EXERCISE-I

History of photosynthesis

- 1. The researches on photosynthesis started
 - (A) In the 17th century
 - (B) In the 18th century
 - (C) In the 19th century
 - (D) In the early 20th century
- 2. Most of the plants contain a green colouring pigment which is responsible for photosynthesis. This pigment was named chlorophyll by
 - (A) Melvin Calvin (B) Jean Senebier
 - (C) Julius Robert Mayer (D) Pelletier Caventou
- **3.** 'Photosynthesis is the conversion of light energy within a plant' was first stated by
 - (A) Willstatter and Stoll
 - (B) Mayor and Anderson
 - (C) Benson and Calvin
 - (D) Robert Mayer
- 4. *'Thylakoid'* name was given by
 - (A) Arnon(B) Park and Biggins(C) Park and Fortan(D) Manke
- **5.** The significance of light and chlorophyll in photosynthesis was discovered by
 - (A) Priestley (B) Ingenhousz

(C) Englemann (D) Blackman

6. "The amount of CO_2 absorbed and O_2 released during photosynthesis are in equal volumes" was proved by

(A) Englemann	(B) Robert Mayer
(C) Priestley	(D) Bousingault

7. The first important biological investigation which led to the conclusion that plant makes its substance from water and not from soil was carried out by

(A) Lamarck	(B) De Vries
(C) Von Helmont	(D) Darwin

- 8. Early studies on the pathway of CO_2 fixation in plants were made during 1940s in
 - (A) Unicellular green algae by Calvin
 - (B) Isolated chloroplast of spinach by Hill
 - (C) Mesophyll cells of variegated leaves by Arnon
 - (D) Bundle sheath cells of maize by Hatch and Slack
- 9. Who proposed the cycle of events leading to the fixation of CO_2 in mesophyll and its reduction in bundle sheath
 - (A) Emerson (B) Melvin Calvin
 - (C) Hatch and Slack (D) Hill and Bendall
- **10.** Who proposed the 'law of limiting factor' as the 'law of minimum'

(A) Blackman	(B) Hill
(C) Leibig	(D) Priestley

Early Experiments

- **11.** McAlister and Mayer have studied the Warburg's effect on
 - (A) Pea (B) Arachis
 - (C) Soyabean (D) All the above
- **12.** Discovery of Emerson effect has clearly shown the existence of
 - (A) Two distinct photochemical reactions or processes
 - (B) Light and dark reactions in photosynthesis
 - (C) Photophosphorylation
 - (D) Photorespiration
- **13.** During photosynthesis, the oxygen in glucose comes from
 - (A) Water
 - (B) Carbon dioxide
 - (C) Both from CO_2 and water
 - (D) Oxygen in air

- **14.** The experimental material that has largely been responsible for making rapid advances in research on photosynthesis is
 - (A) Chlamydomonas (B) Spinach leaf

(C) Chlorella (D) Hydrilla

- **15.** Which of the method is more effective to know the chemical pathway of a physiological process
 - (A) Titration method
 - (B) Calorimetric method
 - (C) Tracer technique
 - (D) None of the above
- **16.** The oxygen produced during photosynthesis comes from photolysis of water was first time proved by

(A) Ruben and Kamen (B) Robert Mayer(C) Malvin Calvin (D) Blackman

- **17.** The first experiment on photosynthesis in flashing light were carried out by
 - (A) F. F. Blackman
 - (B) Robert Emerson and Arnold
 - (C) Melvin Calvin
 - (D) Robert Hill
- 18. Moll's experiment shows
 - (A) Unequal transpiration from two surfaces of leaf
 - (B) Relation between transpiration and absorption
 - (C) CO_2 is required for photosynthesis
 - (D) Chlorophyll is essential for photosynthesis
- **19.** Algae used by Calvin and associates for photosynthetic research is

(A) Chlorella	(B) Chlamydomonas
(C) Volvox	(D) All the above

20. The path of CO_2 in the dark reaction of photosynthesis was successfully traced by the use of the following **or** The dark reaction is traced by

