Candidate's name……..…

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P530/1
BIOLOGY
(Theory)
JulAug.2024
2½ hours

THE BIOLOGY SYNDICATE (TBS) MOCK 2024

Uganda Advanced Certificate of Education
BIOLOGY
(THEORY)
Paper 1
2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES:

*This paper consists of sections **A** and **B.***

*Answer **all** questions in both sections.*

*Write answers to this section **A** in the boxes provided and answers to section **B** in the spaces provided.*

No additional sheets of paper should be inserted in this booklet.

For Examiners' Use Only			
Section		**Marks**	**Examiner's Signature &No.**
A	**1-40**		
B	**41**		
	42		
	43		
	44		
	45		
	46		
Total			

Turn Over

SECTION A: 40 MARKS

1. If an animal is repeatedly given a stimulus of the same intensity but it gradually fails to respond to it, the resulting behavior is called

A. stereotyped
B. conditioning
C. imprinting
D. habituation

2. Which one of the following is correct about the cyanobacteria? They are

A. prokaryotes
B. eukaryotes
C. acellular
D. multicellular

3. The development of resistance to various types of pesticides is explained partly by the random incidence of mutation and

A. natural selection
B. hybrid vigor
C. artificial selection
D. polymorphism

4. Which of the following describes the conditions in a photosynthesizing cell exposed to high light intensity and low carbon dioxide concentration?

	RuBP	**ATP**	**GP**
A.	high	high	low
B.	high	low	low
C.	low	high	high
D.	low	low	high

5. Which one of the following transfusions would result in agglutination?

A. Donor group A and recipient of blood group A
B. Donor group A and recipient of blood group AB
C. Donor group A and recipient of blood group O
D. Donor group O and recipient of blood group A

6. Which one of the following changes occurs when a myofibril relaxes?

A. A band shortens
B. Myosin filaments contract
C. Sarcomere shortens
D. l band widens

7. Which one of the following forms of bacteria has an organic source of energy and carbon?.

A. Photoautotrophic
B. Chemoautotrophic
C. Photo heterotrophic
D. Chemo heterotrophic

8. Figure **1** shows the change in percentage saturation of myoglobin with oxygen. Over which range of partial pressures will both myoglobin and haemoglobin release oxygen to respiring tissues at greatest rate?

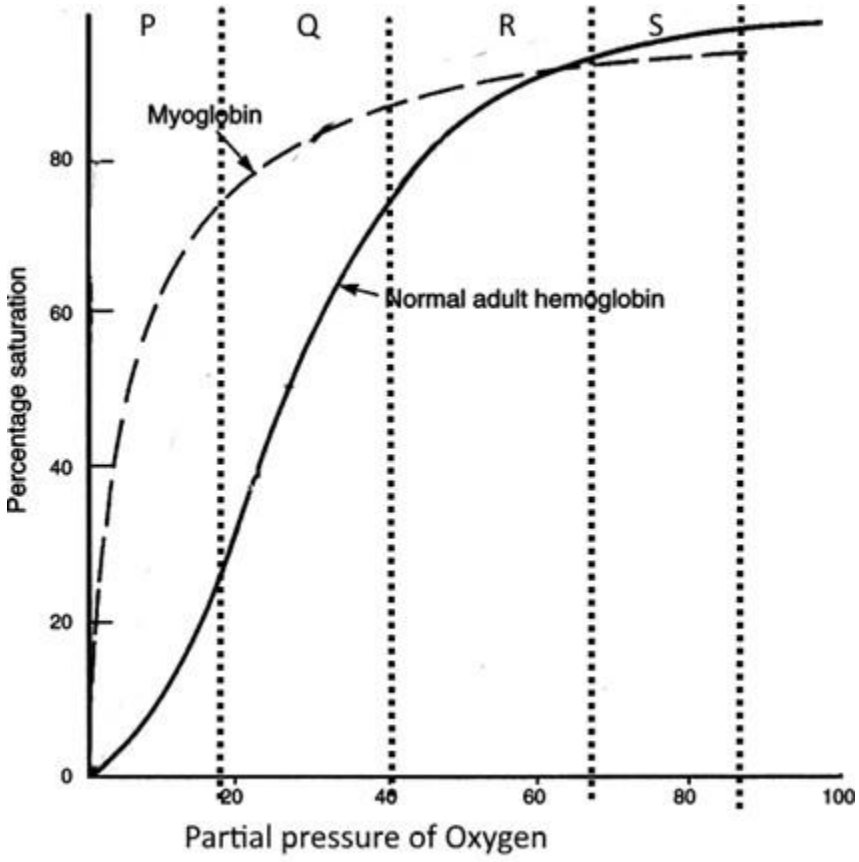

Fig. 1

A. P
B. Q
C. R
D. S

9. Lichens and mutualistic organisms consisting of organisms belong to
A. one kingdom
B. two kingdoms
C. three kingdoms
D. four kingdoms

