

079/2023

Maximum : 100 marks

Time : 1 hour and 30 minutes

1. Who among the following was awarded Nobel Prize in 1973 for his contributions to animal behaviour studies?

- (A) Tinbergen (B) Karl Von Frisch
(C) Konrad Lorenz (D) E.O. Wilson

2. Match List I with List II and select the correct code using the code given below the lists :

- | List I | List II |
|--------------------|------------------|
| (a) Coeloblastula | 1. Insects |
| (b) Stereoblastula | 2. Branchiostoma |
| (c) Periblastula | 3. Birds |
| (d) Discoblastula | 4. Annelids |
- (A) (a)–1, (b)–3, (c)–2, (d)–4 (B) (a)–4, (b)–3, (c)–1, (d)–2
(C) (a)–2, (b)–4, (c)–1, (d)–3 (D) (a)–3, (b)–4, (c)–2, (d)–1

3. Crossing over occur in which of the following stages of Meiosis–I?

- (A) Leptone (B) Pachytene
(C) Zygotene (D) Diplotene

4. Consider the statements given below :

- (1) Two species with identical niches cannot coexist.
(2) The concept was put forwarded by Georgii Gause in 1934.

Which of the above statement about competition exclusion principle is/are correct?

- (A) (1) only (B) (2) only
(C) Both (1) and (2) (D) Neither (1) nor (2)

5. The vitamin required for blood coagulation is :
- (A) Vitamin A (B) Vitamin D
(C) Vitamin E (D) Vitamin K
6. Consider the following statements about CRISPR technology :
- (1) CRISPR is the acronym for Clustered Random Interspaced Short Palindromic Repeats
(2) It is a gene-editing system.
- Which of the above statement is/are correct?
- (A) (1) only (B) (2) only
(C) both (1) and (2) (D) neither (1) nor (2)
7. A group of organisms that consist of similar individuals capable of interbreeding or exchanging genes among themselves is :
- (A) Race (B) Deme
(C) Cline (D) Species
8. Consider the following statements about C-value paradox :
- (1) The amount of DNA in a haploid genome (1 C value) corresponds strongly to the complexity of an organism.
(2) C value can be extremely variable across species.
- Which of the above statement is/are correct?
- (A) (1) is correct only (B) (2) only
(C) both (1) and (2) (D) neither (1) nor (2)
9. Consider the following :
- (1) Fumarate
(2) Malate
(3) Succinate
- What is the correct sequence of the above metabolites in citric acid cycle?
- (A) (2) – (1) – (3) (B) (3) – (1) – (2)
(C) (2) – (3) – (1) (D) (1) – (2) – (3)

10. Sickle cell anaemia is due to the substitution of
- (A) Glutamic acid for valine at 6th position in beta-chain
 - (B) Valine for glutamic acid at 6th position in beta-chain
 - (C) Valine for glutamic acid at 5th position in beta-chain
 - (D) Glutamic acid for valine at 5th position in beta-chain
11. Consider the following :
- (1) Class
 - (2) Order
 - (3) Phylum
 - (4) Genus
 - (5) Family
- Which is the correct order of hierarchy down to the species level?
- (A) (2) – (1) – (3) – (4) – (5)
 - (B) (3) – (1) – (2) – (5) – (4)
 - (C) (3) – (2) – (1) – (5) – (4)
 - (D) (4) – (3) – (2) – (1) – (5)
12. Which of the following is not a gaseous neurotransmitter?
- (A) GABA
 - (B) Nitric Oxide
 - (C) Hydrogen Sulphide
 - (D) Carbon Monoxide
13. A genetic condition in which a male human being is born with an extra copy of the X-chromosome is :
- (A) Down Syndrome
 - (B) Turner Syndrome
 - (C) Edward Syndrome
 - (D) Klinefelter Syndrome
14. Industrial melanism is an example for :
- (A) Micro evolution
 - (B) Macro evolution
 - (C) Punctuated equilibrium
 - (D) Co-evolution
15. Which of the following is not a biodiversity hot spot belonging to India?
- (A) Gulf of Kutch
 - (B) Sundaland
 - (C) Eastern Himalayas
 - (D) Indo-Burma region

16. Consider the statements about spiral cleavage :

- (1) The resulting blastomeres are located exactly on top of each other.
- (2) Cleavage occurs in Annelids, Molluscs and Platyhelminths.