(A) O_2^{18}	(B) $C^{14} O_2$
(C) P ³⁶	(D) X-rays

- **21.** Blackman demonstrated that increasing illumination increased the photosynthetic rate upto a point when CO_2 becomes limiting. If light was not limiting, temperature becomes limiting. Emerson found that maximum CO_2 fixation could be achieved with brief flashes of light. Mark the correct statement in the following
 - (A) Only one factor can be limited in photosynthesis
 - (B) Photosynthesis consists of a light and dark reaction
 - (C) The trapping of light by chloroplast is temperature dependent
 - (D) The trapping of light by chloroplast can occur only if CO_2 is present
- **22.** Persons who received Nobel Prizes for their work with green plants are
 - (A) Calvin and Waston
 - (B) Calvin and Borlang
 - (C) Beadle and Tatum
 - (D) Flemming and Waksman
- **23.** The thylakoids are removed and kept in a culture medium containing CO_2 and H_2 *O*. If the setup is exposed to light, hexose sugars are not formed as the end product. The most appropriate reason for this will be that
 - (A) Carbon assimilation cannot take place
 - (B) The pigments (P–700 and P–680) are not linked
 - (C) Enzymes are not available
 - (D) The light trapping device is not functional
- **24.** Isotopes popularly known to have been used in the study of photosynthesis are (A) C^{14} and O^{18} (B) C^{11} and C^{32}
 - (C) C^{16} and N^{15} (D) P^{32} and C^{15}
- **25.** Extraction and separation of chlorophylls and carotenoids tackles by
 - (A) Moll's half-leaf experiment
 - (B) Paper chromatography method
 - (C) Ganong's light screen
 - (D) All the above

Photosynthesis in Higher Plants Photosynthetic apparatus and general 33. Intact chloroplast from green leaves can be isolated by (A) Acetone (B) Ethanol **26.** The starch is insoluble in water even than it is stored in potato in more quantity (C) Alcohol (D) Sugar solution (A) By microbes **34.** Photosynthetic phosphorylation is (B) Because it is manufactured in tuber (A) Oxidative process (B) Photo process (C) Because plants use it as food (D) None of the above (C) Both (A) and (B) (D) Because first it come to tuber as sugar 35. Phenomenon which converts light energy into solution then it is stored as starch chemical energy is **27.** The plant Cuscuta shows (A) Respiration (B) Photosynthesis maximum photosynthesis in (C) Transpiration (D) None of these (A) Red light **36.** Which branch of Botany is concerned with the (B) Blue light study of photosynthesis (A) Ecology (C) Green light (B) Psycology (D) No photosynthesis at all (C) Plant physiology (D) Embryology **28.** Photosynthesis is a process of **37.** Approximate amount of water on earth which split by photosynthesis once every 2 million (A) Oxidation of food years is (B) Manufacture of food (B) 15 million km^3 (A) 10 million km^3 (C) Both (A) and (B) (D) 25 million km^3 (C) 20 million km^3 (D) None of the above 38. For the process of photosynthesis all except **29.** Which of the following is anabolic process one of the following items are essential. Point (A) Synthesis of carbohydrate out the exception (B) Synthesis of fat (A) Water, minerals (C) Synthesis of protein (B) Light, chlorophyll (D) All the above (C) CO_2 , optimum temperature **30.** 85–90% of all photosynthesis of the world is (D) Oxygen, sucrose carried out by **39.** In angiosperms, synthesis of chlorophyll occurs (A) Shrubs in presence of (B) Herbs (A) Phytochrome (B) Light (C) Oceanic algae (C) Cytochrome (D) None of the above (D) Trees with large branches 40. The ultraviolet radiations from the sun cause **31.** Assimilatory power refers to reactions that produce (A) Generation of ATP and NADPH₂ (A) Carbon monoxide (B) Carbon dioxide (B) Reduction of CO_2 (C) Ozone (D) Fluorides (C) Splitting of water 41. Aerobic atmosphere is maintained by (D) Disintegration of plastids (A) Prokaryotes (B) Protists **32.** Grana refers to (C) Plants (D) Fungi (A) Stacks of thylakoids in plastids of higher 42. What is the unique process which has plants supported life on this planet (B) A constant in quantum equation (A) N₂-fixation (B) Photosynthesis (C) Glycolysis of glucose (D) Respiration (C) Protein synthesis (D) Bye product of photosynthesis

