursting require day temperature followed by cool night temperature

b) Seed:-

Hybrid cotton seed rate required 2 to 2.5 kg/ha for spacing 120x90 cm. The seed rate depends upon variety, test weight, spacing, purity of seed and last method of sowing.

Sowing:- Sowing is usually hand dibbled using 2-3 seeds per hill. Depth of sowing is crucial to ensure timely and uniform germination. The seed be placed uniformly at a depth of 3-4 cm in a loose moist soil. The sowing of irrigated cotton after 15th may and pre monsson cotton sown in the month of april.

c) Weed management:-

The cotton crop needs a weed free for critical weed free competition period upto 30-40 days after sowing. The first inter culture is always a weeding operation which ensure a complete removal of weeds at very early stage of crop growth. Subsequently hoeing are given whenever weeds reappear or there is a break in the rains. Chemical control of weeds is possible through application of TOK-E 25 or Ansar 521. Application of diuron at the rate of 400 g as pre-emergence, fluchloraline (Basaline) 48 EC, Alachlor, Dibutalin and pendimethalin 1.5-2.0 lit/ha may be applied. If weed control by post emergence by Tralkoxydin @ 100-300 g/ha or Quizalofop @ 400-750 g/ha.

d) Harvesting:-

Cotton is harvested in 3-4 pickings, first picking in the middle of October, second picking in the beginning of November, third is last week of November and fourth in the first week of December should be done. Picked clean cotton without dry leaves and brust. Dry in sun for 2-4 hours.

Yield:- 25-30 qt/ha seed cotton obtain from Hybrid irrigated cotton.

Q.8 Explain in detail the cultivation practices of Green gram on the following points. ... (4)

a) Soil:-

It can be grown on wide variety of soils from sandy loam to black cotton. However a well drained loamy to sandy loam is best for green gram cultivation. The optimum soil pH is 6.5 to 7.5 through it can tolerate slight soil salinity.

Climate:-

Green gram is a tropical pulse largely grown under semarid and subtropical environment. It can be grown from attitude of 2000 meter. The annual rainfall required 600 to 1000 mm. The optimu mean temperature from 28 to 30^{0}C. The critical temperature for germination is 15^{0}C. Temperature range for growth and development varies from 20 to 40^{0}C.

b) Seed:-

A seed rate of 12-15 kg is sufficient for one ha. However a seed of 20 kg/ha is optimum for an irrigated crop with closer spacing. A row spacing of 30 cm with 10 cm between plants is optimum for rainfed crop

Sowing:- The sowing is done with the onset of monsoon in mid june to first fortnight of july. The crop is sown either by broadcasting or drilling the seeds in row behind a plough or seed drill. After sowing seeds should be covered with light harrowing the depth of sowing should not be more than 5-7 cm.

c) Nutrient management:-

Green gram required 8-10 tons FYM per ha should be applied at the time of land preparation. Fertilizer 15-25 kg nitrogen and 40-50 kg P_2O_5 ha is necessary to meet the nutrient requirement of the crop. All the fertilizers should be applied at the time of sowing. Spraying of 2 % DAP at the time of flowering and pod filling stage.

(7)

d) Harvesting:-

The crop should be harvested at physiological maturity. Shattering is a great problem in pulses, hence picking should be done. The pod matured sequentially hence it should be harvested in 2 to 3 picks. Harvesting is done by cutting plant above the ground level with sickle.

Yield:- A good crop of Green gram 12-15 qt/ha grains yield

Q.9 Describe sowing method, harvesting and yield of the following crops. (Any two) ... (4)

a) Hybrid Napier:-

Method of sowing:-

i) Three budded sets used for planting. Planting should be done by inserting two sets in soil leaving one set above ground. Set should be planted with 40^0 angle.

ii) Furrows are opened with a ridges or country plough and three budded setts are placed end to end in the furrow leaving bud side by side like sugarcane. Then field should be irrigated if moisture is in adequate for sprouting.

Harvesting:-

The first cut is taken after 9-10 weeks after subsequent cuts can be taken by 4 to 6 weeks or when growth attains a height of 1.5 m. A harvesting should be done leaving a stubble of 10-15 cm from the ground level.

Yield:-

The average yield from each cutting ranges from 25 to 35 t/ha. Yield per cut can be increased to 45-50 t/ ha. with irrigation and nitrogen fertilizer on an average yields of 150 to 250 t/ha can be obtained.

b) Pearl millet:-

Sowing method:-

Crop is sown by various methods like broadcasting drilling, dibbling and transplanting. Out of these methods drilling is most popular. Seeds are drilled in the soil by using three to six tined seed drill or behind the plough. As seeds are smaller in size therefore should not be sown deeper than 2 to 3 cm. Sowing of pearl millet in sun-rise and sunset direction (East-West)

Harvesting:-

The crop is harvested at physiological maturity or at later stage when grain are hard and contain 15-20 % moisture. Harvesting is done either by cutting the entire plant or removing the ear head first and cutting down the plant later on. After harvesting ear heads are dried in sun for 10-20 days.

