SET 2016

PAPER – II

LIFE SCIENCES

Signature of the Invigilator

Question Booklet No. 031412

1.

OMR Sheet No.. .....

Subject Code 03 **ROLL No.**

Time Allowed : 75 Minutes **Max. Marks : 100**

No. of pages in this Booklet : **8** No. of Questions : **50**

INSTRUCTIONS FOR CANDIDATES

1. Write your Roll No. and the OMR Sheet No. in the spaces provided on top of this page.
2. Fill in the necessary information in the spaces provided on the OMR response sheet.
3. This booklet consists of fifty (50) compulsory questions each carrying 2 marks.
4. Examine the question booklet carefully and tally the number of pages/questions in the booklet with the information printed above. **Do not accept a damaged or open booklet**. Damaged or faulty booklet may be got replaced within the first **5** minutes. Afterwards, neither the Question Booklet will be replaced nor any extra time given.
5. Each Question has four alternative responses marked (A), (B), (C) and (D) in the OMR sheet. You have to completely darken the circle indicating the most appropriate response against each item as in the illustration.

6. All entries in the common OMR response sheet for Papers I and II are to be recorded in the original copy only.
7. Use only Blue/Black Ball point pen.
8. Rough Work is to be done on the blank pages provided at the end of this booklet.
9. If you write your Name, Roll Number, Phone Number or put any mark on any part of the OMR Sheet, except in the spaces allotted for the relevant entries, which may disclose your identity, or use abusive language or employ any other unfair means, you will render yourself liable to disqualification.
10. You have to return the Original OMR Sheet to the invigilators at the end of the examination compulsorily and must not carry it with you outside the Examination Hall. **You are, however, allowed to carry the test booklet and the duplicate copy of OMR Sheet** on conclusion of examination.
11. Use of any calculator, mobile phone or log table etc. is strictly prohibited.
12. **There is no negative marking.**

03-16

SEAL

PAPER-II
LIFE SCIENCES

1. Fluid-mosaic model of membrane has been proposed by :
   (A) Robertson (B) Danielli-Davson
   (C) Singer-Nicholson (D) Hartley

2. Which one of the following is *not* an essential process of meiosis in terms of genetic consequence ?
   (A) Chaismata (B) Synapsis
   (C) Segregation (D) Cytokinesis

3. Which phase of cell cycle is most variable in length in mammals ?
   (A) G2 (B) S
   (C) G1 (D) G0

4. Meiosis prophase I arrest occurs in female sex germ cells in :
   (A) Leptotene (B) Zygotene
   (C) Pachytene (D) Diplotene

5. Thermogenesis is associated with :
   (A) Brown fat and hyperactivity
   (B) β-oxidation and hibernation
   (C) White fat and diapause
   (D) Yellow fat and β-oxidation

6. A measurement unit for blood pressure is :
   (A) mM Hg (B) mm Hg
   (C) Mm Hg (D) mm HG

7. Fasting triggers :
   (A) Glycolysis (B) Glycogenolysis
   (C) Glycogenesis (D) Lactogenesis

8. Smallest peptide hormone found in vertebrate is :
   (A) TSH (B) TRH
   (C) CRH (D) GnRH

9. Which one of the following is *not* an excitatory neurotransmitter in mammals ?
   (A) Acetylcholine (B) Dopamine
   (C) Adrenaline (D) Histamine

10. Second antibody against IgG will be mostly raised in _____ for immunohistochemical analysis.
    (A) Goat (B) Rabbit
    (C) Mice (D) Rat

11. Fluidity of the membrane can be physically demonstrated by using the technique :
    (A) X-ray diffraction (B) HPLC
    (C) Flow-cytometry (D) Ultracentrifugation

12. *In situ* hybridization is a powerful technique for localizing specific _____ within fixed tissues and cells.
    (A) cRNA (B) Protein
    (C) Nucleic acids (D) cDNA

13. _____ technique allows characterization of the genome and chromosome hybrid plants and recombinant breeding lines.
    (A) GISH (B) FISH
    (C) ISH (D) qPCR

14. Which one of the following metals is considered best for preparing nanoparticle-based biosensor ?
    (A) Gold (B) Silver
    (C) Copper (D) Platinum

15. Western blot is useful for the detection of specific :
(A) Protein which is either phosphorylated or not phosphorylated
(B) Phosphorylated protein only
(C) cDNA
(D) cRNA

16. Which one of the following is *not* equivalent to 10 micrometers ?
(A) 1,00,000 Angstroms (B) 10,000 nm
(C) 0.01 mm (D) 0.0001 cm

17. Phase Contrast microscopy uses :
(A) Continuous changes of the phase of the incident light from the condenser to improve contrast in the specimen
(B) Special lenses to distinguish between solid and liquid phases of the specimen
(C) Special lenses to change the color of light passing through the specimen
(D) Circular filters in the condenser and objective to provide contrast to the specimen with different refractive indices

18. Which one of the following statements is *incorrect* about Atomic Force Microscopy (AFM) ?
(A) AFM can visualize protein bound to DNA molecules
(B) AFM can visualize unfixed specimens in water or buffer
(C) AFM moves a very sharp tip over the surface of the specimen to "feel" its shape
(D) AFM can visualize protein bound to sugar moieties

19. Which one of the following is a binucleated at times ?
(A) Adipose cell (B) Neuronal cell
(C) Erythrocyte (D) Hepatocyte