				Photosynt	hesis in Higher Plants
43.	Total amount of t	he dry weight of		Light reaction	/Pigments
	photosynthate produced	by all type of plants			
	per annum is		51.	Which of the following	g is the non-polar part
	(A) 1.7 million tonnes			of chlorophyll	
	(B) 17 million tonnes			(A) Phytol	(B) Pornhyrin
	(C) 170 million tonnes			(C) Durmel	(D) None of the above
	(D) 1700 million tonnes		50		
44.	How many molecules	of water are needed	52.	Which of the following	g wavelength occur in
	by a green plant to pro	duce one molecule of		red part of the spectrum	l
	hexose/ reduce 6 molec	cules of CO_2		(A) 470 <i>nm</i>	(B) 390 <i>nm</i>
	(A) 6	(B) 12		(C) 680 <i>nm</i>	(D) 830 <i>nm</i>
	(C) 24	(D) One only	53.	Which of the fol	lowing product of
45.	What is the comm	non value of PQ		photosynthesis is produ	ced first
	(photosynthetic quotient	t) of a leaf		(A) Glucose	
	(A) > 1	(B) < 1		(B) Oxygen	
	(C) One	(D) Zero		(C) Both (A) and (B) to	oether
46.	Plants are known as p	ourifiers of air due to		(D) None of the above	Section
	process of		54	(D) None of the dolve	
	(A) Respiration	(B) Photosynthesis	54.	which of the follow	ving is black-yellow
	(C) Transpiration	(D) Desiccation		pigment of carrot roots	
47.	The use of solar cooker	by man is copying of		(A) Alpha–carotene	(B) Beta–carotene
	which one by the follow	ing processes		(C) Violoxanthin	(D) Fucoxanthin
	(A) Photosynthesis	(B) Respiration	55.	Chlorophyll molecule	(PS-II) when excited
	(C) Guttation	(D) Photorespiration		and electron so released	passes first into
48.	Which process is related	l with photosynthesis		(A) Plastoquinone	
	(A) Phosphorylation	(B) Translation		(B) Plastocyanin	
40	(C) Transcription	(D) None of these		(C) Ferredoxin	
49.	The full expansion of N	ADP 1s		(D) Ferredoxin reducing	o substrate
	(A) Nicotinamide adenii	ne dipnosphate	56.	Solarisation is	
	(B) Nicotinamide adeno		201	(A) Formation of chlore	nhvll
	(C) Nicounamide ac	ienne anucieoude		(R) Destruction of chlor	conhull
	(D) Nicotinamide ade	enosine dinucleotide		(C) Utilization of sunlig	opnyn
	nhosphate	undereotide		(C) Utilisation of sumption (C)	, ,
50.	Make suitable pair			(D) Effects of solar ligh	t
	(A) Emerson effect	(a) C_4 cycle	57.	Elements required for p	hotolysis of water
	(B) Hill reaction	(b) Photolysis		(A) Mn	$(\mathbf{B}) Mg$
	(C) Calvin's cvcle	(c) C_3 cycle		(C) Fe	(D) <i>Zn</i>
	(D) Hatch and Slack	(d) Photosystem–I	58.	How many molecules	of water should be
	cycle	and II		photolysed to form a NA	$ADPH_2$ molecule
	(A) Aa, Bb, Cc, Dd	(B) Aa, Bc, Cd, Da		(A) 4	(B) 2
	(C) Ac, Bd, Ca, Db	(D) Ad, Bb, Cc, Da		(C) 6	(D) 1

59. If E is Emerson effect, *x* is the rate of oxygen production in mixed beam of light, *y* is the rate of O_2 production in low wavelength of light and *z* is the rate of O_2 evolution in high intensity of red light. What will be the value of E

(A)
$$\frac{x-u}{z}$$
 (B) $\frac{x-z}{u}$
(C) $\frac{z-u}{x}$ (D) $\frac{z-x}{u}$

