ANSWER KEY
NEET
Part Test-05 (XI)

PHYSICS

Q.1 (3)	**Q.2** (3)	**Q.3** (1)	**Q.4** (1)	**Q.5** (4)	**Q.6** (1)	**Q.7** (1)	**Q.8** (3)	**Q.9** (3)	**Q.10** (2)
Q.11 (3)	**Q.12** (4)	**Q.13** (3)	**Q.14** (4)	**Q.15** (2)	**Q.16** (3)	**Q.17** (3)	**Q.18** (1)	**Q.19** (2)	**Q.20** (2)
Q.21 (1)	**Q.22** (3)	**Q.23** (4)	**Q.24** (4)	**Q.25** (3)	**Q.26** (4)	**Q.27** (2)	**Q.28** (1)	**Q.29** (4)	**Q.30** (3)
Q.31 (4)	**Q.32** (2)	**Q.33** (4)	**Q.34** (1)	**Q.35** (2)	**Q.36** (1)	**Q.37** (4)	**Q.38** (3)	**Q.39** (2)	**Q.40** (1)
Q.41 (3)	**Q.42** (2)	**Q.43** (3)	**Q.44** (4)	**Q.45** (3)	**Q.46** (1)	**Q.47** (3)	**Q.48** (2)	**Q.49** (3)	**Q.50** (1)

CHEMISTRY

Q.51 (1)	**Q.52** (3)	**Q.53** (3)	**Q.54** (2)	**Q.55** (3)	**Q.56** (2)	**Q.57** (2)	**Q.58** (1)	**Q.59** (3)	**Q.60** (2)
Q.61 (3)	**Q.62** (4)	**Q.63** (3)	**Q.64** (4)	**Q.65** (2)	**Q.66** (2)	**Q.67** (1)	**Q.68** (4)	**Q.69** (1)	**Q.70** (3)
Q.71 (4)	**Q.72** (2)	**Q.73** (4)	**Q.74** (4)	**Q.75** (2)	**Q.76** (2)	**Q.77** (1)	**Q.78** (4)	**Q.79** (4)	**Q.80** (1)
Q.81 (2)	**Q.82** (1)	**Q.83** (1)	**Q.84** (3)	**Q.85** (4)	**Q.86** (4)	**Q.87** (2)	**Q.88** (2)	**Q.89** (4)	**Q.90** (4)
Q.91 (3)	**Q.92** (4)	**Q.93** (1)	**Q.94** (1)	**Q.95** (1)	**Q.96** (2)	**Q.97** (3)	**Q.98** (4)	**Q.99** (1)	**Q.100** (4)

BIOLOGY

Q.101 (2)	**Q.102** (3)	**Q.103** (1)	**Q.104** (3)	**Q.105** (1)	**Q.106** (4)	**Q.107** (3)	**Q.108** (3)	**Q.109** (1)	**Q.110** (4)
Q.111 (4)	**Q.112** (3)	**Q.113** (2)	**Q.114** (2)	**Q.115** (4)	**Q.116** (2)	**Q.117** (2)	**Q.118** (2)	**Q.119** (1)	**Q.120** (1)
Q.121 (1)	**Q.122** (3)	**Q.123** (1)	**Q.124** (4)	**Q.125** (1)	**Q.126** (1)	**Q.127** (1)	**Q.128** (2)	**Q.129** (1)	**Q.130** (1)
Q.131 (1)	**Q.132** (4)	**Q.133** (2)	**Q.134** (4)	**Q.135** (1)	**Q.136** (2)	**Q.137** (2)	**Q.138** (3)	**Q.139** (4)	**Q.140** (4)
Q.141 (1)	**Q.142** (1)	**Q.143** (1)	**Q.144** (1)	**Q.145** (3)	**Q.146** (1)	**Q.147** (3)	**Q.148** (4)	**Q.149** (3)	**Q.150** (1)
Q.151 (1)	**Q.152** (3)	**Q.153** (3)	**Q.154** (3)	**Q.155** (3)	**Q.156** (4)	**Q.157** (1)	**Q.158** (3)	**Q.159** (3)	**Q.160** (2)
Q.161 (3)	**Q.162** (1)	**Q.163** (4)	**Q.164** (2)	**Q.165** (1)	**Q.166** (3)	**Q.167** (4)	**Q.168** (4)	**Q.169** (4)	**Q.170** (4)
Q.171 (4)	**Q.172** (1)	**Q.173** (1)	**Q.174** (4)	**Q.175** (4)	**Q.176** (2)	**Q.177** (3)	**Q.178** (4)	**Q.179** (3)	**Q.180** (1)
Q.181 (4)	**Q.182** (2)	**Q.183** (3)	**Q.184** (2)	**Q.185** (1)	**Q.186** (1)	**Q.187** (1)	**Q.188** (2)	**Q.189** (2)	**Q.190** (3)
Q.191 (3)	**Q.192** (1)	**Q.193** (4)	**Q.194** (3)	**Q.195** (1)	**Q.196** (1)	**Q.197** (2)	**Q.198** (2)	**Q.199** (4)	**Q.200** (4)

SOLUTIONS

PHYSICS

Q.1 (3)

