



## ATOMIC ENERGY EDUCATION SOCIETY

Anushaktinagar, Mumbai-400 094

### 2015 – Open Candidates Examination

Post – PGT (Biology)

Date – 27.09.2015

Time – 1 Hour 30 Minutes

Maximum Marks – 50

#### Instructions

1. There are 50 Multiple Choice Questions (MCQ) in this paper. Each question carries 1 mark. There will be negative marking of 0.25 per wrong answer.
2. Answer should be darkened/marked in the OMR answer sheet only.
3. Use of any electronic gadget (e.g. calculator, mobile phone, etc.) is not permitted, in the examination hall.
4. In case a candidate has not signed the Attendance Sheet or the OMR Answer Sheet is not signed by the Invigilator, it will be dealt with as a case of unfair means.
5. On completion of the test, the candidates MUST HAND OVER THE OMR ANSWER SHEET AND QUESTION PAPER TO THE INVIGILATOR in the room/hall.
6. The candidates should ensure that the OMR answer sheet is not folded or damaged.

#### To be filled by the candidate

Name of the Candidate: \_\_\_\_\_

Roll Number: \_\_\_\_\_

OMR Number: \_\_\_\_\_

No of printed pages –8

2015-Open Candidates- PGT (Biology) – QP

*Filepodia*

- Q.1) The protozoan with heliopodia as locomotory structures
- a) Actinophrys
  - b) Entamoeba
  - c) Elphidium
  - d) Euglypha
- Q.2) With reference to phylum-Echinodermata, identify the classes which have Pedicellariae
- a) Crinoidea and Holothuroidea
  - b) Holothuroidea and Echinoidea
  - c) Asteroidea and Echinoidea
  - d) Ophiuroidea and Holothuroidea
- Q.3) Tall (T) is completely dominant over dwarf (t). Red flower colour(R ) is incompletely dominant over white(r ), the heterozygote being pink. Plant having genotype of TtRr is self-pollinated. What would be the proportion of plants with a dwarf and pink characters in its progeny?
- a)  $\frac{2}{16}$
  - b)  $\frac{1}{16}$
  - c)  $\frac{9}{16}$
  - d)  $\frac{3}{16}$
- Q.4) What is the duration of the one cardiac cycle in man when the heart beats for 75 times per minute?
- a) 0.3 sec
  - b) 0.4 sec
  - c) 0.8 sec
  - d) 0.5 sec
- Q.5) Of the following statements about 'antibodies' and 'antigens'. Choose correct set.
- I. An antibody consists of four identical light (L) chains, and two identical heavy (H) chains.
  - II. The stem 'Y' of antibody is called ' $F_{ab}$ ' fragment.
  - III. The stem of antibody and lower part of the arms constitute the 'constant'(C) region.
  - IV. The portion of the antigen to which an antibody binds is called epitope.
- a) II and IV
  - b) I and III
  - b) III and IV
  - d) I and II
- Q.6) In a DNA fragment, there are 8 turns, with 40 % of the bases are cytosine. What would be the total number of Hydrogen bonds present in this DNA fragment?
- a) 96
  - b) 192
  - c) 224
  - d) 60
- Q.7) What is the amino acid sequence in the polypeptide segment translated from the mRNA base sequence of AGU-UUU-UCC-GGG-UCG?
- a) Serine- Glycine -Serine-Phenylalanine-Serine
  - b) Serine-Phenylalanine-Serine-Glycine-Serine
  - c) Serine-Serine-Phenylalanine-Glycine-Serine
  - d) Phenylalanine-Serine—Serine-Glycine-Serine

- Q.8) Identify the wrong statement in relation to Funaria.
- Stomata are present in the epidermis of capsule
  - Spores are viable for only one year
  - Inner spore sac is one celled in thickness
  - Trabeculae connect the inner most layer of the capsule wall with the outer spore sac.
- Q.9) Which of the following character is not associated in a plant having a single cotyledon in a seed, tendrillar stipules and adventitious root system?
- Bisexual flowers with homochlamydeous perianth
  - Reticulate venation in leaves
  - Trimerous flowers with odd tepal of outer whorl is anterior in position
  - Unisexual flowers in umbel inflorescence
- Q.10) When cells of a 15-celled filament of Spirogyra affinis participate in indirect lateral conjugation, the maximum possible number of zygospores produced is
- 15
  - 14
  - 8
  - 7
- Q.11) Which is common among earthworm, leech and centipede?
- They have Malpighian tubules
  - They are hermaphrodites
  - They have ventral nerve cord
  - They have no legs
- Q.12) In which, blood circulation starts and ends in capillaries?
- Portal system
  - Arterial system
  - Capillary system
  - Lymphatic system
- Q.13) Choose the wrong statement in the process of protein synthesis.
- After uncoiling of DNA molecule, one strand acts as a template for the formation of mRNA.
  - In the presence of DNA polymerase enzyme, the mRNA is formed based on the triplet codes.
  - The mRNA that leaves nucleus reaches cytoplasm and gets attached with 30 S ribosomal subunit.
  - The amino acids are transferred from the intracellular amino acid pool to the active ribosomes by the tRNA.
- Q.14) A mother with blood group –B type has a child with blood group type-O. What is the possibility of the genotypes of that mother and father?
- $I^A I^A$  (father) and  $I^B I^O$  (mother)
  - $I^A I^B$  (father) and  $I^B I^B$  (mother)
  - $I^A I^O$  (father) and  $I^B I^O$  (mother)
  - $I^B I^O$  (father) and  $I^A I^O$  (mother)

