



Previous Year Solved Question Paper
of

G.A.T.E. (XL) 2013

LIFE SCIENCES

XL: J Botany

Examination

(Original Question Paper with Answer Key)

GRADUATE APTITUDE TEST IN ENGINEERING



For more question papers, please visit: www.easybiologyclass.com

GATE XL 2013

J:BOTANY

Q. 1 – Q. 10 carry one mark each.

- Q.1 Bast fibres are present in
(A) Xylem (B) Phloem (C) Collenchyma (D) Parenchyma **B**
- Q.2 During cellular respiratory process, pyruvate must be oxidized to acetyl CoA and CO₂ before it enters the citric acid cycle. The corresponding simplified equation is
$$\text{Pyruvate} + \text{NAD}^+ + \text{CoASH} \longrightarrow \text{Acetyl-S-CoA} + \text{NADH} + \text{CO}_2$$

This oxidation reaction occurs in mitochondria and is carried out in presence of the enzyme
(A) Pyruvate kinase (B) Pyruvate dehydrogenase **B**
(C) Pyruvate decarboxylase (D) Pyruvate carboxylase
- Q.3 Which one of the following statements having the terms - gene, chromosome and genome is **CORRECT**?
(A) The rice gene contains about 50,000 genomes located on 12 different chromosomes
(B) The rice genome contains about 50,000 genes located on 12 different chromosomes
(C) The rice chromosome contains about 50,000 genes located on 12 different genomes **B**
(D) The rice genome contains about 50,000 chromosomes located on 12 different genes
- Q.4 The aflatoxin found in post-harvested grains is injurious to health due to
(A) *Aspergillus* (B) *Alternaria* (C) *Fusarium* (D) *Phytophthora* **A**
- Q.5 Identify the event that exclusively occurs in meiotic cell division
(A) Chromatid formation (B) Spindle formation
(C) Synapsis (D) Chromosome movement to pole **C**
- Q.6 In the symbiotic nitrogen fixation process, Leghemoglobin present in the nodule helps in fixing nitrogen in presence of the enzyme
(A) Nitrate synthetase (B) Nitrate synthase
(C) Glutathione synthetase (D) Nitrogenase **D**
- Q.7 Considering environment and ecosystem, identify the **INCORRECT** statement
(A) In detrital food chain, it is very difficult to measure the energy flow although the use of radioactive tracers give some idea about the energy flow
(B) The change in species composition, community structure and function over time is ecological succession
(C) The slower rise of environmental temperature may be attributed to the increase in pollution in environment which reflects enough solar energy back to other spacer to slow down global warming
(D) Photoperiodism has no relation with the environment and ecosystem, rather it is a biological event taking place in every plant **D**
- Q.8 The two enzymes commonly used for isolation of protoplasts from plants are
(A) Cellulase and Lipase (B) Cellulase and Amylase
(C) Pectinase and Cellulase (D) Pectinase and Lipase **C**

- Q.9 For successful transfer of a foreign gene from the engineered Ti-plasmid to the plant genome, few *cis*-acting DNA elements and *trans*-acting protein factors are very much essential. Select the **CORRECT** combination from the following
- (A) Opine catabolism genes, Left border sequence, Right border sequence
 (B) Opine catabolism genes, Left border sequence, Virulence genes
 (C) Hormone biosynthetic genes, Right border sequence, Virulence genes
 (D) Left border sequence, Right border sequence, Virulence genes **D**
- Q.10 In naturally occurring cytoplasmic male sterility, the molecular determinant is located in
- (A) Chloroplast (B) Endoplasmic reticulum
 (C) Golgi complex (D) Mitochondria **D**

Q. 11 - Q. 20 carry two marks each.

- Q.11 Identify the floral formula with the family and the corresponding plant species

General Floral Formula	Family	Plant	
P. $\oplus \ominus P_{0 \text{ or } 2-3}, A_{3 \text{ or } 3+3}, \underline{G_{1 \text{ or } (3)}}$	1. Liliaceae	i. <i>Cocos nucifera</i>	
Q. $\oplus \ominus P_{3+3}, A_{3+3 \text{ or } 3} / \oplus \ominus P_{3+3}, \underline{G_{(3)}}$	2. Cannaceae	ii. <i>Musa paradisiaca</i>	
R. $\oplus \ominus P_{3+3}, A_{3+3}, \underline{G_{(3)}}$	3. Graminae (Poaceae)	iii. <i>Maranta bicolor</i>	
S. $\cdot \oplus \ominus P_{3+3}, A_{6 \text{ or } 5}, \underline{G_{(3)}}$	4. Palmae (Arecaceae)	iv. <i>Canna indica</i>	
	5. Musaceae	v. <i>Allium cepa</i>	
	6. Marantaceae	vi. <i>Oryza sativa</i>	
(A)	(B)	(C)	(D)
P-1-iv	P-2-v	P-3-v	P-3-vi
Q-2-iii	Q-4-vi	Q-6-iii	Q-4-i
R-6-i	R-3-iii	R-5-i	R-1-v
S-4-ii	S-5-iv	S-2-ii	S-5-ii

- Q.12 A plant of genotype *GGHH* is crossed with another plant of the genotype *gghh*. If the F_1 is test crossed, what percentage (%) of the test cross progeny will have the genotype *gghh* when the two genes are - (P) unlinked, (Q) completely linked with no crossing over, (R) 10 m.u. (genetic map unit) apart, (S) 24 m.u. apart?
- (A) (B) (C) (D)
- P-25 P-25 P-50 P-25
 Q-25 Q-50 Q-50 Q-50
 R-25 R-45 R-90 R-10
 S-25 S-38 S-76 S-24

Q.13 Which two of the following are the **CORRECT** statements ?