Yield:- Rainfed pearl millet yield 12-15 qt grain and 70-75 qt stover per ha. However, under irrigation the yield of grain 30-35 qt/ha and 100 qt/ha stover.

c) Cowpea:-

Sowing method:-

The crop is sown either with seed drill on behind a local plough. The fodder as well as green manure crop is sown by broadcasting seed over soil surface. After sowings the seed should be covered with light layer of soil.

Harvesting:-

For vegetables purpose green pods can be harvest 45-60 DAS depending on maturity of variety. It is desirable to harvest pods when they are tender and half grown. For grain it is harvested in 90-125 days when pods are fully matured. As a fodder crop the crop is harvested at the age of 40-45 days.

Yield:- Good crop yield about 12-15 qt/ha grain and 50-60 qt/ha straw while fodder crop yield 250-300 qt/ha green fodder.

Q.10 Writes short notes (Any two) ----(4)

a) Retting of Jute:-

It is biological process by which the bast fibre in the bark gets loosened for an ea separation from the woody stalk. During this process the gums, pectin and other mucilaginou substances are removed from plants by a combined water and micro-biological action. For an ideal retting the jack should be kept submerged at least 20 cm below the surface of the water because incomplete submergence result in under retting and produces 'croppy fibre' of extremely low value while over retting 'dazed weak fibre'. It is observed that tying of few plants of 'Daincha or sunhemps in each bundle of jute causes an early rettting. In case of stagnant water addition of little amount of ammonium sulphate or bonemeal specially when atmospheric temperature is low it accelerates retting process. Gently flowering , fairly deep, clean and soft water use congenial for ideal retting. The retting needs around 34^0C water temperature and the retting completes within 10-15 days during july while about 21 to 30 days during September when retting is over the fibre comes out after pressing the plant between thumb and finger. After the end point the jacks should be taken out and extraction of fibre must be completed as soon as possible because any delay results in a poor quality fibre.

b) Importance of Pulses:-

Pulses play most important part in our diet as pulses are the richest sources of protein amongst the food grains pulses are not only the rich source of protein but they consist of many important amino acids than the cereal proteins and hence both together in food have greate biological values and better beneficial effect on human health. Pulses are rich in vitamin A, which is three or fours time greater as compared with wheat. The vitamin B-1 content in pulses is much higher than cereals. Vitamin C is also found more in pulses at sprouting. Pulses are also better source of minerals, specially Ca which is most required mineral by the human being. The Ca content in gram is 0.19% in udid it is 0.21% and mung it is 0.15%. Pulses add 0.5 to 1.5 tons of organic matter to the soil in the form of their roots left after harvesting of the crop. The symbiotic bacteria are found on the root surface which fix the atmoshpheric nitrogen in the soil. Pulses provide a superior quality of fodder and feed to cattle. They also control weeds due to plant very vigorously growth and cover the ground surface hence they suppress or smother the weeds.

c) Soil & Climate of sesame

Soil:-

Sesame is highly susceptible to water logging through clay soils. Saline and alkali soils are unsuitable for cultivation. It can grow on wide variety of soils with good drainage. Medium fertile soil with high drainage and a mixture of sand and clay texture are highly suitable. It can also be grown on loams and heavy clay loams which are well drained. The suitable soil pH should be between 5.5. to 8.0.

Climate:-

It is a crop of warm regions of the tropic and sub tropics. It can grow very well in the area receiving rainfall of 500-650 mm but a low to high rainfall range of 300-1000 mm also produces a good crop. A temperature of 25-27^0C encourage rapid germination, initial growth and flower formation. Low temperature at flowering can result in the production of sterile pollen or premature flower drop. If night temperature is less than 15^0C delayed flower initiation. It is a short day plant and required a minimum of 10 hours light per day.

SECTION 'B'

Q.11 Match the following points pairs : ... (4)

'A'	'B'
1) Little millet	b) ✗ Panicum sumatrense
2) Niger	a) ✗ Guizotia abyssinica
3) Groundnut	d) ✗ Arachis hypogea
4) Horse gram	c) ✗ Dolichos biflorus

Q.12 Fill in the blanks. ... (4)

1) In Rice crop **Azospirilium** bio-fertilizer is used for N fixation.

2) **Cajanus cajan** is the botanical name of Red gram.

3) The golden rice contain vitamin **A** .

4) The origin of Green gram is **India** .

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