- Q.15) Which one of the following statements is not true with reference to the genes of eukaryotic animals?
- RNA polymerase allows the transcription of structural genes to synthesise a polycistronic mRNA
  - Many genes have stretches of nitrogen bases that code for amino acids and are called 'exons'
  - Heterogeneous nuclear RNA (hnRNA) is synthesized from split genes
  - The bases that do not code for amino acids are called 'introns'
- Q.16) From evolutionary point of view, tracheids and sieve cells are more primitive than tracheae and sieve tubes respectively. The angiosperms have
- Tracheae and sieve tubes
  - Tracheids, tracheae and sieve tubes
  - Tracheae, sieve cells and sieve tubes
  - Tracheids, tracheae and sieve cells
- Q.17) Which of the following respiratory substrate requires the highest number of  $O_2$  molecules for its complete oxidation?
- Tripalmitin
  - Triolein
  - Tartaric acid
  - Oleic acid
- Q.18) The growth of the population without limit at its maximal rate and also that, rates of immigration and emigration are equal, then it is called
- Carrying capacity
  - biotic potential
  - Positive growth
  - negative growth
- Q.19) Study the following features of a fish
- It is a crossopterygian fish
  - It is found in the river Chalumnae
  - It does not exhibit aestivation
  - It is an uricotelic animal
- Q.20) In heterozygous condition, the individual expression of both the alleles in the phenotype is exemplified by
- Colourblindness
  - AB blood group
  - Rh factor
  - A and B blood group
- Q.21) When a cow is crossed to a bull and the female progeny is yielding more milk than its mother. From this it is inferred.
- More number of genes for high yielding milk are inherited, only from the female parent
  - More number of genes for high yielding milk are inherited only the male parent
  - More number of genes of high yielding milk are inherited from both the parents
  - The progeny through mutation achieved more number of genes for high yielding milk

Q.22) Assertion (A) : Conjugation is a temporary union between two ciliates belonging to two different mating types for exchange and reconstitution of nuclear materials.

Reason (R) : Conjugation occurs between two inactive individuals which have gained their vigour and vitality due to chromosomal imbalance in their macronuclei, cause by repeated amitotic division

- a) Both A and R are true and R explains A
- b) Both A and R are true but R cannot explain A
- c) Only A is correct but not R
- d) Both A and R are wrong

Q.23) Which of the following pairs in angiosperms are diploid and triploid, respectively?

- a) Secondary nucleus and endosperm
- b) Microspore mother cell and egg cell
- c) Polar nucleus and secondary nucleus
- d) Endosperm and antipodal cells

Q.24) The triploid number of chromosomes of the first taken is 10 times more than the haploid number of chromosomes of the second taxon, while the diploid number of the third taxon is 6 time more than the haploid number of the fourth taxon. Which one of the following shows the ascending order of the number of chromosomes in their respective endosperm?

- a) Oryza – Allium – Saccharum – Nicotiana
- b) Allium-Oryza-Nicotiana-Saccharum
- c) Nicotiana-Saccharum-Oryza-Allium
- d) Saccharum-Oryza-Nicotiana-Allium

Q.25) Study the following lists:

	List –I		List – II
A	Population	1	Part of the earth consisting of all the ecosystems of the world.
B	Community	2	Assemblage of all the individuals belonging to different species occurring in an area.
C	Ecosystem	3	Group of similar individuals belonging to the same species found in an area
D	Ecosphere	4	Interaction between the living organisms and their physical environmental components
		5	Classification of organisms based on the type of environment

The correct match is:

- |    |   |   |   |   |
|----|---|---|---|---|
|    | A | B | C | D |
| a) | 1 | 4 | 5 | 3 |
| b) | 5 | 2 | 3 | 1 |
| c) | 2 | 3 | 5 | 4 |
| d) | 3 | 2 | 4 | 1 |

- Q.26) Test tube baby means, a baby born when:
- The ovum is fertilized externally and there after implanted in the uterus
  - It develops from a non-fertilized egg
  - It is developed in a test tube
  - It is developed through tissue culture method
- Q.27) Which of the following requires an invertebrate intermediate host?
- Dugesia
  - Schistosoma
  - Echinococcus
  - Ancylostoma
  - Wuchereria
- 3 and 4
  - 2 and 5
  - 3 and 5
  - 1 and 4
- Q.28) The bird without pecten is
- Pteropus
  - Apteryx
  - Eryx
  - Gallus
- Q.29) A plant with low  $CO_2$  compensation point is:
- Atriplex patula
  - Leucopoa kingii
  - Gossypium hirsutum
  - Tidestromia Oblongifolia
- Q.30) An example of vestigial organ is
- Wing of Apteryx
  - tail of Macropus
  - eyelid of man
  - flipper of whale
- Q.31) The underground stem of this genus is a rhizome
- Allium
  - Gloriosa
  - Scilla
  - Lilium
- Q.32) The structure which join two bones at joints are made up of
- Elastic fibres
  - collagen fibres
  - fibrocytes
  - chondrocytes
- Q.33) The seat of the origin of the lateral roots is
- epidermis
  - cortex
  - endodermis
  - pericycle
- Q.34) The ultimate unit in Trinomial nomenclature is
- order
  - sub species
  - species
  - genus