10. Microscopic examination of an animal cell revealed a revealed a high density of ribosomes. The cell is most likely to be a
A. muscle cell
B. nerve cell
C. lymphocyte
D. bacterial cell

11. In pants, fruit ripening begins in response to increases in levels of
A. auxins
B. gibberellins
C. ethene
D. cytokinin

12. Which of the following is a physiological adaptation of a halophyte?
A. Well-developed taproot system
B. Low water potential in root hairs sap
C. Possession of large air spaces
D. Low rate of transpiration

13. The availability of mineral salts in soil is most likely to be limited by
A. intensive use of fertilizers
B. deposition of acid rain
C. increased afforestation
D. reduced rate of erosion

14. Woody plants do not need a circulatory system for transporting gases because
A. they have fewer living cells compared to animals of similar biomass
B. they have larger surface area
C. they are metabolically more active
D. gases would block their xylem vessels

15. Which one of the following events occurs in the loop of Henle during urine formation?
A. Active release of sodium ions from descending limb
B. Active release of sodium ions from ascending limb
C. Passive release of sodium ions from descending limb
D. Passive release of sodium ions from ascending limb

16. In tomatoes the allele for red fruit (R) is dominant to that for yellow fruit (Y) and the allele for tallness (T) is dormant to that for shortness (s). In the cross RrTT X rrTt what are the chances that an offspring being homozygous for both traits?
A. 6/16
B. 9/16
C. ¼
D. ½

17. Which ones of tissues are responsible for secondary growth in plants?
A. Phloem and xylem
B. Cortex and pith
C. Epidermis and periderm
D. Cork cambium and vascular cambium

18. One feature that necessitated fungi to be classified in a separate kingdom from plants was
A. having asexual reproduction as well as sexual reproduction
B. storage of carbohydrate in the form of starch
C. parasitic nutrition as one of the many forms of nutrition
D. undergoing nuclear mitosis instead of normal mitosis

19. The source of nutrients for the zygote before implantation is
A. egg York
B. follicle cells
C. ovary
D. uterine secretions

20. When planning a conservation strategy, the species whose survival is of greatest concern are those that are

A. endangered
B. rare
C. vulnerable
D. extinct

21. Potassium cyanide interferes with the synthesis of adenosine triphosphate in cell metabolism. If the use of potassium cyanide accelerates entry of a solute into a cell this means it enters by

A. active transport
B. osmosis
C. simple diffusion
D. pinocytosis

22. Transduction in bacteria is a form of

A. nutrition
B. asexual reproduction
C. respiration
D. sexual reproduction

23. Which one of the following may result in reduced supply of oxygen to the fetal tissues in mammals?

A. Rupturing of the ling capillaries
B. Partial closure of the foramen ovale
C. Accumulation of surfactant in the lungs
D. Partial closure of the ductus arteriosus

24. Which of the following types of mutation cam increase the chromosome number of a cell?

A. Non disjunction
B. Inversion
C. Deletion
D. Translocation

25. Which one of the following forms of reproduction may result into a slow rate of increase in a population?

A. Fragmentation
B. Multiple fission
C. Conjugation
D. Sporulation

26. Which one of the following has the greatest trophic efficiency?

A. Algae
B. Herbivores
C. carnivores
D. scavengers

27. Which of the following substances is least required during blood clotting?

A. Phylloquinone
B. Calcium ions
C. Phospholipids
D. Fibrinogen

28. The following characteristics are exhibited by cones only except

A. high visual acuity
B. colour vision
C. possession of lodopsin
D. retinal convergence

29. **Figure 2** shows the relationship between growth and Respiration.