20. Cytoplasmic microtubules completely disappear at :
(A) Room temperature (B) 8°C
(C) 37°C (D) 0°C

21. Odd number of cells during cleavage is found in the _____ embryo.
(A) Mice (B) Frog
(C) Fish (D) Snake

22. Fertilization of ova and implantation of zygote in human takes place in :
(A) Fallopian tube and uterus, respectively
(B) Uterus and cervix, respectively
(C) Ovary and fallopian tube, respectively
(D) Vagina and cervix, respectively

23. In human, the placenta is :
(A) Haemochorial (B) Endothelial
(C) Epithelial (D) Syndesmochorial

24. During stress hypothalamus triggers certain hormones predominantly from :
(A) Adenohypophysis
(B) Neurohypophysis
(C) Intermediary lobe of pituitary
(D) Third ventricle

25. First biosensor for glucose diagnosis is discovered in 1962 by using the principle of :
(A) Optics (B) Electrochemistry
(C) Biochemistry (D) Thermodynamics

26. Which one of the following belongs to the category of endogenous opioids having healthy effects ?
(A) Morphine (B) Endorphin
(C) Dopamine (D) Serotonin

27. Occurrence of "industrial melanism" demonstrates :
(A) Geographical selection
(B) Natural selection
(C) Survival of the fittest
(D) Induced mutation

28. Animals inhabiting polar regions have shorter and poorly developed ears, eyes and other phenotypic variations. This is well explained by :
(A) Darwinism (B) Lamarckism
(C) Cope's law (D) Allen's law

29. In the Hardy-Weinberg equation, "2pq" represents the frequency of :
(A) Heterozygotes
(B) Dominant homozygotes
(C) Recessive homozygotes
(D) Dominant allele

30. The effects of 'natural selection' can be countered by :
(A) Inbreeding (B) Genetic drift
(C) Gene flow (D) Mutation

31. Which type of post-hoc statistical test can be performed if you intend for a parametric analysis ?
(A) Student's t- test
(B) Newman-Keuls test
(C) Kruskal-Wallis test
(D) Dunnett's test

32. What is the probability that you win at least twice if you buy ten tickets ?
(A) 0.5013 (B) 0.0906
(C) 0.3849 (D) 0.3072

33. Which one of the following statements is *true* for all organisms ?
(A) They require organic nutrients
(B) They require inorganic nutrients
(C) They require growth factors
(D) They require oxygen gas

34. Which one of the following is *true* of passive transport ?
(A) It requires a gradient
(B) It uses the cell wall
(C) It includes endocytosis
(D) It only moves water

35. A product or products of glycolysis is/are :
(A) ATP (B) H_2O
(C) CO_2 (D) Both (A) and (B)

36. Which one of the following organisms would *not* undergo meiosis ?
(A) Bacteria (B) Fungi
(C) Plant (D) Human

37. Which statement is *wrong* about genetic suppression ? It involves :
(A) Two different phenotypes
(B) Two different mutations in one gene
(C) Mutation in two genes
(D) Two proteins that interact

38. Mark the *incorrect* statement. The technical problems that have hampered widespread use of gene therapy include :
(A) Developing reliable methods for introducing genes into cells
(B) Obtaining sufficient amounts of DNA to carry out the procedures
(C) Insuring appropriate tissue-specific expression
(D) Developing methods for obtaining long stretches of DNA that contain complete gene

39. Which of the following statements regarding repair of damaged DNA is *wrong* ?

(A) It can occur spontaneously because of the nature of the chemical bonds in DNA

(B) It can occur during normal replication of DNA

(C) It may require excision and resynthesis of affected DNA

(D) It is carried by enzymes that cause disease if mutated

40. Mark the *incorrect* statement. Transcriptionally inactive genes :

(A) May be located within heterochromatin

(B) Often are methylated

(C) Are resistant to DNaseI

(D) Always are associated with repressors

41. The wood of which one of the following trees is used for making musical instruments ?

(A) *Acacia catechu*

(B) *Dalbergia latifolia*

(C) *Quercus floribundas*

(D) *Artocarpus integrifolia*

42. In recessive epistasis, the F_2 ratio gets modified to :

(A) 9:7 (B) 9:3:4

(C) 12:3:1 (D) 15:1

43. An example of an autotetraploid is

(A) *Nicotianatabacum* L.

(B) *Gossypiumhirsutum* L.

(C) *Zea mays* L.

(D) *Solanumtuberosum* L.

44. If the frequency of children homozygous for the recessive allele for cystic fibrosis in a population is about 0.0008, then the frequency of heterozygotes is :

(A) 0.002 (B) 0.028

(C) 0.054 (D) 0.972

45. Molecular phylogenies in prokaryotes are constructed based on the nucleotide sequence analysis of the gene encoding :

(A) 5S rRNA (B) 16S rRNA

(C) 23S rRNA (D) 18S rRNA

46. Which one of the cellular organelles is considered to follow the "symbiont hypothesis" in evolution ?

(A) Peroxisomes (B) Lysosomes

(C) Mitochondria (D) Chloroplast

47. Which one of the following chemicals is *not* used for surface sterilization of plant parts in tissue culture ?

(A) Hydrogen peroxide (B) Mercuric chloride

(C) Silver nitrate (D) Calcium nitrate

48. In plant breeding undesirable linkages can be broken by :

(A) Recurrent selection

(B) Diallele selection mating

(C) Disruptive mating

(D) Selfing

49. The isotope used to prove the semi-conservative nature of DNA replication in *Escherichia coli* by Messelson and Stahl was :

(A) ^{32}P (B) ^{15}N

(C) ^{35}S (D) ^{3}H

50. The occurrence of bridge in Anaphase I is an indication of :

(A) Paracentric (B) Pericentric

(C) Translocation (D) Duplication