Q.35) In the life cycle of Rhizopus, the unicellular structure with diploid nuclei is

- a) sporangiophore
- b) sporangium
- c) zygospore
- d) gametangium

Q.36) A cephalopod without a shell

- a) Sepia
- b) Loligo
- c) Octopus
- d) Nautilus

Q.37) A good example for recapitulation theory is

- a) embryonic membrane of reptiles
- b) tadpole larva of frog
- c) placenta of mammals
- d) caning of dog

Q.38) The site of EMP pathway in cell is

- a) Inner membrane of mitochondria
- b) Matrix of mitochondria
- c) Cytoplasm
- d) peroxisome

Q.39) Which one of the combination is not correct?

Parasite	Source of infection
a) Taenia saginata	Beef
b) Ancylostoma duodenale	Water and soil
c) Enterobius vermicularis	Cyclops
d) Wuchereria bancrofti	Mosquito

Q.40) By which mechanism, the salt resistant plants can get rid of excess  $\text{Na}^+$  ions to the outer side, through the roots?

- a)  $\text{H}^+$  - ATPase uniport system
- b)  $\text{Na}^+$  - ATPase uniport system
- c)  $\text{H}^+$  -  $\text{Cl}^-$  symport system
- d)  $\text{Na}^+$  -  $\text{H}^+$  antiport system

Q.41) A plant which lives on rocks under water with photosynthetic root is:

- a) Tinospora
- b) Podostemon
- c) Taeniophyllum
- d) Yanda

Q.42) An abnormal increase in the cell number due to the infection is called:

- a) hyperplasia
- b) hypertrophy
- c) hypoplasia
- d) necrosis

Q.43) Which age group chicks are affected by Gumboro disease:

- a) 1-2 weeks
- b) 3 weeks
- c) 4-8 weeks
- d) 10 weeks

Q.44) Gynaecomastia is a symptom of –

- a) Down's Syndrome
- b) Trisomy
- c) Turner's Syndrome
- d) Klinefelter's Syndrome

Q.45) In certain parts of India muscular dystrophy is commonly found amongst the poor people because they eat cheap pulse from the plant –

- a) Pisum sativum
- b) Lathyrus sativus
- c) cicer arietinum
- d) Phaseolus mungo

Q.46) Five sacral vertebrae fuse to form

- a) Coccyx
- b) Sternum
- c) Coastal cartilage
- d) Sacrum

Q.47) "No Tobacco Day" is observed on

- a) 31<sup>st</sup> May
- b) 31<sup>st</sup> June
- c) 22<sup>nd</sup> April
- d) 2<sup>nd</sup> October

Q.48) Formation of Concentrated (Hyper osmotic) urine in vertebrates generally depends on

- a) Length of the proximal convoluted tubule
- b) Length of Henle's loop
- c) Area of Bowman's capsule
- d) Capillary net work forming glomerulus

Q.49) False statement related to Cycas is

- a) motile male gametes and pollen tubes are involved in fertilization
- b) endosperm formation occurs before fertilization
- c) ovule contains pollen chamber
- d) gametophytic tissue is not found in seeds

✓ Q.50) Arrange the following events of meiosis in the correct sequence:

sequence not given

- a) Terminalization
- b) Crossing over
- c) Synapsis
- d) Disjunction of genomes

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OPEN ADVERTISEMENT CANDIDATE EXAM-2015  
PGT (Biology)

ANSWER KEY

- |      |       |
|------|-------|
| 1. * | 30.a  |
| 2. c | 31.b  |
| 3. a | 32.a  |
| 4. d | 33.d  |
| 5. a | 34.b  |
| 6. c | 35.c  |
| 7. b | 36.c  |
| 8. b | 37.b  |
| 9. b | 38.c  |
| 10.d | 39.c  |
| 11.c | 40.d  |
| 12.a | 41.b  |
| 13.b | 42.a  |
| 14.c | 43.c  |
| 15.a | 44.d  |
| 16.b | 45.a  |
| 17.b | 46.d  |
| 18.b | 47.a  |
| 19.c | 48.b  |
| 20.b | 49.d  |
| 21.c | 50. * |
| 22.c |       |
| 23.a |       |
| 24.b |       |
| 25.d |       |
| 26.a |       |
| 27.b |       |
| 28.b |       |
| 29.d |       |

\* Question no 1 & 50 had been typed wrong and therefore all the examinees have been given  $(1 \times 2) = 2$  bonus marks irrespective of the attempt.