Relation between velocity and displacement is

$$V = \omega\sqrt{A^2 - X^2}$$

$$\Rightarrow \frac{V^2}{\omega^2} = A^2 - X^2$$

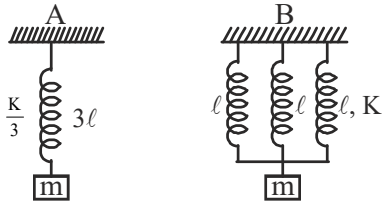
$$\Rightarrow \frac{V^2}{\omega^2} + X^2 = A^2$$

$$\Rightarrow \frac{V^2}{(A\omega)^2} + \frac{X^2}{A^2} = 1$$

G raph will be ellipse

Q.2 (3)

$$\text{Spring constant , } K \propto \frac{1}{\text{length of spring}}$$



From combination of spring

$K_B = 3K$ (parallel)

$$\text{Time period} = 2\pi\sqrt{\frac{M}{K}}$$

$$\Rightarrow \frac{T_A}{T_B} = \sqrt{\frac{K_B}{K_A}} = \sqrt{\frac{3K}{\frac{K}{3}}} \quad \Rightarrow \frac{T_A}{T_B} = 3$$

Q.3 (1)

Kinetic energy,

$$KE = \frac{1}{2} \times \text{Total energy(T.E)}$$

Also, $KE + PE = TE$

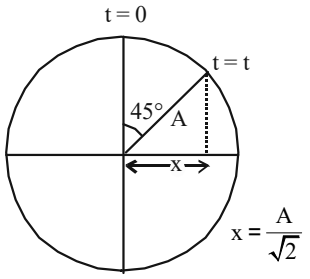
$$\Rightarrow PE = TE - KE = TE - \frac{TE}{2} = \frac{TE}{2}$$

$$\Rightarrow PE = \frac{1}{2}KX^2 = \frac{1}{2}\left(\frac{1}{2}KA^2\right)$$

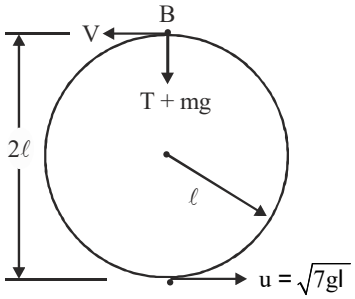
$$\Rightarrow X^2 = \frac{A^2}{2} \Rightarrow X = \frac{A}{\sqrt{2}}$$

Time taken to cover $45° = \frac{T}{2\pi} \times \frac{\pi}{4}$

$\Rightarrow \Delta t = \frac{T}{8} = 1s$



Q.4 (1)



Applying energy conservation between A and B

$$\frac{1}{2}mu^2 + O = \frac{1}{2}mv^2 + mg(2\ell)$$

$\Rightarrow u^2 = v^2 + 2g(2\ell) \Rightarrow 7g\ell = v^2 + 4g\ell$

$v^2 = 3g\ell$

Applying Newton's second law at heightest point,

$$T + mg = \frac{mv^2}{\ell} = \frac{m3g\ell}{\ell} = 3mg \Rightarrow T = 2mg$$

Q.5 (4)

Potential energy, $PE = \frac{1}{2}kx^2$

where x= displacement from mean position

Total energy, $TE = \frac{1}{2}kA^2$

where A = amplitude

Given, $\frac{1}{2}kA^2 = 80$

To find PE at $x = \frac{3A}{4}$

$$\Rightarrow U = \frac{1}{2}kx^2 = \frac{1}{2}k\left(\frac{3A}{4}\right)^2$$

$$\Rightarrow U = \frac{1}{2}kA^2\left(\frac{9}{16}\right) = 80 \times \frac{9}{16}$$

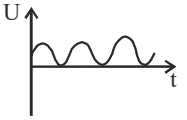
$\Rightarrow U = 45\ J$

Q.6 (1)

$X = A \sin \omega t$

$$U = \frac{1}{2}KX^2$$

$$= \frac{1}{2}A^2 \sin^2 \omega t$$



Q.7 (1)

$v = \pm\ \omega\sqrt{A^2 - x^2}$

$a = \pm\ \omega^2 x$

at $x = 0$, $v = v_{max}$ and $a = 1$

Q.8 (3)

Q.9 (3)

$T.E. = (PE)_{min} + (K.E.)_{max}$

$9 = 5 + (K.E.)_{max}$

$(K.E.)_{max} = 4J$

This is KE at mean position

Q.10 (2)

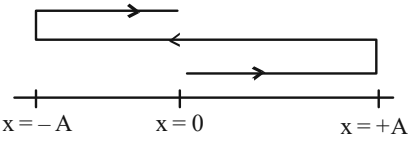
$$\frac{T+1}{T} = \sqrt{\frac{m+2}{m}}$$

$$\Rightarrow \frac{2+1}{2} = \sqrt{\frac{m+2}{m}} \Rightarrow 9m = 4m + 8 \Rightarrow m = 1.6kg$$

Q.11 (3)

$$a = -\omega^2 x = -\left(\frac{2\pi}{4}\right)^2 \times (-2)\ ;\ a = \frac{\pi^2}{2}$$

Q.12 (4)



Distance covered in one cycle = 4A

Q.13 (3)

$$\text{Potential energy} = \frac{-GmM}{r}$$

$$\text{Total energy} = \frac{-GmM}{2r}$$

$$\text{Kinetic energy} = \frac{GmM}{2r}$$

$$\text{Potential energy at } \infty = \frac{-GmM}{\infty} = \text{zero}$$

Q.14 (4)

Time period, $T = 2\pi\sqrt{\frac{\ell}{g_{eff}}}$

when lift is at rest, $g_{eff} = g$

when lift accelerate up, $g_{eff} = g + a$

$$\Rightarrow \frac{T_{New}}{T_{Old}} = \sqrt{\frac{g}{g+a}} = \sqrt{\frac{g}{g+3g}} = \frac{1}{2} \Rightarrow T_{New} = \frac{T}{2}$$

Q.15 (2)

At t = 4 s, a = 0 and $a = -\omega^2 x$

where x = displacement $\Rightarrow$ x = 0 at t = 4 s

Speed in maximum at mean position, x = 0

$\Rightarrow V_{max}$ at t = 0, 2 and 4 s

Q.16 (3)

Total energy of a particle executing SHM is constant.