- **60.** The process for which manganese and chloride ions are required is
 - (A) Photolysis of water
 - (B) For transfer of H^+ ion to *NADP*
 - (C) For transfer of charge of hydroxyl ion to chlorophyll
 - (D) None of the above
- **61.** The specific function of light energy in the process of photosynthesis is to
 - (A) Activate chlorophyll
 - (B) Split water
 - (C) Reduce carbon dioxide
 - (D) Synthesize glucose
- **62.** In cyclic photophosphorylation which one of the following is formed
 - (A) ATP
 - (B) NADP and ATP
 - (C) $NADH_2$ and O_2
 - (D) $NADPH_2$, ATP and O_2
- **63.** *NADP* is converted into $NADPH_2$ in
 - (A) Photosystem-I
 - (B) Non-cyclic photophosphorylation
 - (C) Calvin cycle
 - (D) Photosystem-II
- **64.** When a cell convert light energy into chemical energy, which of the following reaction would take place
 - (A) ADP + IP = ATP (B) ATP IP = ADP
- (C) AMP + IP = ADP (D) GDP + P = GTP65. The brown colour of some algae is due to the

presence of pigments	
(A) Chlorophyll	(B) Phycocyanin
(C) Carotene	(D) Fucoxanthin

- **Photosynthesis in Higher Plants**
- 66. Pigment system–I recieves radiant energy and releases electron
 (A) Chlorophyll–683 (B) Chlorophyll–673
 (C) Chlorophyll–695 (D) P–700
- 67. The basic structure of all chlorophyll comprises of(A) Porphyrin system
 - (B) Cytochrome system
 - (C) Plastocyanin system
 - (D) Flavoproteins only
- **68.** Which of the following pigment is soluble in water
 - (A) Chlorophyll (B) Carotene
 - (C) Anthocyanin (D) Xanthophyll
- **69.** Where does the primary photochemical reaction occur in chloroplast **or** Where does the light reactions of photosynthesis take place or Light reaction takes place in
 - (A) Stroma
 - (B) Edoplasmic reticulum
 - (C) Quantasome or thylakoids (Grana)
 - (D) Inner membrane of chloroplast
- **70.** The trapping centre of light energy in photosystem–I is
 - (A) P–660 (B) P–680
 - (C) P–700 (D) P–720
- 71. Hill's reaction takes place in(A) Dark(B) Light
 - (C) Dark and light both (D) At any time
- **72.** Anthocyanin generally occurs in the nature in the form of
 - (A) Chlorides (B) Phosphates
 - (C) Both (A) and (B) (D) None of the above
- **73.** The approximate dimension of chlorophyll porphyrin ring is
 - (A) $1 \text{ } \mathring{A}$ square (B) $5 \text{ } \mathring{A}$ square
 - (C) 10 Å square (D) 15 Å square
- 74. Chlorophyll a molecule lost 1 electron from its outer orbit and gain(A) Negative charge(B) Becomes neutral
 - (D) News 6 the short
 - (C) Positive charge (D) None of the above

- 75. The life of all excited chlorophyll molecules is
 - (A) Less than 0.01 second
 - (B) More than 0.01 second
 - (C) 10 seconds
 - (D) 1 second
- **76.** Chlorophyll is
 - (A) Soluble in organic solvents
 - (B) Soluble in water
 - (C) Soluble in both organic solvents and water
 - (D) None of the above
- 77. The role of phycobilins in photosynthesis is to
 - (A) Absorb and transfer energy to chlorophyll
 - (B) Donate electrons to the electron transport system
 - (C) Fix carbon dioxide
 - (D) Carry hydrogen or electrons
- **78.** The main difference between the molecules of chlorophyll *a* and *b* is
 - (A) Chlorophyll a has an aldehyde group while chlorophyll b has a methyl group
 - (B) Chlorophyll a has a methyl group while chlorophyll b has an aldehyde group
 - (C) The phytol tail is absent in chlorophyll a and is present in chlorophyll b
 - (D) The porphyrin group in chlorophyll b has no binding site but a binding site is present in chlorophyll a
- 79. Which element is left when chlorophyll is burnt
 - (A) Iron (B) Manganese
 - (C) Magnesium (D) Molybdenum
- 80. Chloroplasts absorb light of wavelength
 - (A) $200 300 \, m\mu$ (B) $800 - 1000 \ m\mu$
 - (C) $460 660 \, m\mu$ (D) $300 - 400 \ m\mu$
- 81. The two light reactions when absorb light drive the flow of electrons against an electrochemical gradient from
 - $(A) 1.1 \ volt \ to + 0.8 \ volt$
 - (B) + 0.8 *volt* to -0.3 *volt*
 - (C) + 2.0 volt to + 5.2 volt
 - (D) 0.5 volt to +25 volt

