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JINJA JOINT EXAMINATIONS BOARD

MOCK EXAMINATONS2023

P530/1 - BIOLOGY

PROPOSED MARKING GUIDE 2023

SECTION A

1 C	2 A D.	3 B	4 B	5 A D	6 C	7 A	8 A	9 D	10 B
11 B	12 B	13 A	14 B	15 C	16 C	17 A	18 A	19 C	20 D
21 C	22 C	23 D	24 D	25 D	26 B C	27 D	28 A	29 A	30 C
31 B B A	32 A	33 C	34 B D	35 A C	36 C	37 A	38 C	39 C	40 D

40 marks/ 1 mark each

SECTION B

41. (a) – Numerous mitochondria; to release ATP for continuous contraction;
– Elongated muscle fibres; to allow considerable contraction;
– Parallel fibres; to provide maximum (strong) contractile effect;
– Muscle fibres have tapered ends to interlock; and are interwoven to increase strength;
– Contractile actin and myosin protein filaments overlapping arrangement ; allows contraction by sliding over each other;
– Dense Rich supply of blood vessels; provide enough supply of oxygen and glucose needed for respiration;
– Lots of myoglobin present in sarcoplasm ;of fibres to store a lot of oxygen for release when blood oxygen levels are low;
– Motor end plates; (specialized synapses) allow stimulation of the muscle;
– Fibres arranged in motor units; to allow variable degree of contraction;

Any four adaptations @ 1 mark (maximum 4 marks)

(b) (i) Calcium ions combine with troponin of actin; (to form troponin-calcium complex) ; causing troponin (or tropomyosin) to change shape; displacing tropomyosin from myosin binding sites; on the actin filaments; The myosin heads bind to actin filaments; (forming cross bridges) causing actin filaments to slide past myosin; resulting into muscular contraction (shortening sarcomere)

@ ½ mark (maximum 4 marks)

(ii) ATP molecules attach to myosin heads; breaking the cross bridges between actin filaments and myosin filaments. ;This causes muscle to relax; as the actin filaments slide back past the myosin filaments;

@ ½ mark (maximum 2 marks)

42 (a) R- Yellow body / corpus luteum;
S- graafian follicle;
T- Secondary oocyte;
U- Primary follicle;

Deny any wrong spelling

@ ½ mark (maximum 2 marks)

(b) R secretes progesterone hormone which;
Stimulates continued thickening and vascularization of the uterine endometrium in preparation for implantation;
Inhibits any further secretion of FSH by the pituitary to allow only one follicle to develop at a time;

@ 1 mark (maximum 3 marks)

(c) Yellow body degenerates reducing/stopping; secretion of progesterone; levels of progesterone and oestrogen fall; causing the endometrium to break down leading to menstruation/ menstrual flow;

@ ½ mark (maximum 2 marks)

(d) Hypothalamus secretes gonadotrophin releasing hormone; which stimulates the anterior pituitary gland to FSH and LH;
FSH stimulates development of follicles in the ovary secretion of eostrogen from the ovary;
LH causes ovulation and change the graafian follicle into yellow body (which secretes the progesterone);

@ 1 mark (maximum 3 marks) 43

43. (a) (i)
Sodium gates open (increasing permeability of axon membrane to sodium ions) ; sodium ions rapidly diffuse from outside membrane into the cytoplasm (down a diffusion gradient);

@ ½ mark (maximum 2 marks)

(ii)
Non myelinated axon depolarises whole axon membrane; slowing conduction of action potentials; in myelinated axons depolarisations only occur at nodes of Ranvier; causing action potentials to jump from one node to the next node; (leading to saltatory conduction) ; increasing speed of transmission of impulses.;

@ ½ mark (maximum 3 marks)

(b)

Rods	Cones
Rod shaped	Cone shaped
Greater number than cone cells	Fewer numbers than rod cells

-Sensitive to low light intensity	- Sensitive to high light intensity
Distributed more at sides (periphery) of retina	Fewer at periphery of retina
- Smaller	- Larger
- Visual pigment Rhodopsin	- Visual pigment Iodopsin.
Absent at fovea	Concentrated at the fovea
- Show retinal convergence.	- Do not show retinal convergence.
Poor visual acuity	Good visual acuity
- Not sensitive to colour	- Sensitive to colours

Visual pigment is rhodopsin	Visual pigment is iodopsin

b)

