

# RESPONSE AND CO-ORDINATION MARKING SCHEME

## 1. 1989 Q2 P1

**Structural differences:** - The cell body of a motor neurone is terminal (at the end) and inside the central nervous system, while the cell body in sensory neurone is not terminal but has axons on both ends i. e it is bipolar

**Functional difference:-**Motor neurone carry impulses from central nervous system (CNS) the effectors i. e muscles or glands, while sensory neurons carry impulses from receptors/senses

## 2. 1990 Q15 P1

	<b>Adaptation</b>	<b>Function</b>
<b>Conjunctiva</b>	An epithelium; Colourless	protects eyeball
<b>Cornea:</b>	Transparent/ Curved	Allow / refract light entering the eye
<b>Aqueous/ Vitreous:</b>	clear	Allows light to pass through/
	Contains sugar / solution and Proteins	refract light to provides nutrients to the eye
	Hydrostatic pressure	Maintain shape of the eye
<b>Iris:</b>	Opaque and contractile	Controls light intensity/ Amount of light entering the eye
<b>Ciliary muscle / body</b>	Contractile Glandular	Controls curvative of lens Secrets humour
<b>Suspensory body ligaments</b>	Are fibrous	Holds lens in position
<b>Lens</b>	Transparent/biconvex	To allow light to go through / Refract light/ to focus light.
<b>Cones</b>	Contain pigments/iodopsin	for colour vision/bright light/of high intensity.
<b>Retina</b>	Contains light sensitive cells	Where an Image is formed which Perceive light
<b>Rods</b>	Contains pigments/iodeosin	for dim vision

<b>Fovea centralis</b>	Has high concentration of cones	For accurate vision
<b>Choroid</b>	Layer has blood vessels	For nutrition and pigment to reduce reflection and absorb stray light.
<b>Sclera / scleroids</b>	Tough, none elastic/fibrous	Gives eye shape and protects.
<b>Optic nerve</b>	Contains sensory neurones for transmitting impulse from retina to the brain to optic robe	Gives eye shape and protects
<b>External eye muscle</b>	Contractile	Move eye ball (within the socket)

b)	Myopia/short sightedness	Concave / diverging lenses
	Hypermetropia/long sightedness	Biconcave/converging lenses
	Astigmatism	Cylindrical lenses with combined curvatures
	Presbyopia	Biconcave/ converging lenses
	Squinting	Surgery

**3. 1991 Q6 P1**

- (a) **S** – Action potential/ spike potential
- (b) **T** – Resting potential

**4. 1991 Q11 P1**

- (a) The coleoptiles tip bends towards light/ positive phototropism positively phototropic move cell elongation / curve growth on the side away from the light due to more auxin on the side away from light
- (b) B and C are controls A  
B shows that it is the tip that responds to light (stimulus)  
C Shows that it is the tip that the source of growth hormone/ auxin
- (c) No current in D because hormone from the tip do reach region of cell elongation (due to mica blade) In E curve because mica blade does not interfere with the movement of the auxins/ hormones from the region of cell elongation on the side away from the light

**5. 1992 Q13 P1**

- (a) A- Relay/associate/intermediate/ interneurone  
 B- Motor neurone / efferent neurone
- (b) Impulse initiates release of acetylcholine / transmitter substance (at the end of sensory neurone) Acetylcholine, which diffuses across the gap, generates an impulse in the next neurone.  
 Rej. Noradrenaline as transmitter substance

**(c) Nervous**

- Electrical impulse via nerves
- Route of transmission is rapid
- Speed of transmission is rapid
- Speed of transport is short
- Location of response is confined to effector cell/ organ

**Hormonal**

- Chemical via blood
- Route of transmission is slower
- Speed of transmission is slower
- Speed of transmission usually longer
- Duration of response is usually long lasting
- Location of response is widespread

**6. 1994 Q9 P1**

- (a) Nastic/ Haotonanasty/Thigmonasty  
 (b) Phototaxis  
 (c) Chemotaxis

**7. 1994 Q15 P1**

- i) E-axon  
 ii) A - synaptic knob and G

- ii) B  
 iii) C/F

Motor neurone transmit impulses away from CNS to effectors while sensory transmits impulses towards CNS / from receptors / sense organ / gland

**8. 1994 Q9 P1**

**(a) Circulatory system**

Heart beat increased / cardiac output increase: Blood vessel dilate hence more hence more blood to the tissues (body / brain / skeleton)to deliver nutrients / glucose and remove metabolic waste products / CO<sub>2</sub>

**(b) Respiratory**

Intercostal muscles and diaphragm muscles contract and relax faster (maximally) to increase ventilation / breathing rate / rate of external respiration increased so as to supply more oxygen and remove more carbon dioxide.