Q.17 (3)

General equation of stationary wave is :

$y = 2A \sin(kx + \phi_1) \cos(\omega t + \phi_2)$

Given equation of progressive wave is :

$y = A \sin(kx - \omega t + \phi)$

General equation of SHM is :

$y = A \sin(\omega t + \phi)$

Q.18 (1)

Frequency, $f = \frac{\text{wave velocity}}{\text{wave length}} = \frac{v}{\lambda}$

wave velocity $= \sqrt{\frac{T}{\mu}} \Rightarrow f = \frac{1}{\lambda}\sqrt{\frac{T}{\mu}} \Rightarrow f^2 \propto T$

Q.19 (2)

$$v = \sqrt{\frac{T}{\rho A}}$$

$$\frac{\Delta v}{v} \times 100 = \frac{1}{2}\frac{\Delta A}{A} = \frac{1}{2} \times 4 = 2\%$$

Q.20 (2)

Frequency subjected to 5 segments,

$$n_5 = \frac{5V}{2L} = 480\,Hz$$

Frequency subjected to 2 segments,

$$n_2 = \frac{2V}{2L} = 2 \times \frac{480}{5} - - = 192Hz$$

Q.21 (1)

$$\upsilon = \sqrt{2gx}$$

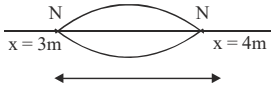
$$\therefore \frac{\upsilon_B}{\upsilon_A} = \sqrt{\frac{2g(3\ell/4)}{2g(\ell/4)}} = \sqrt{3}$$

$$\upsilon_B = \sqrt{3}\upsilon_A$$

Q.22 (3)

$$\frac{I_1}{I_2} = \frac{\omega_1^2 A_1^2}{\omega_2^2 A_2^2} = \frac{\upsilon_1^2 A_1^2}{\upsilon_2^2 A_2^2} = \frac{1 \times 25}{4 \times 4} = \frac{25}{16}$$

Q.23 (4)



So , x = 3m +1 = 4m

distance between N – N

$$\frac{\lambda}{2} = \frac{2}{2} = 1m$$

Q.24 (4)

For same phase, path difference is integral multiple of wavelength, here it is λ.

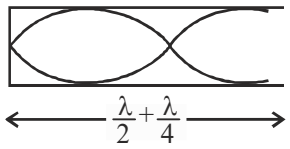
Q.25 (3)

Mechanical transverse waves can propagate through solids as solids have shear modulus of rigidity.

Q.26 (4)

For closed pipe

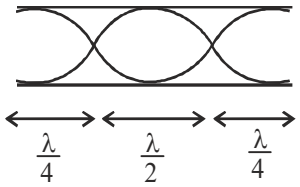
I[st] over tone



$$L_1 = \frac{\lambda}{2} + \frac{\lambda}{4} = \frac{3\lambda}{4}$$

For open pipe

I[st] over tone



$$L_2 = \frac{\lambda}{4} + \frac{\lambda}{2} + \frac{\lambda}{4} = \lambda \Rightarrow \frac{L_1}{L_2} = \frac{3}{4}$$

Q.27 (2)

Velocity of sound in gas medium $= \sqrt{\frac{\gamma RT}{M}}$

Where M = molar mass, γ = adiabatic constant

Molar mass of O_2 =32 gram

Molar mass of He =4 gram

$$\gamma(\text{monoatomic}) = \frac{5}{3}$$

$\gamma(\text{diatomic}) = \frac{7}{5}$

$$\frac{V(He)}{V(O_2)} = \sqrt{\frac{\gamma_{He}}{M_{He}}\frac{M_{O_2}}{\gamma_{O_2}}} = \sqrt{\frac{5}{3}\times\frac{5}{7}\times\frac{32}{4}}$$

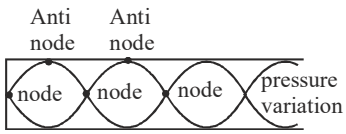
$$\Rightarrow V(He) = 460\times\sqrt{\frac{25}{21}\times 8} = 460\times\sqrt{9.5} = 1418\ \text{m/s}$$

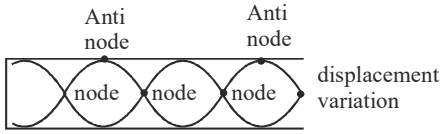
Q.28 (1)

$N_C = (2M+1)n_c$
$= (2\times5+1)\times100$
$N_C = 1100\text{Hz}$

Q.29 (4)

Closed organ pipe at 3rd overtime





No. of nodes = 4
No. of antinodes = 4

Q.30 (3)