Which of the statement is/are correct?

- (A) (1) only
- (B) (2) only
- (C) both (1) and (2)
- (D) neither (1) nor (2)

17. During translation in prokaryotes, the initial aminoacyl-tRNA enters the ribosome through:

- (A) A site
- (B) P site
- (C) E site
- (D) None of the above

18. During a heart attack, the level of which of the following increases in blood?

- (A) Calcium
- (B) Calmodulin
- (C) Troponin
- (D) Tropomyosin

19. Thermoregulatory centre in mammals is located in :

- (A) Pons Varolii
- (B) Floccular lobes
- (C) Hypothalamus
- (D) Corpus callosum

20. Consider the following statements about PCR :

- (1) PCR employs a thermophilic DNA polymerase such as Taq Polymerase.
- (2) It causes the denaturation of the enzyme during the heating step.

Which step of the above statement is/are correct?

- (A) (1) only
- (B) (2) only
- (C) both (1) and (2)
- (D) neither (1) nor (2)

21. ELISA testing is used to diagnose which of the following?

- (A) HIV infection
- (B) Pregnancy
- (C) Blood typing
- (D) All of the above

22. Which is the most common form of DNA?

- (A) A-DNA (B) B-DNA
(C) Z-DNA (D) Triplex DNA

23. Match List I with List II and select the correct code using the code given below the lists :

List I

List II

- | | |
|---------|--|
| (a) IgG | 1. Predominant in body secretions |
| (b) IgM | 2. Defence against parasite infections |
| (c) IgA | 3. Membrane bound antibody |
| (d) IgE | 4. Crosses the placenta |
- (A) (a)-3, (b)-4, (c)-1, (d)-2 (B) (a)-2, (b)-3, (c)-4, (d)-1
(C) (a)-4, (b)-1, (c)-2, (d)-3 (D) (a)-4, (b)-3, (c)-1, (d)-2

24. Erythropoietin is synthesized in the :

- (A) Intestine (B) Kidneys
(C) Bonemarrow (D) Liver

25. Which one of the following compounds is an inhibitor of $\text{Na}^+\text{-K}^+$ pump?

- (A) Phlorizin (B) Ouabain
(C) Dicumarol (D) Arsenol

26. Consider the following statements :

- (1) Neutrophils are the least predominant granulocyte in blood.
(2) The number of nuclear lobes in neutrophils is 2.

Which of the above statement is/are correct?

- (A) (1) only (B) (2) only
(C) (1) and (2) both (D) neither (1) nor (2)

27. SDS-PAGE is an electrophoresis method that allows the separation of :

- (A) DNA (B) RNA
(C) Proteins (D) None of the above

28. Which of the following component is absent in the cell walls of Gram negative bacteria?

- (A) N-acetyl muramic acid (B) N-acetyl glucosamine
(C) Lipopolysaccharide (D) Teichoic acid

29. The counter stain used in Gram staining technique is :

- (A) Crystal violet (B) Safranin
(C) Gram's iodine (D) Acetone

30. Match List I with List II and select the correct code using the code given below the lists :

- | List I | List II |
|---------|----------|
| (a) UAG | 1. ochre |
| (b) UAA | 2. amber |
| (c) UGA | 3. opal |
- (A) (a)-2, (b)-1, (c)-3 (B) (a)-1, (b)-2, (c)-3
(C) (a)-3, (b)-1, (c)-2 (D) (a)-2, (b)-3, (c)-1

31. Which among the following is a non-essential amino acid?

- (A) Histidine (B) Glycine
(C) Lysine (D) Leucine

32. Which of the following is not a secondary lymphoid organ?

- (A) Thymus (B) Lymph nodes
(C) Spleen (D) Tonsils

33. An example for secondary data base is :

- (A) EMBL (B) TrEMBL
(C) SWISS PROT (D) DDBJ

34. Consider the following statements :

- (1) Chemiosmotic theory explains how ATP is generated in the mitochondria.
- (2) The synthesis of ATP is driven by an electron motive force.

Which of the above statement is/are correct?