**9. 1995 Q14 P1**

- (a) (i) P – will tend/ grow towards light  
Q – will remain straight/ little/ no growth  
R – will remain/ grow straight / Acc. Grow upwards

- (ii) P – Growth substances or hormones/ auxins/IAA are produced by the stem tip. They move downwards and get disturbed to the side away from the side of light. Where they cause more rapid growth/ cell division/ elongation ( that results in bending)

The source of auxin has been removed and the auxins are not affected by light because the area has been covered.

- (b) Tip will bend towards the light  
(c) All the seedlings will grow upwards.

**10. 1996 Q16 P1**

- (a) – Phototropism

(b) Auxins / hormones; move diffuse to the shaded/ away from the light side; causing elongation/ growth on the dark sides hence bending

**11. 1997 Q5 P1**

Cerebrum cerebral hemisphere/ cerebral cortex;

**12. 1997 Q12 P1**

- (a) Long sightedness/ hypermetropia

(b) Eye ball too short/ eye lens are unable to focus because they are flat/weak, unable to focus the image on the retina; eyes are unable to accommodate/ change their focal length

- (c) By wearing convex / biconvex lenses; accept converging lenses

**13. 1998 Q6 P1**

- (a) Phototaxis  
(b) To avoid desiccation/ drying/ dehydration  
Escape from predators;

**14. 1998 Q17 P1**

- (a) (i) Sensory neurone/sensory nerve cell; reject sensory nerve

(ii) Cell body on a branch/ at the side of axon/off the axon/cell body unipolar both axon and dendron are long.

(b) T- myelin sheath; Acc Neurilema

(c) Direction of impulse from receptor towards cell body.

**15. 1999 Q6 P1**

Ability to pollinate

Response to (tactic, nastic, tropic) Stimuli

Ability to exploit localized nutrients/ability to photosynthesize

Ability to disperse seeds/fruits-propagation

**16. 2000 Q6 P1**

Attachment of powerful back muscles that maintain posture flex the vertical column/ support viscera/ abdominal organs

**17. 2003 Q15 P1**

a) i) Thigmotropism / haptotropism

ii) Contact with support; causes migration of auxine to enter the side; causing faster growth on the side away from centre of surface (causing tendrils curl around support.)

b) Escape injurious stimuli / seek favorable habitats; move towards light / stimuli.

c) Induce foot growth in stem cutting

- Selective weed killers
- Encourage apical dominance
- Encourage sprouting of side branches
- Breaking seeds dormancy
- Induce parthenocarpy
- Promotes flowering
- Induce fruit fall
- Accelerates ripening of fruits.

**18. 2003 Q18 P1**

**Sclerotic layer** – (made up of collagen fibres thus) protects the eye maintains shape of eyeball.

**Cornea** - Allows light to enter the eye  
- Refracts light towards retina

**Conjunctive** - Protects cornea

**Eyelids** - Protects cornea from mechanical & chemical damage / protects eye from entry of foreign particles.

- protects retina from bright light (by reflex action)

**Choroids** – (Contains black pigment which) prevents reflection of light within the eye / absorbed light.

-Nourishes the eye / retina / supply oxygen / remove CO<sub>2</sub>

**Ciliary muscles** – Alter shape of lens during accommodation

- Ciliary body produces aqueous humour.

**Suspensory ligaments** – adjusts shape of lens during accommodation

**Lens** – Refracts light rays / focuses light on retina

Vitreous aqueous humour once.

**Aqueous Humour** – Nourishes cornea / lens

Refracts light

**Iris** – ( pigmented thus) – gives the eye its colour / absorbs light controls amount of light entering the eye / adjusts size of pupil impulses

**Pupil** – light enters the eyes through pupil

**Retina** – has photoreceptor cells / rods / cones / image formation; 1 generates impulses.

Fovea / yellow spot – visual acuity / most sensitive part of retina with only cones.

**Blind spot** – point where nerve fibre emerges from the optic nerve / where the Optic nerve leaves the eye / point where blood vessels & nerve fibres enter the eye.