- 82. The energy of a 'mole' of light quanta is 72 kcal in blue region at 400 nm and 41 kcal in red region at 700 nm. How much light energy would be required under standard conditions to make 1 mole of glucose costing 686 kcal (A) 1986 kcal (B) 1968 to 3456 kcal (C) 2620 to 3456 kcal (D) 1980 kcal
- 83. Which of the following does not participate when the light reaction synthesizes only ATP or performs the cyclic flow of electrons (A) PS–I (B) PS-II
- (C) Ferredoxin (D) Plastocyanin 84. The first electron carrier molecule from P_{700} to
- $NADP^+$ is believed to be (A) Cytochrome
 - (B) Cu protein/plastocyanin
 - (C) FeS protein/ferredoxin
 - (D) FeMg protein
- 85. How much energy in terms of ATP equivalents is consumed in the photosynthetic production of a mole of hexose
 - (A) 36 *ATP* eq. (B) 38 *ATP* eq.
 - (C) 40 ATP eq. (D) 54 *ATP* eq.
- 86. Chlorophyll converts
 - (A) Light energy into chemical
 - (B) Chemical energy into light
 - (C) Light energy into electrical
 - (D) Electrical energy into food
- 87. In higher plants, the photosynthetic pigments are
 - (A) Chl a + Chl b + anthocyanins
 - (B) Chl a + carotenoid
 - (C) Chl a + Chl b + carotenoid
 - (D) Chl b + carotenoid + phycobilins
- 88. Why the rate of photosynthesis declines at very strong light intensities. It may be due to (A) Increased respiration
 - (B) Decreased hydration
 - (C) Photo-oxidation of chlorophyll
 - (D) All the above
- 89. Chlorophyll 'a' and 'b' shows maximum absorption in
 - (A) Blue region
 - (B) Red region
 - (C) Blue and red regions
 - (D) Yellow and violet regions

- 90. What are the two peaks of light absorption of Chlorophyll 'a'. The two peaks are near
 (A) 400 and 500 nm
 (B) 430 and 730 nm
 (C) 430 and 660 nm
 (D) 400 and 660 nm
- **91.** Which one of the following concerns photophosphorylation
 - (A) AMP + Inorganic PO₄ \longrightarrow ATP
 - (B) $ADP + AMP \xrightarrow{\text{Light energy}} ATP$
 - (C) ADP+Inorganic PO₄ \longrightarrow ATP
 - (D) ADP + Inorganic $PO_4 \rightarrow ATP$
- **92.** Which fractions of the visible spectrum of solar radiations are primarily absorbed by carotenoids of the higher plants
 - (A) Violet and blue (B) Blue and green
 - (C) Green and red (D) Red and violet
- **93.** Photosystem I and Photosystem II are found in (A) Stroma of chloroplast
 - (B) Grana of chloroplast
 - (C) Matrix of mitochondria
 - (D) Inner membrane of mitochondria
- 94. Number of chlorophyll arranged per reaction centre in the light harvesting complex are(A) 100 (B) 200
 - (C) 300 (D) 400
- **95.** The light absorbed by the chlorophyll is at the wave length of
 - (A) 400 nm
 (B) 500 nm
 (C) 600 nm
 (D) 660 nm
- **96.** Phytol chain is present in
 - (A) Carotenoids (B) Haemoglobin
 - (C) Chlorophyll (D) Phycocyanin
- **97.** O_2 evolution is directly associated with
 - (A) PS I (B) PS II
 - (C) Phytochrome (D) Phycocyanin
- **98.** *ATP* formation in photosynthesis is known as
 - (A) Phosphorylation
 - (B) Photophosphorylation
 - (C) Oxidative phosphorylation
 - (D) None of the above