$\omega_1 = 316\pi = 2\pi f_1$
$\Rightarrow f_1 = 158\ \text{Hz}$
$\omega_2 = 310\pi = 2\pi f_2$
$\Rightarrow f_2 = 155\ \text{Hz}$
Beat frequency, $f_1 - f_2 = f_{beat}$
$f_{beat} = 158 - 155 = 3\text{Hz}$

Q.31 (4)

Number of betas per second

$$= \frac{v}{\lambda_1} - \frac{v}{\lambda_2} = 330\left(\frac{1}{5} - \frac{1}{5.5}\right) = 66 - 60 = 6$$

Q.32 (2)

Light wave – tramsverse ;
sound wave – longitudinal

Q.33 (4)

$f \propto \frac{1}{\ell} \Rightarrow f\ell = \text{constant}$
$f_1\ell_1 = f_2\ell_2$
$(n+5)(l) = (n-5)(1.05)$
$n+5 = 1.05\,n - 5.25$
$0.05n = 10.25$
$n = 205\ \text{Hz}$

Q.34 (1)

Both longitudinal and transverse waves can be produced on water surface while inside liquid only longitudinal waves will be produced.
Due to change in temperature of medium, velocity of sound wave changes as a result wavelengths changes.

Q.35 (2)

In liquid and gas, only mechanical longitudinal waves can be produced

Q.36 (1)

Time period is independent of mass of the bob.

$T \propto \sqrt{L}$

If length is made four times, the time period will be doubled.

Q.37 (4)

From graph
$A\omega = 10$ .... (i)
$A = 2.5$ ....(ii)
from (i) & (ii)

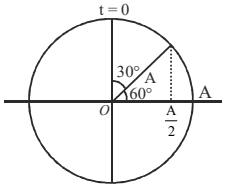
$$\omega = 4 = \frac{2\pi}{T} \Rightarrow T = \frac{\pi}{2} = 1.57$$

$a_{max} = \omega^2 A = 16\times2.5 = 40\ \text{cm/sec}$

$$v = \omega\sqrt{A^2 - x^2}$$

$$= 4\sqrt{\left(\frac{5}{2}\right) - (1)^2} = 4\sqrt{\frac{25-4}{4}} = 2\sqrt{21}\ \text{cm/sec}$$

Q.38 (3)



From phasor diagram

$$\Delta\theta = 30° = \omega\Delta t$$

$$\Rightarrow \Delta t = \frac{\Delta\theta}{\omega} = 3\text{s}$$

for $\Delta\theta = 60° = \omega\Delta t$

$$\Rightarrow \Delta t = \frac{\Delta\theta}{\omega} = \frac{60°}{\omega} = 6\text{s}$$

Q.39 (2)

$a = \omega^2 x$

$$\omega^2 = \frac{a}{x} = \frac{8}{2} = 4$$

$\omega = 2\ \text{rad/s}$

$$T = \frac{2\pi}{\omega} = \frac{2\pi}{2} = \pi\text{s}$$

Q.40 (1)

Time period, $T = 4s = \frac{2\pi}{\omega}$

$\Rightarrow \omega = \frac{2\pi}{4} = \frac{\pi}{2}$ rad / s

From graph, amplitude = 8 cm

Q.41 (3)

$\frac{d^2x}{dt^2} + \frac{320}{4}x = 0 \Rightarrow \frac{d^2x}{dt^2} + 80x = 0$

so $\omega^2 = 80 \quad \Rightarrow \omega = \sqrt{80} = 2\sqrt{5}$

$T = \frac{2\pi}{\omega} = \frac{2\pi}{4\sqrt{5}} = \frac{\pi}{2\sqrt{5}}S$

Q.42 (2)

acceleration, $a = -\omega^2 x$

$V = \omega\sqrt{A^2 - X^2}$

For V_{max}, $X = 0 \quad \Rightarrow V_{max} = \omega A$

$a_{max} = \omega^2 A = \omega(\omega A) \Rightarrow a_{max} = \omega V_{max}$

Q.43 (3)

v = 1080 m/s

frequency $n = \frac{1800}{30} = 60$ Hz

Now wavelength $\lambda = \frac{v}{n} = \frac{1080}{60} = 18m$

Q.44 (4)

Sound level = $10 \log \frac{I}{I_0}$

(dB)

$90 = 10 \log \frac{I_1}{I_0} \Rightarrow I_1 = 10^9 I_0$

$40 = 10 \log \frac{I_2}{I_0} \Rightarrow I_2 = 10^4 I_0$

$\frac{I_1}{I_2} = 10^5$

Q.45 (3)

Harmonic = (overtone + 1)

= 2 + 1 = 3rd harmonic

3rd harmonic = 324 Hz

$\frac{3v}{2\ell} = 324$

$v = \frac{324 \times 0.9 \times 2}{3}$

v = 194.4 m/s

Q.46 (1)

$y = 4 \sin\left(\frac{2\pi t}{0.2} - \frac{2\pi x}{100}\right)$

$\therefore \omega = \frac{2\pi}{0.02}, k = \frac{2\pi}{100}$

$v = \frac{\omega}{k} = \frac{2\pi / 0.02}{2\pi / 100} = \frac{100}{0.02}$

v = 5000 cm/s = 50 m/s

$\therefore \omega = \frac{2\pi}{0.02}$

$2\pi n = \frac{2\pi}{0.02}$

$n = \frac{100}{2} = 50$Hz

Q.47 (3)

Let frequency of A, $n < 256$

$\Rightarrow (256 - n)\,2 = 262 - n$

$\Rightarrow n = 512 - 262 = 250$Hz

Q.48 (2)

$f = \frac{(2n-1)v}{4I}$

$f = (2n-1)f_0$

The frequencies produced by it will be odd integral multiple of fundamental frequency.