- (A) (1) only
- (B) (2) only
- (C) both (1) and (2)
- (D) neither (1) nor (2)

35. The coenzyme present in aminotransferase is :

- (A) Coenzyme Q
- (B) FAD
- (C) NAD
- (D) Pyridoxal Phosphate

36. Which of the following is/are the characteristics of arbuscular mycorrhizal fungi :

- (i) They belong to division glomeromycota
- (ii) They help in the nutrient uptake by plants
- (iii) They produce oospore
- (iv) They form mutualistic association with plant root

- (A) Only (i) and (ii)
- (B) Only (i), (ii) and (iii)
- (C) Only (i), (ii) and (iv)
- (D) All the above

37. Alternation of generation between independent gametophyte with sex organs, which produces sperm and eggs and dependent sporophyte which contains spores are characteristic of :

- (A) Gymnosperms
- (B) Pteridophytes
- (C) Bryophytes
- (D) Angiosperms

38. DNA polymerase III enzyme lacks this activity in connection with DNA replication :

- (A) $5' \rightarrow 3'$ exonuclease activity
- (B) Discontinuous synthesis of the lagging template strand
- (C) Proof reading capabilities that corrects replication mistakes
- (D) Exonuclease activity reading $3' \rightarrow 5'$ and DNA synthesizing $5' \rightarrow 3'$

39. Which of the following statement is/are NOT correct about mass selection :
- (i) Mass selection is the process in which the individuals are selected from mixed population based on genotype
 - (ii) The next generation is grown by bulking the selected seeds
 - (iii) After 5 to 6 years of continuous selection, the selected seeds are multiplied and distributed
 - (iv) The varieties developed through mass selection does not show variation
- (A) Only (ii) and (iv) (B) Only (ii) and (iii)
(C) Only (ii), (i) and (iv) (D) Only (i) and (iv)
40. Which among the following is a tautonym?
- (A) *Mangifera indica* (B) *Oryza sativa*
(C) *Malus malus* (D) *Oryza nivara*
41. Acharya Jagadish Chandra Bose Indian botanical garden is located in :
- (A) Howrah (B) Lucknow
(C) Chennai (D) Haryana
42. Which among the following is an alkaloid?
- (A) Kaempferol (B) Quercetin
(C) Catechin (D) Morphine
43. A vector which regulatory sequences that act an enhancer and promoter regions designed for efficient production of protein :
- (A) Amplifiable vector (B) Selectable vector
(C) Expression vector (D) Integrating vector
44. Which of the following statement is/are **CORRECT** for Yeast Artificial Chromosome (YAC) :
- (A) They can be used to express eukaryotic proteins that require post translational modification
 - (B) Able to insert large fragments of DNA
 - (C) Cloning site for foreign DNA is located within the *SUP4* gene
 - (D) All the above

45. Which are the software's used for the construction of phylogenetic tree?
- (A) RASMOL (B) MEGA and PHASE
(C) PSIPRED (D) GENSCAN
46. Which of the following statement is/are **NOT CORRECT** for non-cyclic photophosphorylation?
- (i) Only ATP is produced
(ii) Both PSI and PSII are involved
(iii) Photolysis is present
(iv) It is predominant in bacteria
- (A) Only (i) and (ii) (B) Only (ii) and (iii)
(C) Only (iii) and (iv) (D) Only (i) and (iii)
47. Type of PCR used for the detection and measurement of products generated during each cycle of PCR process :
- (A) Nested PCR (B) qRT-PCR
(C) Multiplex PCR (D) Assembly PCR
48. Among the listed reactions of C3 cycle which is/are catalyzed by trans ketolase enzyme :
- (i) $3 \text{ PGAL} + \text{Fructose 6 Phosphate} \rightarrow \text{Erythrose 4 phosphate} + \text{xylulose 5 phosphate}$
(ii) $\text{DHAP} + 3 \text{ PGAL} \rightarrow \text{Fructose 1, 6 Biphosphate}$
(iii) $\text{Sedoheptulose 7 phosphate} + 3 \text{ phospho'glyceraldehyde} \rightarrow \text{Xylulose 5 phosphate} + \text{Ribose 5 phosphate}$
(iv) $\text{Ribulose 5 phosphate} + \text{ATP} \rightarrow \text{Ribulose 15 phosphate}$
- (A) Only (i) and (iv) (B) Only (i) and (ii)
(C) Only (i) and (iii) (D) Only (ii) and (iii)
49. Hairy root culture is established by transforming plant cells with :
- (A) *Agrobacterium tumefaciens* (B) *Agrobacterium rhizogenes*
(C) *Agrobacterium aurantiacum* (D) *Sinorhizobium meliloti*