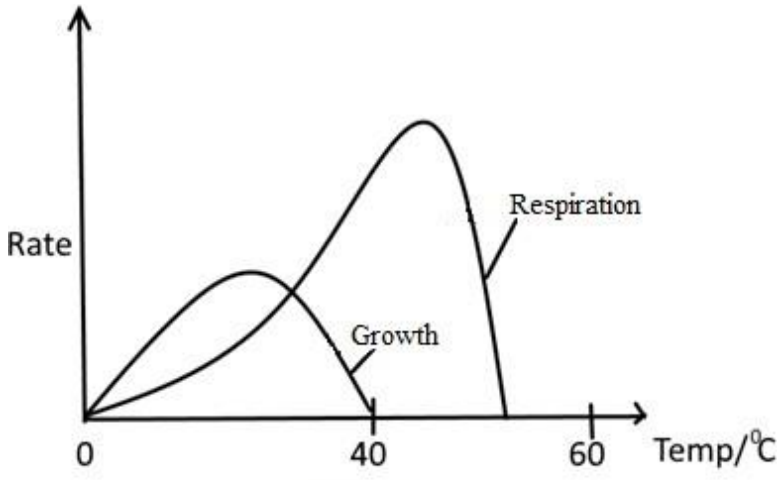

Fig. 2

Which of the following is the best conclusion from the figure?

A. At low temperature growth proceeds further than respiration
B. Growth and respiration are inhibited by temperatures above 40^0C
C. Growth and respiration are affected equally by temperature
D. Temperatures that inhibit growth still favor respiration

30. Which of the following pairs of hormones raises blood glucose levels?

A. Growth hormone and cortisol
B. Adrenaline and thyroxine
C. Thyroxine and adrenaline
D. Growth hormone and adrenaline

31. Regular exercise increases the toughness of ligaments and tendons because

A. their fiber content increases in number and thickens
B. the amount of connective tissue increases
C. more calcium and phosphate salts are deposited in them
D. their myosin and actin component increases

32. If a radioactively labeled amino acid were taken up by a secretory cell, what is the correct sequence of structures in which radioactivity would appear?

A. Cytoplasm, endoplasmic reticulum ,Golgi apparatus
B. Endoplasmic, reticulum nucleus, lysosome
C. Lysosome, nucleus, Golgi apparatus
D. Mitochondria, endoplasmic reticulum, lysosomes

33. Carnivorous plants like Venus fly trap are commonly found in soils deficient of

A. phosphate
B. nitrogen
C. potassium
D. magnesium

34. Which one of the following is an adaptation of Osteichthyes that live in water of a lower osmotic potential than that of their tissue fluids?

A. Possession of few glomeruli
B. Long lop of Henle
C. Active secretion of salts into water
D. Possession of many glomeruli

35. Molting hormone is secreted in insects undergoing metamorphosis by which glands?

A. Corpora allata
B. Pineal gland
C. Hypothalamus
D. Prothoracic glands

36. Auxins promote a plant to grow towards a light source by

A. increasing the rate of cell division on the shaded side of the stem
B. shortening the cells on the light side of the stem
C. causing cells on the shaded side of the stem to elongate
D. decreasing the rate of cell division on the light side of the stem

37. What could be the consequence of removing the Casparian strip from a root endodermis?

A. water and minerals nutrients would not be able to reach the xylem
B. there would be less selectivity as to what passed into the xylem
C. water and mineral salts would be lost from the xylem back into the soil
D. water and mineral nutrients would no longer be able to pass through the walls of the endodermis

38. In vascular plants one difference between roots and shoot systems is that

A. root systems cannot undergo secondary growth
B. root systems undergo secondary growth but do not form bark
C. root systems contain pronounced zones of elongation whereas shoot systems do not
D. root systems can store food reserves whereas stem structures do not

39. In annelids which of the following structures is used for the process of locomotion?

A. clitellum
B. chaetae
C. septa
D. parapodia

40. Prezygotic premating mechanisms include the following except

A. hybrid sterility
B. courtship rituals
C. habitat separation
D. seasonal reproduction

SECTION B (60 MARKS)

41. (a) Describe **three** characteristics of the specific immune response. ***(03 marks)***

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(b) (i) What is meant by **inflammation**? ***(02 marks)***

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(ii) Outline three situations where an inflammatory response may be effective. ***(03 marks)***

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(c) State **two** differences between the non-specific and specific immune systems. ***(02 marks)***

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42. (a) What is meant by the term **gaseous exchange?** ***(02 marks)***

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(b) Describe the role of each of the following in the respiratory pathways