Q.49 (3)

First overtone of c.o.p.

= first overtone of o.o.p.

$\frac{3v}{4\ell_1} = \frac{2v}{2\ell_2}$

$\frac{3}{4\ell_1} = \frac{1}{\ell_2}$

$\frac{3}{4} = \frac{\ell_1}{\ell_2}$

Q.50 (1)

Time interval between two maximum or two minimum intensities is $\left(\frac{1}{n_2 - n_1}\right)$, so time interval between maximum and minimum intensity is.

$t = \frac{1}{2(n_1 - n_2)} = \frac{1}{2 \times 4} = \frac{1}{8}s$

CHEMISTRY

Q.51 (1)
Mg^{2+}, $Na^{+} \rightarrow 10\ e^{-}$.

Q.52 (3)
$N_2O \rightarrow$ Neutral
$As_2O_3 \rightarrow$ Amphoteric
$K_2O \rightarrow$ Basic
$SO_2 \rightarrow$ Acidic

Q.53 (3)
Vanadium is transition element.

Q.54 (2)
Sulphur has greater atomic radius than Cl due to less effective nuclear charge in sulphur.

Q.55 (3)
Electron gain enthalpy $\rightarrow$ S > Se > O

Q.56 (2)
Ga is known as eka-aluminium.

Q.57 (2)
Li shows diagonal relationship with Mg.

Q.58 (1)
Alkali metal $\rightarrow ns^1$
Alkaline earth metal $\rightarrow ns^2$
Halogens $\rightarrow ns^2np^5$
Chalcogens $\rightarrow ns^2np^4$

Q.59 (3)
f-block configuration $\rightarrow$
$(n-2)f^{1-14}\ (n-1)d^{0-1}\ ns^2$

Q.60 (2)
107 $\rightarrow$ Bohrium
102 $\rightarrow$ Nobelium
104 $\rightarrow$ Rutherfordium
105 $\rightarrow$ Dubnium

Q.61 (3)
In and Bi both are p-block elements and representative elements.

Q.62 (4)
$$\text{Ionic radii} \propto \frac{\ominus \text{charge}}{\oplus \text{charge}}$$

Q.63 (3)
When we move top to bottom in the group, metallic character increases. When we move left to right in periodic table metallic character decreases.

Q.64 (4)
Group-16 elements are known as chalcogens.

Q.65 (2)
Acidic strength $\propto \oplus$oxidation state.

Q.66 (2)
$1s^2, 2s^2 2p^6, 3s^1 \rightarrow$ Na
$1s^2, 2s^2 2p^6, 3s^2 3p^5 \rightarrow$ Cl
$1s^2, 2s^2 2p^6, 3s^2 3p^3 \rightarrow$ P
$1s^2, 2s^2 2p^6, 3s^2 \rightarrow$ Mg
Atomic radius $\rightarrow$ Na > Mg > P > Cl

Q.67 (1)
H–E–H bond angle order $\rightarrow$
$NH_3 > PH_3 > AsH_3 > SbH_3$

Q.68 (4)
(IV) $\rightarrow$ F
(III) $\rightarrow$ Cs

Q.69 (1)
Atomic radius $\rightarrow$ N > F

Q.70 (3)
Al oxidation state = +3
Covalency = +6

Q.71 (4)
Facts

Q.72 (2)
Density, In = 7.31 g/cm^3
Ga = 5.90 g/cm^3
Melting point, Tl = 576 K
Al = 933 K

Q.73 (4)
$GeO_2 \rightarrow$ Amphoteric oxide
$\Delta_f H^\circ$, Graphite = 0
$\Delta_f H^\circ$, Diamond = 1.90 kJ/mol
$\Delta_f H^\circ$, Fullerene = 38.1 kJ/mol
B^{10} isotope has high ability to absorb neutron

Q.74 (4)
Nihonium is a radio active element.

Q.75 (2)
Ga^{3+} is more stable than Ga^{+1} that's why it behave as reducing agent.

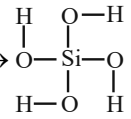
Q.76 (2)
SnO is amphoteric oxide.

Q.77 (1)
PbF_4 ionic in nature.

Q.78 (4)
NCl_5, PH_5, $SiCl^{-2}_6$ does not exist

Q.79 (4)
Tl is more stable in Tl^{+1} oxidation state.

Q.80 (1)
In CCl_4, carbon does not have vacant d-orbitals.

Silicic acid $\rightarrow$ 

Q.81 (2)
SnF_4 and PbF_4 ionic in nature.

Q.82 (1)
Stability of+1 oxidation state increases due to inert pair effect.
So, stability order is:
AI < Ga < In < Tl.

Q.83 (1)
Sn $\rightarrow$ Lowest M.P. in group-14
Pb $\rightarrow$ Highest density amongst group-14 element
Si $\rightarrow$ Highest electrical resistivity

Q.84 (3)
$[SiF_6]^{2-}$ exist

Q.85 (4)
PbF_4 ionic in nature.
$SiCl_4$ easily hydrolysed.
GeX_4 is more stable than GeX_2.

Q.86 (4)
Facts

Q.87 (2)
Z = 105 $\rightarrow$ UnP
(Dubnium)

Q.88 (2)
Chlorine has highest electron affinity.
Cl belongs to group 17, period 3.