Hormonal control	~~Nervous control~~ Nervous control
Communication is by chemicals called hormones	Communication is by nerve impulses (electrical)
Transmission is by blood	Transmission is by neurones
Transmission/control is relatively slow	Transmission/control is rapid
Hormones travel to all parts of the body but only target organs that respond	Nerve impulses travel to specific parts of the body
Response is wide spread	Response is localised
Response is often long lasting	Response is short lived
Response is slow	Response is rapid
Effect may be permanent and Irreversible	Effect is temporary and reversible ~~irreversible~~

Any two differences @ 1 mark (maximum 2 marks)

(c)

Rod cells	Cone cells
Sensitive to low light intensity	Sensitive to high light intensity
Retinal convergence	No retinal convergence

Any three differences @ 1 mark (maximum 3 marks)

44. (a) (i)

IPM is pest control method which combines biological control, cultural methods with limited use chemical pesticides, selected to control pests to minimum ecological and economic damage (pest population to a level below economic injury level)

@ 1 mark (maximum 2 marks)

(ii)

Indicator species is a species that needs a particular environmental condition or set of conditions in order to survive and provide information about the envt

OR.

An organism whose presence/absence/abundance reflects a specific environmental conditions

Or species sensitive to a specific level of pollution (environmental change), ; and will not appear in an ecosystem if it polluted beyond a certain level;

@ 1 mark (maximum 1 mark)

(b) DDT is not specific as it kills many non- target organisms besides target pests;
DDT is not biodegradable, once applied it does not breakdown into harmless substances in the soil;
DDT builds up in either in specific parts of an organism or as it passes along food chains (bioaccumulation);

@ 1 mark (maximum 3 marks)

(c) **Advantages of biological control**

- Pests do not become resistant;
- Once introduced, control organism reproduces itself requiring no other applications. ;
- Its specific not killing non-target organisms;
- It is environment friendly as it does not pollute the environment;
- Not associated with bio magnification & bio accumulation;

@ 1 mark (maximum 2 marks)

Disadvantages of biological control

- **Does not act quickly;** slow actions
- **Control organism its self may become a pest with time;** destructive to other important organisms;
- **Does not eradicate the pest population completely;**

@ 1 mark (maximum 2 marks)

45 (a) Rate of O2 uptake = change in O2 uptake/ change in time;
= (11.2 - 1.2) / (9 – 2) ;
= 1.43 au/hour; res. without units.

0½mk

@ 1 mark (maximum 2 marks)

(b) from o to 17.2 hours; oxygen uptake rapidly increases to maximum as aerobic respiration increases due to growing yeast population. ;
From 17.2 to 24 hours; oxygen uptake rapidly decreases due to glucose (or oxygen) having reduced / yeast cells die from toxic ethanol produced by anaerobic respiration. ;

max 4.

@ 1 mark (maximum 2 marks)

(c) from 0 to 16 hours, no ethanol production due to yeast cells respiring aerobically; ; From 16 to 22.8 hours, ethanol production rapidly increases to maximum as oxygen uptake rapidly decreases and yeast cells respire anaerobically producing ethanol. ;
From 22.8 to 24 hours; ethanol production decreases as glucose is used up / ethanol is toxic and it kills yeast cells. ;

max 3.

@ 1 mark (maximum 3 marks)

(d) Oxygen uptake decreases (stops);
Oxygen is final electron acceptor in the ETC;
Ethanol production immediately starts and more ethanol will be produced by anaerobic respiration;

@ 1 mark (maximum 3 marks)

(a) age of students; weight of students/subjects of same sex/ fitness;

@ 1 mark (maximum 1 mark)

(b) Hypothalamus secretes ADH; and ~~anterior~~ posterior pituitary gland stores the ADH;

@ 1 mark (maximum 2 marks)

(c) From o to 100 au of intensity of exercise; concentration of ADH in blood plasma remains almost constant at 2 au (from 0 to 150 au of exercise ADH amount slightly increases);. Low intensity exercises result into little water loss by sweating.;
from 100 to 150 au of intensity of exercise; ADH concentration in blood ~~plasma slightly increases~~ increases due to gradual slightly increased water loss from body by sweating causing a slight stimulation of hypothalamus to secrete ADH.;
From 150 to 250 au of intensity of exercise; ADH concentration in blood ~~gradually~~ rapidly increases; due to increased sweating leading to more water lost stimulating the hypothalamus to secrete more ADH;

@ ½ mark (maximum 4 marks)

(d) students become more dehydrated; as they lose more water by sweating and through urine;
low levels of ADH reduce the permeability; of collecting ducts and distal convulated tubules of kidney nephron to water; less water is reabsorbed into the medulla (blood); leading to large(r) quantities of dilute urine produced;

@ ½ mark (maximum 3 marks)

END