(i) Goblet cells ***(01 mark)***

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(ii) Elastic fibres. ***(01 mark)***

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(c) Explain the following facts related to gaseous exchange in mammals

(i) Blood flowing into and out of the alveoli has different partial pressure of oxygen and carbon dioxide. ***(03marks)***

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(ii) Blood leaving the lungs is not fully oxygenated. ***(03 marks)***

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43. (a) What is meant by **biotic potential?** ***(02 marks)***

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(b) Give reasons why a population may fail to achieve its biotic potential. ***(03 marks)***

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(c) (i) During the estimation of fish population in a small lake 625 fish were netted but during the marking 10% of the fish netted escaped. The rest were released back to the lake. After one week 873 fish were netted and out of these 50 had been marked. Determine the estimated population size of fish in the lake. ***(03 marks)***

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(ii) What assumption is considered when working out the estimated population of fish in the pond? ***(01 mark)***

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44. (a) How does consumption of a protein rich diet affect urea concentration in urine? ***(04 marks)***

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(b) Suggest why deamination in the liver could be associated with the accumulation of glycogen. ***(03 marks)***

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(c) Explain why urea is not found in the body of a fresh water fish.

(03 marks)

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45. (a) Two groups of short-day plants were each subjected to different treatment of light and dark periods as shown in **Figure 3**.

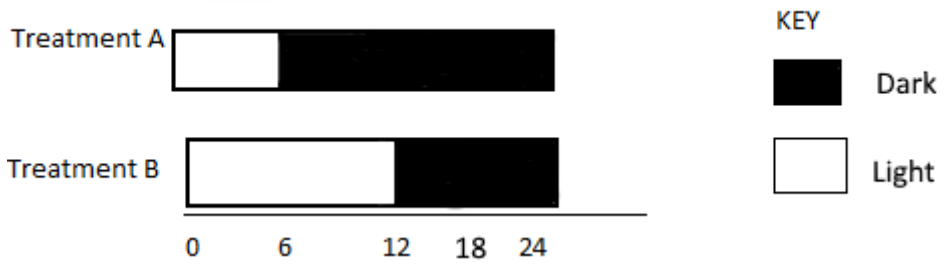

Fig. 3

Explain how each of the treatments would affect flowering response in the two groups of plants.

(i) Treatment A ***(02 marks)***

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(ii) Treatment B ***(02 marks)***

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(b) In a second series of experiments the group in (a) which had been exposed to long dark periods was flashed with red and far red light in the middle of the dark periods. Giving a reason suggest the flowering response expected in plants flashed with;

(i) Red light ***(03 marks)***

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(ii) far red light ***(02 marks)***

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(d) What conclusions can you draw from the results of experiment in (a)?

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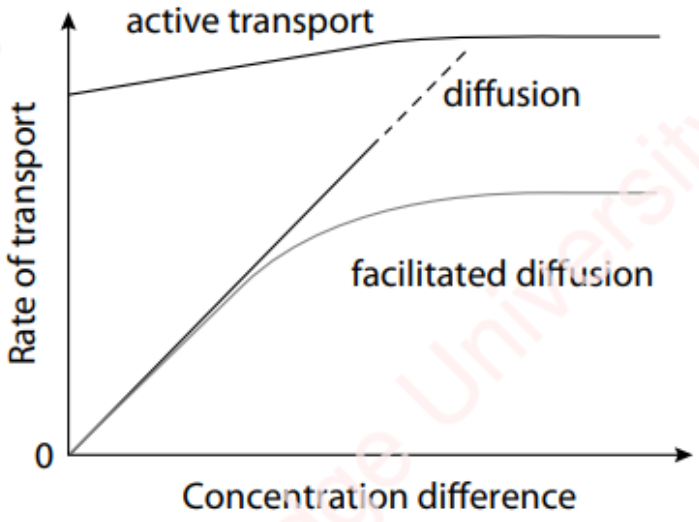
46. Figure **4** shows the effect of concentration gradient on the rate of transport of substances across the cell membrane by different transport processes.



(a) (i) Comment on the rate of transport of substances across the cell membrane by different processes at zero concentration difference.

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(iii) Suggest the cause of the difference in the rates of transport processes above. ***(02 marks)***

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(b) Explain the effect of concentration difference on the rate of transport of substances by facilitated diffusion. ***(04 marks)***

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(c) State two differences between active transport and facilitated diffusion ***(02 marks)***

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END