- P. Nondisjunction in the parental meiosis is not essential to produce diploid organisms
Q. Nondisjunction in the parental meiosis is essential to produce aneuploid organisms
R. Nondisjunction in the parental meiosis is essential to produce hexaploid organisms
S. Nondisjunction in the parental meiosis is essential to produce tetraploid organisms

(A) P,Q (B) Q,R (C) R,S (D) P,S

A

Q.14 Identify the correct matching by taking one item from each column

Column -I	Column -II	Column -III
P. Morphine	1. <i>Cinchona officinalis</i>	i. Antineoplastic
Q. Nicotine	2. <i>Hyoscyamus niger</i>	ii. Respiratory paralysis
R. Atropine	3. <i>Papaver somniferum</i>	iii. Antibacterial
S. Vinblastine	4. <i>Nicotiana tabacum</i>	iv. Narcotic analgesic
	5. <i>Coffea arabica</i>	v. Anticholinergic
	6. <i>Catharanthus roseus</i>	vi. Antifungal
(A)	(B)	(C) (D)
P-1-i	P-2-iii	P-3-iv P-4-iii
Q-2-ii	Q-3-i	Q-4-ii Q-1-v
R-3-iii	R-1-iv	R-2-v R-5-i
S-4-iv	S-5-v	S-6-i S-2-vi

C

Q.15 Which two of the following are the **INCORRECT** statements ?

- P. All plants fix CO₂ by the action of ribulose biphosphate carboxylase. The reaction occurs in the bundle sheath of C₄ plants
Q. All plants fix CO₂ by the action of ribulose biphosphate carboxylase. The reaction occurs in the mesophyll cells of C₄ plants
R. Phosphoenol pyruvate + CO₂ → Oxaloacetate + Pi, catalyzed by the enzyme phosphoenol pyruvate carbxylase occurs in the mesophyll cells of C₄ plants
S. Phosphoenol pyruvate + CO₂ → Oxaloacetate + Pi, catalyzed by the enzyme phosphoenol pyruvate dehydrogenase occurs in the mesophyll cells of C₄ plants

(A) P,Q (B) Q,R (C) Q,S (D) P,R

C

Q.16 Select the **CORRECT** set comprising only the synthetic analogues of auxin and cytokinin

(A) IAA and Kinetin (B) 2, 4-D and Zeatin (C) IAA and Zeatin (D) 2, 4-D and Kinetin

D

Q.17 Which two of the following are the **INCORRECT** statements ?

- P. In monocotyledonous stems with closed vascular bundle, secondary growth takes place without any cambium
Q. In dicotyledonous stems hypodermis is collenchymatous
R. Mobilization of storage reserves takes place during post-germination of embryo
S. Osborne's classification of seed storage proteins is based upon solubility in *n*-hexane

(A) P,R (B) Q,S (C) Q,R (D) P,S

D

Q.18 Identify two **CORRECT** characteristic features of (P) Autogamy and (Q) Allogamy from the following statements

1. Plant species usually does not depend on external agents
2. Plant species usually depends on external agents
3. Plant species normally produces progeny that are healthier and better adapted in nature
4. Plant species normally produces weaker progeny in several generations

(A)	(B)	(C)	(D)
P-1,3 Q-2,4	P-2,4 Q-1,3	P-1,4 Q-2,3	P-2,3 Q-1,4

C

Q.19 Identify the correct matching by taking one item from each column

Column-I	Column-II		
P. Coenzyme	1. Holoenzyme + Apoenzyme		
Q. Holoenzyme	2. Non-protein part in an active enzyme		
R. Prosthetic group	3. Only the protein part in an active enzyme		
S. Apoenzyme	4. Cofactor in an enzymatic reaction		
	5. Apoenzyme + Prosthetic group		
	6. Holoenzyme + inorganic phosphate		
(A)	(B)	(C)	(D)
P-4 Q-5 R-2 S-3	P-4 Q-3 R-1 S-2	P-4 Q-3 R-5 S-6	P-4 Q-1 R-3 S-5

A

Q.20 Identify two **CORRECT** statements from the following which are related to the ion transportation in the root system of plant

- P. The proton pumps and H^+ -pyrophosphatase appear to work in anti-parallel with the vacuolar ATPase to create a proton gradient across the tonoplast
- Q. Calcium is one of the important ion whose concentration is strongly regulated by the concentration of apoplastic spaces in the millimolar level
- R. Solute move through both apoplast and symplast, and xylem parenchyma cells participate in xylem loading
- S. The limitation of Nerst equation for relating the membrane potential to the distribution of ion at equilibrium is that it cannot distinguish between active and passive transport

(A) P,S	(B) Q,R	(C) R,S	(D) Q,S
---------	---------	---------	---------

B**END OF SECTION - J**

Please visit: www.easybiologyclass.com for:

- Lecture Notes
- Biology PPTs
- Biology MCQs
- Online Mock Tests (MCQ)
- Video Tutorials
- Practical Aids
- Model Question Papers of NET, GATE, DBT, ICMR Exams
- CSIR NET Life Sciences Previous Year Question Papers
- GATE Previous Year Question Papers
- DBT BET JRF Previous Year Question Papers
- ICMR JRF Entrance Exam Resources
- Jobs Notifications
- Higher Studies in Biology / Life Sciences
- Seminar / Workshop/ Conference Notifications
- And many more....



Please subscribe our **youtube** channel: **easybiologyclass**
<https://www.youtube.com/user/easybiologyclass/videos>



You can access more PDFs & PPTs from our **Slideshare** account
<http://www.slideshare.net/EasyBiologyClassEBC/>



Our sister concern: www.angiospermtaxonomy.com