**Optic nerve** – transmit impulses to brain.

19. 2004 Q6 P1

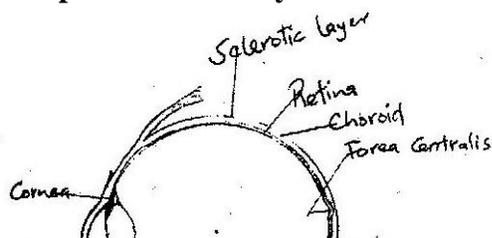
- a) Myopia/ short-sightedness / short sight
- b) Concave lens / divergent lenses; to diverge the rays so that the image is focused on the retina Acc. Concave.

20. 2005 Q1 P1

Maintain balance and posture of the body

21. 2005 Q19 P1

**Adaptations of the eye.**



The presence of:-

-The **sclerotic** layer which contains tough connective tissue fibres which helps it to support and protect the other parts of the eye ball.

-The **choroids** which contain many blood capillaries which supply oxygen and nutrients of the retina and removes metabolic wastes from eye.

-Its highly pigmented, to prevent reflection of light within the posterior chamber of the eye ball.

-The **retina** which contains photoreceptor cells called cones and rods. It is said to be the light sensitive part of the eye. Cones are adapted for light and colour vision while rods are adapted for dim light vision.

-The **vitreous humour**-Which is under pressure. It helps to maintain the shape of the posterior chamber of the eye ball. It also plays an important part in the refraction of light rays enabling them to be focused on the retina.

-**The cornea**, transparent and curved which helps to play an important role in focusing of the image on the retina. It accounts for the largest refraction of light rays.

-**The aqueous humour** –Contains oxygen and nutrients, which nourish the cornea and the lens. It is under pressure thus helping to maintain the shape of the anterior chambers of the eye. It also plays a part in the refraction of light rays enabling them to be focused on the retina.

-**The Iris is heavily** is heavily pigment, to prevent entry of light into the eye except through its central aperture called the pupil. It contains circular and radial muscles which constrict or dilate the pupil depending on the intensity of light.

-**The lens** is elastic, therefore allows changes in its shape depending on the tension exerted through the suspensory ligaments. This enables it to bring light rays causing from either near or far objects into sharp focus on the forea.

-The ciliary's body Contains the ciliary muscles whose contraction and relaxation alters the tension exerted on the suspensory ligaments.

This in turn alters the shape of the lens enabling it to focus for both near and distant objects.

-**The eyelids** which are movable and opaque structures can be closed through a reflex action to protect the eye from too much light or from foreign objects.

- **The eye muscles** help to move the eye ball within the orbit. The lateral rectus muscles move the eye up and down while the oblique muscles the eyeball in its up and down movement.

-**The lachrymal gland** which continuously secretes a watery, saline and antiseptic fluid called tears. The tears moisten the cornea and wash foreign particles out of the eye.

-**The eyelashes**, which are many hairs, protect the eye from the entry of small foreign particles.

-**The eyebrows** raised portion of the skin above the eye, thickly covered with hair, whose functions are to prevent sweat and dust from entering the eye.

22. **2006 Q10 P1**

Move towards favorable environment; accept converse

23. **2006 Q21 P1**

(a) X- motor neurone- accept of motor neurone rej. Axon alone

Y- Sense organ/ receptor

(b) Acetyl; chlorine/ noradrenaline ( Nerepinephrine)

24. **2006 Q22 P1**

(a) They contract and relax, to alter the shape of lens.

(b) **Rods**

Perceives light of low intensity

Not Sensitive to colour

Have low visual acuity

**Cones**

Perceives light of high intensity

Sensitive to colour

Have high visual acuity

25. **2006 Q23 P1**

(a) Ear Ossicle – transmits/ magnify/ amplify sound vibration.  
Rej. Sound waves

(b) Cochlea – converts sound vibrations into nerve impulse

(c) Semicircular canals- for body posture/ balance

(d) Eustachian tube- balances pressure in middle ear to that of outside.

26. **2007 Q22 P1**

- (a) In the central nervous system (spinal cord)
- (b) Motor neuron
  - (ii) P- Dendrites
  - Q- Axoplasm (Axon)
- (c) Insulates the axon

**27. 2007 Q7 P2**

The ear is an organ involved in perceiving sound and maintaining body balance and posture. It is made of the following sections

**Pinna** – That is funnel shaped structure made of skin and cartilage. It receives sound waves and directs them to the ear tube.