- **99.** Hill reaction occurs in
 - (A) High altitude plants
 - (B) Total darkness
 - (C) Absence of water
 - (D) Presence of ferredoxin
- 100.Plants adapted to low light intensity have
 - (A) More extended root system
 - (B) Leaves modified to spines
 - (C) Larger photosynthetic unit size than the sun plants
 - (D) Higher rate of CO_2 fixation than the sun plants

Dark reaction

- 101.CO2 joins the photosynthetic pathway during
 - (A) Light reaction (B) Dark reaction
 - (C) Photosystem–I (D) Photosystem–II
- **102.**Dark reaction of photosynthesis is called so because
 - (A) It can also occur in dark
 - (B) It does not require light energy
 - (C) Cannot occur during day time
 - (D) It occurs more rapidly in night
- 103. The initial enzyme of Calvin cycle is
 - (A) Ribulose 1, 5 diphosphate carboxylase
 - (B) Triose phosphate dehydrogenase
 - (C) Phosphopentokinase
 - (D) Cytochrome oxidase
- **104.**During photosynthesis when PGA is changed into phosphoglyceraldehyde, which of the following reaction occur
 - (A) Oxidation (B) Reduction
 - (C) Electrolysis (D) Hydrolysis
- **105.**Ribulose diphosphate carboxylase enzyme catalyses the carboxylation reaction between
 - (A) Oxaloacetic acid and acetyl CoA
 - (B) CO_2 and ribulose 1, 5 diphosphate
 - (C) Ribulose diphosphate and phosphoglyceraldehyde
 - (D) PGA and dihydroxy acetone phosphate

106. Calvin cycle occur in	
(A) Chloroplasts	(B) Cytoplasm
(C) Mitochondria	(D) Glyoxisomes
107. During dark reaction of	photosynthesis
(A) Water split	I
(B) CO_2 is reduced to or	ganic compounds
(C) Chlorophyll is activa	ated
(D) 6 carbon sugar is	broken down into 3
carbon sugar	
108.Dark reaction of photosy	onthesis take place in
(A) Grana	(B) Stroma
(C) Matrix	(D) Cytoplasm
109. In C_3 plants, the firm	st stable product of
photosynthesis during da	ark reaction is
(A) 3–phosphoglyceric a	acid
(B) Phosphoglyceraldeh	yde
(C) Maleic acid	
(D) Oxaloacetic acid	
110.For the reduction of one	molecule of CO_2 with
water, the energy require	ed is
(A) 100 kcal	(B) 110 kcal
(C) 120 kcal	(D) 210 kcal
C ₄ Pathway/CAM/Pł	notorespiration
111.In CAM cycle, during	formation of maleic
acid, stomata remains	
(A) Open	(B) Closed
(C) Semiopen	(D) Always closed
112. Which one of the follow	ing is C_4 plant
(A) Spirogyra	(B) Pinus
(C) Sorghum	(D) Funaria
113. Agranal chloroplasts occ	cur in certain
(A) Succulents	
(C) Hydrophytes	(B) C_4 plants
(C) Hydrophytes	(B) C_4 plants (D) C_3 plants
114. Which of the followin	(B) C_4 plants (D) C_3 plants g is essential for the
114. Which of the followin normal growth of C_4 pla	(B) C_4 plants (D) C_3 plants g is essential for the nts
114. Which of the followin normal growth of C_4 pla (A) Silicon (100 <i>m</i>) (B)	(B) C_4 plants (D) C_3 plants g is essential for the nts Vanadium (100 μm)
114. Which of the followin normal growth of C_4 pla (A) Silicon (100 m) (B) (C) Sodium (100 m) (D)	(B) C_4 plants (D) C_3 plants g is essential for the nts Vanadium (100 μm) Barium (100 m)
114. Which of the followin normal growth of C_4 pla (A) Silicon (100 m) (B) (C) Sodium (100 m) (D) 115. Which of the followin	(B) C_4 plants (D) C_3 plants g is essential for the nts Vanadium (100 μm) Barium (100 m) powing plants stand
114. Which of the followin normal growth of C_4 pla (A) Silicon (100 m) (B) (C) Sodium (100 m) (D) 115. Which of the followintermediate between C_3	(B) C_4 plants (D) C_3 plants g is essential for the nts Vanadium (100 μm) Barium (100 m) owing plants stand and C_4 plants
114. Which of the followin normal growth of C_4 pla (A) Silicon (100 m) (B) (C) Sodium (100 m) (D) 115. Which of the follo intermediate between C_3 (A) Triticum aestivum	(B) C_4 plants (D) C_3 plants g is essential for the nts Vanadium (100 μm) Barium (100 m) owing plants stand and C_4 plants (B) Zea mays