50. Meristem culture is largely used for the production of :
- (A) Virus free plants (B) Somatic embryos
(C) Haploid plant production (D) Secondary metabolite
51. The formula for calculating Variance from standard deviation (SD) is :
- (A) SD/N (B) $SD/2$
(C) $(SD)^2$ (D) \sqrt{SD}
52. Polyvinylpyrrolidone is added in tissue culture medium as a :
- (A) Antioxidizing agent (B) Micronutrient
(C) Growth regulator (D) Chelating agent
53. Numerical taxonomy was largely developed and popularized by :
- (A) Cronquist and Takhtajan (B) Sneath and Sokal
(C) Engler and Prantl (D) Michael G. Simpson
54. During DNA extraction process DNA is precipitated using :
- (A) Acetone (B) Diethyl ether
(C) Petroleum ether (D) Ethyl Alcohol
55. How many ATP molecules are needed to fix one molecule of nitrogen?
- (A) 16 (B) 8
(C) 12 (D) 18
56. Which chemical is used as common fusogen in protoplast fusion?
- (A) Triethylene glycol (B) Polyethylene glycol
(C) Tetra ethylene glycol (D) Di propylene glycol

57. A statistical tool to measure the dispersion of the data in relation to the mean :
- (A) Mode (B) Median
(C) Standard deviation (D) All the above
58. Which amino acid act as the precursor for the synthesis of auxin?
- (A) Tryptophan (B) Arginine
(C) Phenyl alanine (D) Threonine
59. Which of the following statement is/are correct about aggregate fruits?
- (i) The fruit has several tiny fruitlets which are derived from a single flower, collectively referred to as etaerio
(ii) These are also known as collective fruits
(iii) These fruits develop from the apocarpous ovary of flowers
(iv) These fruits develop from an inflorescence
- (A) Only (ii) and (iii) (B) Only (i) and (ii)
(C) Only (i) and (iii) (D) Only (ii) and (iv)
60. From the carbohydrate mentioned below which one is a disaccharide?
- (A) Glucose (B) Maltose
(C) Fructose (D) Ribose
61. Which of the following statement is/are wrongly matched about the evolutionary processes of Telomes or telome trusses of primitive Rhynia type of vascular plants :
- (i) Over topping – the telomes and mesomes of the truss to shift from three-dimensional pattern to a single plane
(ii) Planation – One of the two dichotomizing branches of the primitive axis produced by the apical meristem outgrows or over grows the other
(iii) Syngenesiis – Tangential fusion of mesome and telome take place
(iv) Curvation – Unequal growth of the tissues on two opposite flanks of the telome
- (A) Only (i) and (iii) (B) Only (ii) and (iv)
(C) Only (iii) and (iv) (D) Only (i) and (ii)

62. This process, known as mRNA capping, is highly regulated and vital in the creation of stable and mature messenger RNA. Which one of the following statement is **NOT TRUE** about mRNA capping :
- (A) 5'-Capping enzymes are targeted to pre-mRNA by binding to the phosphorylated N-terminal domain of RNA polymerase III
 - (B) The 5' cap protects the newly-synthesized mRNA from 5' – 3' exo nucleases degradation
 - (C) It assists in ribosome binding and help to initiate translation
 - (D) Nuclear export of mRNA is regulated by the cap binding complex (CBC)
63. Barr bodies are inactive X chromosomes “painted” with :
- (A) pi RNA
 - (B) XIST RNA
 - (C) mi RNA
 - (D) si RNA
64. The enzymes which catalyse the formation or removal of a double bond with transfer of amino groups, water or ammonia are :
- (A) Hydrolases
 - (B) Transferases
 - (C) Lyases
 - (D) Ligases
65. Which of the following statement is **CORRECT** for dichogamy?
- (A) The ripening of the stamens and pistils of a flower at different times
 - (B) The spatial separation of the anthers and stigma in hermaphroditic angiosperms
 - (C) Male and female reproductive systems occur on separate plants
 - (D) Stamen and pistil ripen in same time
66. Powdery propagules of lichens composed of fungal hyphae wrapped around Cyanobacteria or green algae is :
- (A) Isidia
 - (B) Soredia
 - (C) Cyphellae
 - (D) Lobules