Q.89 (4)
$[Kr]5s^2 4d^{10} 5p^2$ belongs to 5^{th} period and 14^{th} group.

Q.90 (4)
I.E. $\rightarrow$ Li < B < Be < C < O < N

Q.91 (3)
Noble gas is less reactive, so e^- addition is endothermic process and due to small size of oxygen, O^{2-} formation is endothermic.

Q.92 (4)
Facts

Q.93 (1)

Q.94 (1)
When we move left to right metallic character decreases.

Q.95 (1)
Graphite is thermodynamically most stable allotrope of carbon.

Q.96 (2)
Kernite $\rightarrow Na_2B_4O_7.4H_2O$

Q.97 (3)
When we move top to bottom in p-block elements, stability of lower oxidation state increases due to inert pair effect.

Q.98 (4)
Facts

Q.99 (1)
Ga is more stable in Ga^{+3}, so Ga^{+} can act as reducing agent.

Q.100 (4)
Facts

BIOLOGY

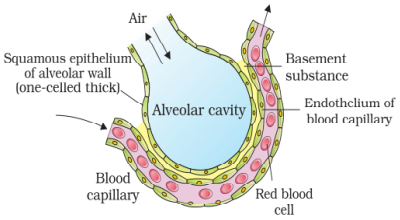
Q.101 (2)
Respiration involves the following steps: (i) Breathing or pulmonary ventilation by which atmospheric air is drawn in and CO_2 rich alveolar air is released out. (ii) Diffusion of gases (O_2 and CO_2) across alveolar membrane. (iii) Transport of gases by the blood. (iv) Diffusion of O_2 and CO_2 between blood and tissues. (v) Utilisation of O_2 by the cells for catabolic reactions and resultant release of CO_2

Q.102 (3)
Blood is the medium of transport for O_2 and CO_2 . About 97 per cent of O_2 is transported by RBCs in the blood. The remaining 3 per cent of O_2 is carried in a dissolved state through the plasma. Nearly 20-25 per cent of CO_2 is transported by RBCs whereas 70 per cent of it is carried as bicarbonate. About 7 per cent of CO_2 is carried in a dissolved state through plasma.

Q.103 (1)
When pCO_2 is high and pO_2 is low as in the tissues, more binding of carbon dioxide occurs

Q.104 (3)
The tracheae, primary, secondary and tertiary bronchi, and initial bronchioles are supported by incomplete cartilaginous rings.

Q.105 (1)



Q.106 (4)
Lower invertebrates like sponges, coelenterates, flatworms, etc., exchange O_2 with CO_2 by simple diffusion over their entire body surface. Earthworms use their moist cuticle and insects have a network of tubes (tracheal tubes) to transport atmospheric air within the body.
Special vascularised structures called gills are used by most of the aquatic arthropods and molluscs whereas vascularised bags called lungs are used by the terrestrial forms for the exchange of gases. Among vertebrates, fishes use gills

Q.107 (3)
Coronary Artery Disease (CAD): Coronary Artery Disease, often referred to as atherosclerosis, affects the vessels that supply blood to the heart muscle. It is caused by deposits of calcium, fat, cholesterol and fibrous tissues, which makes the lumen of arteries narrower.
Angina: It is also called 'angina pectoris'. A symptom of acute chest pain appears when no enough oxygen is reaching the heart muscle.
Heart Failure: Heart failure means the state of heart when it is not pumping blood effectively enough to meet the needs of the body. Heart failure is not the same as cardiac arrest (when the heart stops beating) or a heart attack (when the heart muscle is suddenly damaged by an inadequate blood supply).

Q.108 (3)
Fats are absorbed through lymph in the lacteals present in the intestinal villi.

Q.109 (1)

The P-wave represents the electrical excitation (or depolarisation) of the atria, which leads to the contraction of both the atria.

The QRS complex represents the depolarisation of the ventricles, which initiates the ventricular contraction. The contraction starts shortly after Q and marks the beginning of the systole. The T-wave represents the return of the ventricles from excited to normal state (repolarisation). The end of the T-wave marks the end of systole.

Q.110 (4)

Nearly 20-25 per cent of CO_2 is transported by RBCs whereas 70 per cent of it is carried as bicarbonate.

About 7 per cent of CO_2 is carried in a dissolved state through plasma

Q.111 (4)

Fibrinogens are needed for clotting or coagulation of blood. Globulins primarly are involved in defense mechanisms of the body and the albumins help in osmotic balance.

Q.112 (3)

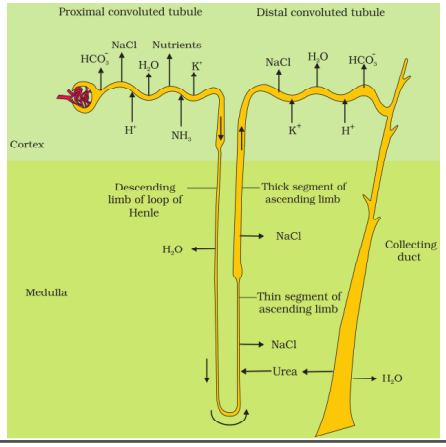
The blood pumped by the right ventricle enters the pulmonary artery, whereas the left ventricle pumps blood into the aorta.

The deoxygenated blood pumped into the pulmonary artery is passed on to the lungs from where the oxygenated blood is carried by the pulmonary veins into the left atrium. This pathway constitutes the pulmonary circulation.

