

**COMMON P. G. ENTRANCE TEST – 2020**

Test Booklet No. :

**DEPT. OF HIGHER EDUCATION, GOVT. OF ODISHA  
TEST BOOKLET**

Subject Code **29**

Subject **LIFE SCIENCE**

Time Allowed : **90 Minutes**

Full Marks : **70**

**: INSTRUCTIONS TO CANDIDATES :**

1. IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS TEST BOOKLET **DOES NOT** HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET.
2. You have to enter your **Hall Ticket No.** on the Test Booklet in the Box provided alongside. **DO NOT** write *anything else* on the Test Booklet.
3. **YOU ARE REQUIRED TO FILL UP & DARKEN HALL TICKET NO. & TEST BOOKLET NO. IN THE ANSWER SHEET AS WELL AS FILL UP TEST BOOKLET SERIAL NO. & ANSWER SHEET SERIAL NO. IN THE ATTENDANCE SHEET CAREFULLY. WRONGLY FILLED UP ANSWER SHEETS ARE LIABLE FOR REJECTION AT THE RISK OF THE CANDIDATE.**
4. **This Test Booklet contains 70 items (questions). Each item (question) comprises four responses (answers). You have to select the correct response (answer) which you want to mark (darken) on the Answer Sheet. In case, you feel that there is more than one correct response (answer), you should mark (darken) the response (answer) which you consider the best. In any case, choose ONLY ONE response (answer) for each item (question).**
5. You have to mark (darken) all your responses (answers) **ONLY** on the **separate Answer Sheet** provided by using **BALL POINT PEN (BLUE OR BLACK)**. See instructions in the Answer Sheet.
6. All items (questions) carry equal marks. All items (questions) are compulsory. Your total marks will depend only on the number of correct responses (answers) marked by you in the Answer Sheet. **There is no negative marking.**
7. **After you have completed filling in all your responses (answers) on the Answer Sheet and after conclusion of the examination, you should hand over to the Invigilator the Answer Sheet issued to you. You are allowed to take with you the candidate's copy / second page of the Answer Sheet along with the Test Booklet, after completion of the examination, for your reference.**
8. Sheets for rough work are appended in the Test Booklet at the end.

**DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE ASKED TO DO SO**



1. Resolving power of a microscope is a function of \_\_\_\_\_.
  - (A) Wavelength of light used
  - (B) Numerical aperture of lens system
  - (C) Both (A) and (B)
  - (D) Refractive index
  
2. If the distance between the sun and earth becomes double, then the gravitational force on earth will be \_\_\_\_\_.
  - (A) Double
  - (B) Same
  - (C) Half
  - (D) One fourth
  
3. A projectile will achieve maximum horizontal range at \_\_\_\_\_ angle.
  - (A)  $30^\circ$
  - (B)  $45^\circ$
  - (C)  $60^\circ$
  - (D)  $90^\circ$
  
4. Which one of the following radiation is absorbed by greenhouse gases ?
  - (A) Infrared
  - (B) Microwaves
  - (C) Ultraviolet
  - (D) Gamma
  
5. The dimensional formula of Planck's constant is \_\_\_\_\_.
  - (A)  $ML^{-2}T^{-1}$
  - (B)  $ML^2T^{-1}$
  - (C)  $M^2L^2T^{-1}$
  - (D)  $M^2LT^{-1}$

6. Calculate the pH of a mixture of 0.1 M acetic acid and 0.2 M sodium acetate. The  $pK_a$  of acetic acid is 4.76. ( $\log 2 = 0.3010$ ) :
- (A) 1.43  
(B) 4.45  
(C) 5.06  
(D) 7.77
7. A radioactive sample has a half-life of 5 mins. What fraction of the sample is left after 20 mins ?
- (A)  $1/2$   
(B)  $1/4$   
(C)  $1/8$   
(D)  $1/16$
8. Which one of the following is paramagnetic?
- (A)  $N_2$   
(B) NO  
(C) CO  
(D)  $O_3$
9. The hybridization of orbitals of N atom in  $NO_3^-$ ,  $NO_2^+$  and  $NH_4^+$  are \_\_\_\_\_ respectively.
- (A)  $sp^2$ ,  $sp^3$ , sp  
(B) sp,  $sp^2$ ,  $sp^3$   
(C)  $sp^2$ , sp,  $sp^3$   
(D) sp,  $sp^3$ ,  $sp^2$
10. The oxidation number of carbon in  $CH_2Cl_2$  is \_\_\_\_\_.
- (A) Zero  
(B) 2  
(C) 3  
(D) 5