67. Which one of the following statement is **NOT TRUE** for 'A'-DNA?
- (i) "A"-DNA formed during dehydrated condition
 - (ii) Deoxyribose sugar is in the C3'-endo conformation
 - (iii) Each turn in A DNA has 10 base pairs
 - (iv) Double helix wind in a zig zag pattern
- (A) Only (i) (B) Only (ii) and (iii)
(C) Only (iii) and (iv) (D) Only All the above
68. Infectious RNA particle is known as :
- (A) Prion (B) Viroid
(C) Mycoplasma (D) Actinomycetes
69. Ploidy in Cultivated banana is :
- (A) Tetraploid (B) Diploid
(C) Hexaploid (D) Triploid
70. Which of the following statement is/are **NOT CORRECT** about histone tail :
- (i) N-terminal tails of histones take part in the dimerization of histone octamer
 - (ii) It contains numerous residues that can be modified by acetylation, methylation etc
 - (iii) It has no role in chromatin condensation
 - (iv) Tail modifications alter both inter and intra nucleosomal interactions
- (A) Only (i) and (iii) (B) Only (i), (ii) and (iii)
(C) Only (i), (ii) and (iv) (D) Only (i) and (ii)
71. Who among the following has stated that 'care is an integral component of Moral reasoning?
- (A) Carol Gilligan (B) Jean Piaget
(C) Elliot Turiel (D) Lawrence Kohlberg

72. Classroom as a social system includes personal and social dimensions and interaction of both determine behaviour within a classroom setting and shapes a particular classroom climate. This model of classroom climate is proposed by :
- (A) Bernard Weiner (B) Doyle
(C) Getzels and Thelen (D) Mc Clelland and Atkinson
73. What is the first action of a responsible teacher in a multicultural classroom?
- (A) Develop learning materials and activities for all categories of students
(B) Examine his/her own biases and modify them, if necessary
(C) Cooperative learning strategies should be used regularly
(D) Carefully think through the physical layout of the classroom and make changes for interaction among students
74. Choose from the following four options, the correct sequence of learning outcomes from lower to higher in the Revised Bloom's Taxonomy, 2001 :
- (i) Understanding
(ii) Remembering
(iii) Applying
(iv) Evaluating
(v) Creating
(vi) Analyzing
- (A) (ii), (iii), (i), (iv), (vi), (v) (B) (i), (ii), (vi), (iii), (v), (iv)
(C) (i), (ii), (iii), (vi), (v), (iv) (D) (ii), (i), (iii), (vi), (iv), (v)
75. Suppose some students are talking loudly outside, when a teacher is teaching in a nearby classroom. Teacher finds it difficult. What will you do if you are the teacher?
- (A) Go out of the classroom and scold the disturbing students
(B) Stop teaching immediately and leave classroom
(C) Continue teaching without caring outside disturbances
(D) Tell the students to speak quietly so as not to disturb the class

76. Presenting work of another source as your own, by including it into your work without full acknowledgement is :
- (i) Plagiarism
 - (ii) Coercion
 - (iii) Phishing
 - (iv) All of these
- (A) (i), (ii) and (iii) only (B) (i) only
(C) (iii) only (D) (iv) only
77. A teacher intends to study the relationship between stress and academic achievement among college students. Which type of research is appropriate?
- (A) Descriptive research (B) Correlational research
(C) Action research (D) Ethnographical research
78. Copy rights and related rights include :
- (i) Books
 - (ii) Trademarks
 - (iii) Music
 - (iv) Art forms
- (A) Only (i) (B) Only (ii) and (iii)
(C) Only (i), (iii) and (iv) (D) Only (iii) and (iv)
79. Formal meeting in which many experts provide short addresses on a topic or on related topics is :
- (A) Seminar (B) Workshop
(C) Symposium (D) Brainstorming
80. Research Report contains :
- (A) Introduction (B) Methodology and research design
(C) Findings and conclusion (D) All of these

86. With reference to the provisions made under the National Food Security Act, 2013 consider the following statements :

- (i) The families coming under the category of 'below poverty line (BPL)' only are eligible to receive subsidised grains
- (ii) Provision for Nutritional support to pregnant women and lactating mothers
- (iii) Every State Government shall, by notification, constitute a State Food Commission for the purpose of monitoring and review of implementation of this Act
- (iv) In case of short supply of food grains from the central pool to a State, the Central Government shall provide funds to the extent of short supply to the State Government for meeting obligations

Which of the statements given above is/are correct?