Q.113 (2)

Antennal glands or green glands perform the excretory function in crustaceans like prawns.

Q.114 (2)

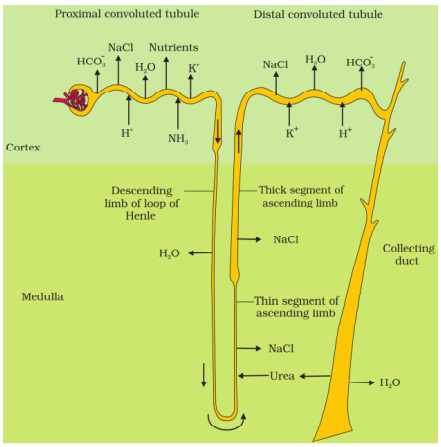


Q.115 (4)

The CNS passes on motor messagesto initiate the contraction of smooth muscles of the bladder and Simultaneous relaxation of the urethral sphincter causing the release of urine.

The process of release of urine is called micturition and the neural Mechanisms causing it is called the micturition reflex.

Q.116 (2)



Q.117 (2)

Sweat produced by the sweat glands is a watery fluid containing NaCl, small amounts of urea, lactic acid, etc.

Though the primary function of sweat is to facilitate a cooling effect on the body surface, it also helps in the removal of some of the wastes mentioned above.

Q.118 (2)

The epithelial cells of Bowman's capsule called podocytes are arranged in an intricate manner so as to leave some minute spaces called filtration slits or slit pores.

Q.119 (1)

Renal calculi: Stone or insoluble mass of crystallised salts (oxalates,Etc.) formed within the kidney

Glomerulonephritis: Inflammation of glomeruli of kidney

Osteoporosis: Age-related disorder characterised by decreased bone mass And increased chances of fractures. Decreased levels of estrogen is a Common cause.

Gout: Inflammation of joints due to accumulation of uric acid crystals.

Q.120 (1)
Synovial joints are characterised by the presence of a fluid filled synovial cavity between the articulating surfaces of the two bones. Such an arragement allows considerable movement.
These joints help in locomotion and many other movements. Ball and socket joint (between humerus and pectoral girdle), hinge joint (knee joint), pivot joint (between atlas and axis), gliding joint (between the carpals) and saddle joint (between carpal and metacarpal of thumb) are some examples.

Q.121 (1)
In the resting state a subunit of troponin masks the active binding sites for myosin on the actin filaments.

An actin (thin) filament

Q.122 (3)
Each myosin (thick) filament is also a polymerised protein. Many monomeric proteins called Meromyosins constitute one thick filament.
Each meromyosin has two important parts, a globular head with a short arm and a tail, the former being called the heavy meromyosin (HMM) and the latter, the light meromyosin (LMM).

Q.123 (1)
Scapula is a large triangular flat bone situated in the dorsal part of the thorax between the second and the seventh ribs.

Q.124 (4)
The PNS is divided into two divisions called somatic neural system and autonomic neural system.
The somatic neural system relays impulses from the CNS to skeletal muscles while the autonomic neural system transmits impulses from the CNS to the involuntary organs and smooth muscles of the body.

Q.125 (1)
Embryonic stage :unipolar neuron
Retina :bipolar neuron
Hydra :apolar neuron

Q.126 (1)
Unmyelinated nerve fibre is enclosed by a Schwann cell that does not form a myelin sheath around the axon, and is commonly found in autonomous and the somatic neural systems.

Q.127 (1)
The PNS is divided into two divisions called somatic neural system and autonomic neural system.

Q.128 (2)
The afferent nerve fibres transmit impulses from tissues/organs to the CNS and the efferent fibres transmit regulatory impulses from the CNS to the concerned peripheral tissues/ organs.

Q.129 (1)
A deep cleft divides the cerebrum longitudinally into two halves, which are termed as the left and right cerebral hemispheres. The hemispheres are connected by a tract of nerve fibres called corpus callosum.

Q.130 (1)
The axoplasm inside the axon contains high concentration of K^+ and negatively charged proteins and low concentration of Na^+ .
In contrast, the fluid outside the axon contains a low concentration of K^+ , a high concentration of Na^+ and thus form a concentration gradient.

Q.131 (1)
The posterior pituitary is under the direct neural regulation of the hypothalamus.

Q.132 (4)
Bone marrow is the site for production of T lymphocyte.

Q.133 (2)
Neurohypophysis (pars nervosa) also known as posterior pituitary, stores and releases two hormones called oxytocin and vasopressin.

Q.134 (4)
Hormones which interact with membrane-bound receptors normally do not enter the target cell, but generate second messengers (e.g., cyclic AMP, IP_3, Ca^{+2} etc).

Q.135 (1)
Prolactin regulates the growth of the mammary glands and formation of milk in them.
FSH stimulates growth and development of the ovarian follicles in females.

Q.136 (2)
Inspiration can occur if the pressure within the lungs (intra-pulmonary pressure) is less than the atmospheric pressure, i.e., there is a negative pressure in the lungs with respect to atmospheric pressure.

Q.137 (2)
Smoking increases carbon monoxide (CO) content in blood and reduces the concentration of haembound oxygen. This causes oxygen deficiency in the body.