116. The mean photosynthe	tic rates of C_3 and C_4				
plants per dm ² per hour	plants per dm^2 per hour are respectively				
(A) 10 mg and 20 mg (B) 90 mg and 22 mg					
(C) 22 <i>mg</i> and 75 <i>mg</i>	(D) 75 mg and 22 mg				
117.Water budget required t	to produce 1 gm of dry				
matter by C_3 and C_4 plan	nt is approximately				
(A) 610 gm each					
(B) 300 <i>gm</i> each					
(C) 300 <i>gm</i> and 610 <i>gm</i>	respectively				
(D) 610 <i>gm</i> and 300 <i>gm</i>	respectively				
118. Which of the followin	g anatomical features				
characterize a C_4 plant					
(A) Chloroplast packed	bundle sheath cells				
(B) Small-sized stomata	al pores				
(C) More compact me	sophyll with reduced				
intercellular spaces					
(D) All the above					
119. Correlation between 'K	ranz' anatomy and C_4				
path of CO_2 assimilation	was first established by				
(A) Hill and Bendall	(B) Calvin				
(C) Dowton and Tregun	a(D) Arnold				
120. The first CO ₂ acceptor	in C_4 cycle is				
(A) PGA	(B) PEP				
(C) RuDP	(D) DHA				
121.Peroxisomes are found i	n				
(A) Bundle sheath	(B) Endospem				
(C) Mesophyll cells	(D) Vascular bundle				
122.Peroxisome are related	with				
(A) Photosynthesis	(B) Photorespiration				
(C) Respiration	(D) None				
123. Photorespiration takes place is					
(A) Chloroplast, mitochondria					
(B) Mitochondria, peroxisome					
(C) Chloroplasts, peroxisome, mitochondria					
(D) Chloroplasts, cytoplasm, mitochondria					
124. Which one is false about kranz anatomy					
(A) Bundle sheath have large chloroplast and					
less developed grana					
(B) Mesophyll cells have large chloroplast and					
more					
(C) It is found in Atriplex, sugarcane, maize					
(D) Plant having	it have better				
photosynthesizing p	ower than C_3 plants				

125. C_4 plant shows efficiency even in

- (A) Low CO_2 concentration
- (B) Low temperature
- (C) High O_2 concentration
- (D) At low water

Bacterial photosynthesis

- 126.Chlorophyll *a* is not found in
 - (A) Algae
 - (B) Photosynthetic bacteria
 - (C) Both (A) and (B)
 - (D) Bryophytes
- 127.Leptothrix is a
 - (A) Nitrifying bacteria (B) Sulphur bacteria
 - (C) Iron bacteria (D) Hydrogen bacteria
- 128. Green bacteria contains
 - (A) Chlorobium chlorophyll-660
 - (B) Chlorobium chlorophyll-650
 - (C) Both (A) and (B)
 - (D) Chlorobium chlorophyll–700
- 129.Bacterial photosynthesis takes place in
 - (A) Cytoplasm (B) Chromoplast
 - (C) Chloroplast (D) Oxysome
- **130.** Which of the following carries out anoxygenic photosynthesis
 - (A) Cyanobacteria (B) Crab grass
 - (C) Bacteria (D) Wheat plant
- **131.**Which of the following bacteria grow on isopropyl alcohol and convert it into acetone
 - (A) Fermentative bacteria
 - (B) Chemosynthetic bacteria
 - (C) Photosynthetic purple non-sulphur bacteria
 - (D) Nitrifying bacteria
- **132.**What is the bye–product of bacterial photosynthesis