- (A) Only (i) and (ii)
- (B) Only (ii) and (iii)
- (C) Only (ii), (iii) and (iv)
- (D) All the above (i), (ii), (iii) and (iv)

87. The Preamble to the RTI Act states that democracy requires an informed citizenry and transparency of information which are vital :

- (i) To its functioning and also to contain corruption
- (ii) To Measure Corruption
- (iii) To hold Governments and their instrumentalities accountable to the governed

- (A) Only (i)
- (B) Only (i) and (ii)
- (C) Only (i) and (iii)
- (D) All the above (i), (ii) and (iii)

88. Consider the following Acts and identify the Act/Acts for the protection of Women :

- (i) Dowry Prohibition Act, 1961
- (ii) Indecent Representation of Women (Prohibition) Act, 1986
- (iii) Protection of Women from Domestic Violence Act, 2005
- (iv) Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013

- (A) Only (i) and (ii)
- (B) Only (i) and (iii)
- (C) Only (i), (ii) and (iii)
- (D) All the above (i), (ii), (iii) and (iv)

89. Jawahar Rozgar Yogaja (JRY) was started with effect from April, 1, 1989 by merging two erstwhile employment programmes. Which are those programmes?
- (A) Bharat Nirman and NREGP
(B) Prime Minister's Rozgar Yojana and Bharat Nirman
(C) National Rural Employment Program (NREP) and Rural Landless Employment Guarantee Programme (RLEGP)
(D) NRDP and National Food for work Programme
90. The vision of Digital India programme is to transform India into a digitally empowered society and knowledge economy. The key vision of the programme is centred on :
- (i) Digital Infrastructure as a Core Utility to Every Citizen
(ii) Governance and Services on Demand
(iii) Digital Empowerment of Citizens
(iv) Formation of India's own Internet companies like China did
- (A) Only (i and ii) (B) Only (i and iii)
(C) Only (i, ii and iii) (D) All the above (i, ii, iii and iv)
91. In which year Ezhava Memorial was submitted?
- (A) 1876 (B) 1896
(C) 1906 (D) 1096
92. The Royal Proclamation issued by the 'Government of Travancore' on 26 July 1859 followed by which struggle?
- (A) 'Nair Pattalam Lahala' (B) 'Kurichiar Lahala'
(C) 'Perinadu Lahala' (D) 'Channar Lahala'
93. Who is the author of the Malayalam drama 'Pattabakki'?
- (A) V.T. Bhattathirippad (B) N. Krishna Pillai
(C) K. Damodaran (D) K.T. Muhammed

94. Period of 'Paliyam Sathyagraha' :
- (A) 1947 – 1948 (B) 1924 – 1925
(C) 1931 – 1932 (D) 1920 – 1921
95. Which of the following organization was established on October 31, 1914?
- (A) 'Sree Narayana Dharama Paripalana Yogam'
(B) 'Samathwa Samajam'
(C) 'Sadhu Jana Paripalana Yogam'
(D) Nair Service Society
96. The day observed as 'World Zoonoses Day' :
- (A) July 6 (B) April 6
(C) January 6 (D) September 6
97. Indian state that does not cross the Western Ghats :
- (A) Maharashtra (B) Gujarat
(C) Rajasthan (D) Keralam
98. Which of the following National water way pass through Kerala?
- (A) National Waterway – 3 (B) National Waterway – 4
(C) National waterway – 5 (D) National Waterway – 1
99. The Indian who won silver medal in the men's 57 kg. Wrestling free style category at the last Tokyo Olympics?
- (A) Neeraj Chopra (B) Levlina Borgahen
(C) Bajrang Puniya (D) Ravikumar Dahiya
100. The first Malayalam film released on OTT platform :
- (A) 'Kumbalangi Nights' (B) 'Soophiyum Sujathayum'
(C) 'Churuli' (D) 'Aarkkariyam'

SPACE FOR ROUGH WORK

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