11. Convert the decimal number 36 to binary :
- (A) 10100
  - (B) 10101
  - (C) 100100
  - (D) 100101
12. Find out the value of  $\log_2 16$  ?
- (A) 1/8
  - (B) 4
  - (C) 8
  - (D) 16
13. Two dice were thrown simultaneously. What is the probability of getting a sum of 9 ?
- (A) 1/9
  - (B) 4/9
  - (C) 1/10
  - (D) 3/10
14. A train is 360 mtr long, which is running at a speed of 45 km/hr. How much time will it take to pass the bridge of 140 mtr long ?
- (A) 20 sec
  - (B) 30 sec
  - (C) 40 sec
  - (D) 50 sec
15. Out of the total 30 students in a classroom, 15 students take notes in pencil, 20 students take notes in pen and 8 students take notes in both pencil and pen. How many students do not use a pen or pencil to take notes ?
- (A) 2
  - (B) 3
  - (C) 8
  - (D) 13

16. Which of the following step in TCA cycle involves substrate level phosphorylation ?
- (A)  $\alpha$ -ketoglutarate to Succinyl CoA
  - (B) Succinyl CoA to Succinate
  - (C) Succinate to fumarate
  - (D) Oxaloacetate to citrate
17. Which one of the following statements regarding the non-competitive inhibition of an enzyme catalyzed reaction is correct ?
- (A) Increases  $K_m$  and increases  $V_{max}$
  - (B) Increases  $K_m$  and reduces  $V_{max}$
  - (C) Reduces  $K_m$  and increases  $V_{max}$
  - (D) Reduces  $K_m$  and reduces  $V_{max}$
18. Which of the following are known as helix breakers?
- (A) Threonine
  - (B) Isoleucine and leucine
  - (C) Valine
  - (D) Proline and glycine
19. Which products of glucose oxidation are essential for oxidative phosphorylation ?
- (A) Pyruvate
  - (B) Acetyl Co-A
  - (C) NADPH and ATP
  - (D) NADH and  $FADH_2$
20. When the initial velocity is plotted against substrate concentration in case of allosteric enzymes, the graphical representation will be a ?
- (A) Straight line with negative slope
  - (B) Hyperbola
  - (C) Sigmoid curve
  - (D) Parabola

21. The time from infection until lysis during the growth curve of plaque-forming units is known as \_\_\_\_\_.
- (A) Eclipse period
  - (B) Rise period
  - (C) Burst size
  - (D) Latent period
22. Which of the following antibiotic inhibits bacterial transcription by directly binding to the bacterial RNA polymerase ?
- (A) Rifampicin
  - (B) Polymixin
  - (C) Puromycin
  - (D) Streptomycin
23. NAG and NAM of peptidoglycan layer is linked by \_\_\_\_\_.
- (A) beta-(1,4) glycosidic linkage
  - (B) alpha-(1,4) glycosidic linkage
  - (C) alpha-(1,6) glycosidic linkage
  - (D) beta-(1,6) glycosidic linkage
24. Which of the following test can be used to detect the production of acetoin ?
- (A) Citrate test
  - (B) Voges-Proskauer test
  - (C) Methyl red test
  - (D) Indole test
25. During the exponential phase, the growth rate is \_\_\_\_\_.
- (A) same as generation time
  - (B) reciprocal of generation time
  - (C) time required for population to double
  - (D) rate of doubling population

26.  $I^A$  allele codes for \_\_\_\_\_ to produce A antigen, while  $I^B$  codes for \_\_\_\_\_ to produce B antigen.
- (A) Alpha N galactosamine transferase, galactose transferase
  - (B) Glycosamino glycan transferase, Alpha N glucosamine transferase
  - (C) Alpha glucosamine transferase, Alpha galactosamine transferase
  - (D) Galactose transferase, galactose transferase
27. The triplet code of CAT in DNA is represented as \_\_\_\_\_ in mRNA and \_\_\_\_\_ in tRNA.
- (A) GAA, CAT
  - (B) CAT, CAT
  - (C) GUA, CAU
  - (D) GTA, CAU
28. A white eyed female drosophila is crossed with a red eyed male drosophila. What will be the colour of eyes for their male and female offspring ?
- (A) Red eyed son and white eyed daughter
  - (B) Both white eyed
  - (C) Red eyed daughter and white eyed son
  - (D) Both red eyed
29. The appearance of a recessive phenotype due to the deletion of dominant gene is called \_\_\_\_\_.
- (A) Hemi-dominance
  - (B) Co-dominance
  - (C) Imperfect dominance
  - (D) Pseudo dominance
30. If there are 4 alleles for a gene, then what would be the number of genotypes?
- (A) 5
  - (B) 10
  - (C) 15
  - (D) 20