(A) O_2			(B) I	$H_2 O$	
(C) S				(D) .	$H_2 S$
XX 71 · 1	c	.1	C 11	•	1

- 133. Which of the following photosynthetic bacteria have both PS–I and PS–II(A) Green sulphur bacteria
 - (B) Purple sulphur bacteria
 - (C) Cyanobacteria
 - (D) Purple non-sulphur bacteria

r notosyntnesis n	ii fiighei fiants
134. Which wavelength of lig	ght carry out
photosynthesis in bacteria	
(A) Ultraviolet light (B) B	Blue
(C) Red (D) F	Far red
135. Photosynthetic bacteria have p	igments in
(A) Leucoplasts (B) C	Chloroplasts
(C) Chromoplasts (D) C	Chromatophore
Factors affecting photosy	nthesis
136. Which of the following wavel	ength of light is
absorbed maximum for photos	synthesis
(A) Red light (B) P	Slue light
(C) Green light (D) χ	Yellow light
137 . In which of the followin	σ the rate of
photosynthesis is decreased a	and is known as
red dron	ind is known us
(A) Blue light	
(B) Green light	
(C) Red light more than 680 m	m
(D) Red light less than $680 nm$	
138 During daylight hours	the rate of
nhotosynthesis is higher	than that of
respiration and the ratio of o	avvgen produced
to that of consumed is	xygen produced
$(A) 1 \cdot 1 \qquad (B) 1$	$0 \cdot 1$
$(C) 50 \cdot 1$ (D) 5	5 · 1
139 A plant is kept in $300ppm$ CC	D_{2} concentration
what will happen to it	
(A) Plant will die soon	
(R) Plant will grow but will no	at die
(C) Plant will show normal ph	otosynthesis
(D) Perspiration will be greatly	decreased
140 What will be the affact of inte	rmittent light on
nhotosynthesis	mittent fight off
(A) It will increase (R) It	t will decrease
(C) Will not be affected (D) E	Process will stop
1/1 Englemann (1882) observed	accumulation of
aerobic bacteria around	blue and red
illumination of chloroplast	in green alga
Cladophora He therefore con	cluded that
(A) Chloronhyll absorbs green	light
(R) Absorption spectrum of	On evolution in
blue and red	σ_2 evolution is
$(C) \Omega_{0}$ is released from $H_{1}\Omega$ in	light reaction
(D) O_2 is released from CO_2 in	light reaction

- 142. The rate of photosynthesis declines in the presence of red light and is increased to normal level when red light is supplemented with
 - (A) Far–red light (B) Orange light
 - (C) Blue light (D) Ultraviolet light
- **143.** The decrease in yield of photosynthesis in the presence of red light becomes increased to normal when it is supplemented with blue light. This phenomenon is termed as
 - (A) Blackman's effect (B) Emmerson's effect
 - (C) Englemann's effect (D) Hill's effect
- 144. If the photosynthetic yield in blue wavelength is 10 units and that in red wavelength is 40 units; what should be the yield of photosynthesis in combination of two wavelengths, if the effect is synergistic
 - (A) 30 units(B) 40 units(C) 50 units(D) 50 units
- **145.**Emmerson defined 'red drop' as a decline in photosynthesis also termed Emmerson's effect. It appears at
 - (A) 460 nm wavelength
 - (B) 630 nm wavelength
 - (C) 680 nm wavelength
 - (D) 680 nm wavelength

- **146.**DCMU is an inhibitor of
 - (A) PS–I (B) PS–II
 - (C) Calvin cycle (D) Krebs cycle
- 147.Q₁₀ refers to
 - (A) Quality quotient
 - (B) Temperature quotient
 - (C) Respiratory quotient
 - (D) Quantum constant
- **148.** In nature the photosynthesis should proceed upto the limit of
 - (A) Light
 - (B) Temperature
 - (C) *CO*₂
 - (D) Moisture and wind
- **149.** When a photosynthetic plant is transferred to an atmosphere of enriched O_2 , its rate of
 - (A) Photosynthesis would increase
 - (B) Photosynthesis would decrease
 - (C) Respiration would decrease
 - (D) Osmosis would increase
- **150.** Which of the following would happen if the supply of O_2 is decreased to an illuminated wheat plant
 - (A) Its photosynthesis would decrease
 - (B) Its respiration would increase
 - (C) Its photosynthesis would increase
 - (D) All the physiological process would stop