**External/auditory meatus** – That is a canal lined with air and wax. It allows passage of sound waves to the middle ear. The hairs and wax trap dust particles that enter the ear.

**Tympanic membrane** – That is a thin flexible sheet-like structure receives sound waves and pass the vibration to the ossicles.

**Middle ear that is composed of**

**Tiny bones known as ossicles** – They are anvil and incus. They amplify vibration from the tympanic membrane.

**Eustachian tube** – That connects the ear to the nasal cavity. It balances pressure on both sides of the tympanic membrane

**Oral window** – That is a thin flexible membrane that opens into the inner ear. it receives vibrations from the ossicles and passes them to the inner ear.

**Inner ear that is compost of;**

**Vestibular apparatus-** That are the semicircular canals, utricles and saccules. They help in maintenance of body balance and posture.

**Cochlea** – That is a coiled structure that has sensory cells for hearing. It connected to the auditory nerve that is involved in transmission of sounds to the brain

**28. 2008 Q13 P1**

- (a) Yellow spot/ cornea ( centralis)
- (b) Inverted; Real; reversed; diminished

**29. 2009 Q4 P2**

- (a) (i) Circular muscles of the iris contract (C/C) while radial muscles relax (R/R); reducing the size of the pupil; hence less light enters the eye
- (ii) The retina is protected from damage

(b)Choroid, has a dense network of blood capillary from which nutrients diffuse out to supply the eye

(c)The blind spot has no photoreceptors /rods and cones, hence no impulse are generated to be transmitted to the brain; ( for interpretation)

**30. 2010 Q6 P1**

(a) Maintain balance/posture/control/muscular movement

(b) Control heart beat/ blood pressure/ breathing(rate) control involuntary activities/ response

Accp. Curved examples of v.a e.g. eating, swallowing e.t.c.

**31. 2010 Q4 P2**

a) **X** – pupil

**Y** – circular muscules

b) i) Dimlight / low light intensity/ darkness/ dull light.

ii) Circular muscles in (iris) relax; while radial muscle contract; the pupil becomes bigger allowing more light to enter the eye.

iii) allow one to visualize/ see objects under dim light;

**32. 2011 Q28a P1**

(a) It is a growth movement in plants/parts in response to a unidirectional stimulus;

(b) Accelerates growth of shoots; Can inhibit growth of roots; (2 marks)

**33. 2011 Q4 P2**

(i) P. Cerebral hemisphere / cerebral cortex / cerebrum;

R. Medulla oblongata;

(ii) Muscular co-ordination; maintaining body balance / posture

Manual / Mortor dexterity;

\* Dexterity - skills and ease in hand use.

**34. 2011 Q8b P2**

- Light rays from a near object are more divergent; and need to bend more; ciliary muscles contract; suspensory ligament slanken; the lens becomes thicker / more

convex / increases in curvature / reduces focal length ; light from the near object is to be refracted more; in order to be focused sharply/ to form an image on the retina;

**35. 2012 Q9, 10 P1**

9. Reduces dehydration/desiccation; avoids predators; mark the first one
10. Ability of an organism to detect (interpret) and respond to changes in the environment/stimulus

**36. 2012 Q7 P2**

Simple reflex actions e.g withdrawal of finger from a hot or sharp object; Acc relevant example. An automatic response to a specific stimulus;when a finger touches a sharp/hot object,pain/ thermoreceptor in the skin are stimulated and trigger off a nerve impulse;The nerve impulse is transmitted via the sensory neuron,to the CNS/brain/grey matter of the spinal cord;The impulse is then transmitted via a synapse;to the relay neuron; and then through another synapse to the motor neuron;The impulse is then transmitted to the effector muscles in the hand,The effector/biceps muscles contract;and the finger is withdrawn from the hot/sharp object.

Conditional reflex actions- Conditional reflex actions e.g salivation of a dog/humans/students in response to sound; Acc other relevant example.It is an automatic response evoked from an animal by unrelated stimulus;substituted for the one which normally elicits the response. It develops from past experience;and involves modification of behavior/learning;it weakens with time;and must be reinforced by repeating the related original/primary stimulus;dogs/students salivate when the bell for meals rings because they have learned to associate the ringing of the bell at meal time with food;every time it rings,they are offered food