31. DNA is digested by endonucleases in four sites giving rise to fragments of which two are equal in length. How many bands would be seen after electrophoresis ?
- (A) 3
  - (B) 4
  - (C) 5
  - (D) 6
32. In which of the following techniques, the DNA is labeled using complementary sequences and then analyzed using autoradiography ?
- (A) Western blotting
  - (B) Isopycnic centrifugation
  - (C) Southern blotting
  - (D) Spectrophotometry
33. The ddNTP is different from dNTP in having \_\_\_\_\_.
- (A) H in 3' position of dNTP
  - (B) OH in 3' position of dNTP
  - (C) H in 2' position of dNTP
  - (D) OH in 3' position of dNTP
34. Which of the following factors does not influence electrophoretic mobility ?
- (A) Molecular weight
  - (B) Shape of molecule
  - (C) Size of molecule
  - (D) Stereochemistry of molecule
35. The PCR variants used for the study of RNA expression level is called \_\_\_\_\_.
- (A) Anchored PCR
  - (B) Nested PCR
  - (C) RT PCR
  - (D) qPCR
36. Different events of cell cycle are controlled by the association of CDKs with different cyclins. Name the cyclin which takes part in M phase ?
- (A) Cyclin A
  - (B) Cyclin B
  - (C) Cyclin D
  - (D) Cyclin E

37. Which of the following is not the function of Golgi apparatus ?
- (A) Processing and shorting of glycoprotein
  - (B) Lipid metabolism
  - (C) Carbohydrate metabolism
  - (D) Amino acid metabolism
38.  $\text{Na}^+$ -glucose transporter is an example of \_\_\_\_\_.
- (A) Symport
  - (B) Antiport
  - (C) Facilitated diffusion
  - (D) ATP driven active transport
39. Which is the principal organelle involved in apoptosis induction ?
- (A) Mitochondria
  - (B) Peroxysome
  - (C) Lysosome
  - (D) Golgi Complex
40. Which is the most appropriate function of mitogens in cell growth ?
- (A) Induce increase in cell volume
  - (B) Increase cell survival in adverse conditions
  - (C) Induce cell division by inducing Cdk protein synthesis
  - (D) Induce cell for synthesis of G1 cyclin-Cdk complex

41. Match the columns :

**Column-1**

- i. Type I hypersensitivity
- ii. Type II hypersensitivity
- iii. Type III hypersensitivity
- iv. Type IV hypersensitivity

**Column-2**

- a. Ag-Ab complex mediated
- b.  $T_H$  cell mediated
- c. IgE mediated
- d. IgG mediated

- (A) i-c, ii-d, iii-a, iv-b
- (B) i-d, ii-c, iii-a, iv-b
- (C) i-b, ii-c, iii-a, iv-d
- (D) i-c, ii-b, iii-a, iv-d

42. The Fc (Fragment crystallization) region of antibody is made up of \_\_\_\_\_.
- (A) Constant region of light chains
  - (B) Constant region of heavy chains
  - (C) Variable region of light chains
  - (D) Variable region of heavy chains
43. Which drug is suitably used to isolate hybridoma cells during HAT selection ?
- (A) Amphetamine
  - (B) Colchicine
  - (C) Aminopterin
  - (D) Ampicillin
44. Name the cytokine (low molecular weight soluble glycoprotein), which is released in response to virus infection ?
- (A) Interferons
  - (B) Monokines
  - (C) Lymphokines
  - (D) Interleukins
45. The MHC-II molecules are usually present in \_\_\_\_\_.
- (A) T-Cell
  - (B) B-Cell
  - (C) Neutrophil
  - (D) Endothelial cells
46. Which of the following defines edge effect ?
- (A) Community complexity
  - (B) Community classification
  - (C) High diversity at the boundary of ecotone
  - (D) Community stability
47. The genetically different populations of same species with wide geographical ranges are known as \_\_\_\_\_.
- (A) Ecological species
  - (B) Ecotypes
  - (C) Ecophenes
  - (D) Sub-species

48. If a species has a lot of offspring but do not provide parental care, then it is described as \_\_\_\_\_.
- (A) K-selected species (B) r-selected species  
(C) Q-selected species (D) w-selected species
49. If the average of a series of values is 10 and their variance is 4, then the coefficient of variance is \_\_\_\_\_.
- (A) 0.2 (B) 0.4  
(C) 2.5 (D) 4.0
50. The average score obtained in biochemistry by 9 students is 65 and the standard deviation in 17.91. Find out the value of standard error of mean from the data ?
- (A) 0.50 (B) 1.99  
(C) 3.62 (D) 5.97
51. The organizing taxonomic information in logical classification is called \_\_\_\_\_.
- (A) Systematics (B) Phenetic  
(C) Phylogenetic (D) Dendogram
52. Abnormal secondary growth is found in \_\_\_\_\_.
- (A) Cucurbita (B) Helianthus  
(C) Triticum (D) Dracaena
53. Apospory is direct formation of \_\_\_\_\_.
- (A) Gametophyte from sporophyte  
(B) Gametophyte from gametophyte  
(C) Sporophyte from gametophyte  
(D) Sporophyte from sporophyte
54. In C3 and C4 plants, the primary carboxylation takes place with the help of \_\_\_\_\_.
- (A) PEP carboxylase and pyruvate carboxylase respectively  
(B) RuBP carboxylase and PEP carboxylase respectively  
(C) PEP carboxylase and RuBP oxidase respectively  
(D) RuBP oxidase and pyruvate carboxylase respectively

55. Which one of the following pairs is not correctly matched ?
- (A) IAA-Cell wall elongation  
 (B) Abscisic acid- Stomatal closure  
 (C) Gibberellic acid- Leaf fall  
 (D) Cytokinin- Cell division
56. The retrogressive metamorphosis is found in \_\_\_\_\_.
- (A) Hemichordata (B) Urochordata  
 (C) Cephalochordata (D) Echinodermata
57. The opening of right atrium into right ventricle is guarded by \_\_\_\_\_.
- (A) mitral valve (B) tricuspid valve  
 (C) bicuspid valve (D) aortic semilunar valve
58. The structure which implants in the endometrium is termed as \_\_\_\_\_.
- (A) Embryo (B) Zygote  
 (C) Blastocyst (D) Morula
59. Which of the following sets of ions is necessary in the chemical events of muscle contraction ?
- (A)  $\text{Na}^+$  and  $\text{K}^+$  ions (B)  $\text{Ca}^{++}$  and  $\text{Mg}^{++}$  ions  
 (C)  $\text{Na}^+$  and  $\text{Ca}^{++}$  ions (D)  $\text{Na}^+$  and  $\text{Mg}^{++}$  ions
60. Which one of the following is also called Sewall Wright Effect ?
- (A) Gene pool (B) Gene flow  
 (C) Genetic drift (D) Speciation
61. Vectors designed to replicate in cells of two different species is called \_\_\_\_\_.
- (A) Expression vector (B) Phasmids  
 (C) Shuttle vector (D) Phagemids
62. The antisense gene involved in the production of Flavr Savr tomato is \_\_\_\_\_.
- (A) Polygalacturonase (B) Lactamase  
 (C) Adenosine deaminase (D) Glutathione transferase
63. Alec Jeffery's name is associated with \_\_\_\_\_.
- (A) DNA sequencing (B) RNA sequencing  
 (C) Site-directed mutagenesis (D) DNA fingerprinting

64. Which of the following statement is true for the production of cybrids ?
- (A) Fusion of two different nuclei from two different species
  - (B) Fusion of two nuclei from the same species
  - (C) Nucleus of one species but cytoplasm from both the parent species
  - (D) All the above
65. The variation in number of tandem repeats between two or more individuals is commonly known as \_\_\_\_\_.
- (A) Variable number of tandem repeats (VNTRs)
  - (B) Restriction fragment length polymorphism (RFLP)
  - (C) Simple sequence repeats (SSRs)
  - (D) Amplified fragment length polymorphism (AFLP)
66. The pre – tRNA involves cleavage by \_\_\_\_\_.
- (A) EcoR-I
  - (B) RNase H
  - (C) RNase P
  - (D) RNA polymerase
67. Which of the following pathway that the dicer does not involve for gene silencing ?
- (A) Translational inhibition
  - (B) mRNA degradation
  - (C) Promoter silencing
  - (D) DNA polymerase binding
68. In SOS repair system, the cleavage of LexA is mediated by \_\_\_\_\_.
- (A) RecA
  - (B) RecB
  - (C) RecC
  - (D) UvrA
69. In tissue culture medium, the embryoids formed from pollen grains are due to \_\_\_\_\_.
- (A) Cellular totipotency
  - (B) Organogenesis
  - (C) Double fertilization
  - (D) Test tube culture
70. The virulent trait of *Agrobacterium tumefaciens* is borne on \_\_\_\_\_.
- (A) Chromosomal DNA
  - (B) Tumor inducing plasmid DNA
  - (C) Both chromosomal and plasmid DNA
  - (D) Cryptic plasmid DNA



**SPACE FOR ROUGH WORK**