Q.138 (3)
Expiratory Capacity (EC): Total volume of air a person can expire after a normal inspiration.
Functional Residual Capacity (FRC): Volume of air that will remain in the lungs after a normal expiration.
Vital Capacity (VC): The maximum volume of air a person can breathe in after a forced expiration.
Total Lung Capacity: Total volume of air accommodated in the lungs at the end of a forced inspiration.

Q.139 (4)
Open circulatory system is present in arthropods and molluscs in which blood pumped by the heart passes through large vessels into open spaces or body cavities called sinuses.
Annelids and chordates have a closed circulatory system in which the blood pumped by the heart is always circulated through a closed network of blood vessels.

Q.140 (4)
The first heart sound (lub) is associated with the closure of the tricuspid and bicuspid valves whereas the second heart sound (dub) is associated with the closure of the semilunar valves.

Q.141 (1)
The proximity between the Henle's loop And vasa recta, as well as the counter current in them help in maintaining An increasing osmolarity towards the inner medullary interstitium, i.e., From 300 $mOsmolL^{-1}$ in the cortex to about 1200 $mOsmolL^{-1}$ in the inner medulla. Human kidneys can produce urine nearly four times concentrated than the initial filtrate formed.

Q.142 (1)
The JGA plays a complex regulatory role. A fall in glomerular blood Flow/ glomerular blood pressure/GFR can activate the JG cells to release Renin which converts angiotensinogen in blood to angiotensin I and Further to angiotensin II.

Q.143 (1)
Cells of the human body exhibit three main types of movements, namely, amoeboid, ciliary and muscular.

Q.144 (1)
Each actin (thin) filament is made of two 'F' (filamentous) actins helically wound to each other
Each myosin (thick) filament is also a polymerised protein.

Q.145 (3)
The globular head of myosin is an active ATPase enzyme and has binding sites for ATP and active sites for actin.

Q.146 (1)
Association areas are responsible for complex functions like intersensory associations, memory and communication.

Q.147 (3)
The skull, the brain is covered by cranial meninges consisting of an outer layer called dura mater, a very thin middle layer called arachnoid and an inner layer (which is in contact with the brain tissue) called pia mater.

Q.148 (4)
The two main types of cells in the Islet of Langerhans are called α-cells and β-cells. The α-cells secrete a hormone called glucagon, while the β-cells secrete insulin.

Q.149 (3)
Aldosterone is the main mineralocorticoid in our body.

Q.150 (1)
The juxtaglomerular cells of kidney produce a peptide hormone called erythropoietin which stimulates erythropoiesis (formation of RBC).contact.

Q.151 (1)
Inspiration is initiated by the contraction of diaphragm which increases the volume of thoracic chamber in the antero-posterior axis.

Q.152 (3)
The nasal chamber opens into the pharynx, a portion of which is the common passage for food and air. The pharynx opens through the larynx region into the trachea.
Trachea is a straight tube extending up to the mid-thoracic cavity, which divides at the level of 5th thoracic vertebra into a right and left primary bronchi. Each bronchi undergoes repeated divisions to form the secondary and tertiary bronchi and bronchioles ending up in very thin terminal bronchioles. Each terminal bronchiole gives rise to a number of very thin, irregular-walled and vascularised bag-like structures called alveoli.

Q.153 (3)
The nasal chamber opens into the pharynx, a portion of which is the common passage for food and air.

Q.154 (3)
Lungs are covered by a double layered pleura, with pleural fluid between them. It reduces friction on the lung-surface.

Q.155 (3)
Each haemoglobin molecule can carry a maximum of four molecules of O_2.

Q.156 (4)
Trachea is a straight tube extending up to the mid-thoracic cavity, which divides at the level of 5^{th} thoracic vertebra into a right and left primary bronchi.

Q.157 (1)
The SAN now generates an action potential which stimulates both the atria to undergo a simultaneous contraction - the atrial systole.

Q.158 (3)
Leucocytes are also known as white blood cells (WBC) as they are colourless due to the lack of haemoglobin.
They are nucleated and are relatively lesser in number which averages 6000-8000 mm-3 of blood.

Q.159 (3)
An Rh-ve person, if exposed to Rh+ve blood, will form specific antibodies against the Rh antigens. Therefore, Rh group should also be matched before transfusions. A special case of Rh incompatibility (mismatching) has been observed between the Rh-ve blood of a pregnant mother with Rh+ve blood of the foetus

Q.160 (2)
Blood is a special connective tissue consisting of a fluid matrix, plasma, and formed elements.

Q.161 (3)
Fibrins are formed by the conversion of inactive fibrinogens in the plasma by the enzyme thrombin.
Thrombins, in turn are formed from another inactive substance present in the plasma called prothrombin. An enzyme complex, thrombokinase, is required for the above reaction.

Q.162 (1)
PCT is lined by simple cuboidal Brush border epithelium which increases the surface area for reabsorption.
Nearly all of the essential nutrients, and 70-80 per cent of electrolytes and water are reabsorbed by this segment.

Q.163 (4)

Urine formation involves three main processes namely, glomerular filtration, reabsorption and secretion, that takes place in different parts of the nephron.

The tubular epithelial cells in different segments of nephron perform this either by active or passive mechanisms. For example, substances like glucose, amino acids, Na^+, etc., in the filtrate are reabsorbed actively whereas the nitrogenous wastes are absorbed by passive transport.

Q.164 (2)

Presence of glucose (Glycosuria) and ketone bodies (Ketonuria) in urine are Indicative of diabetes mellitus.

Q.165 (1)

In the tissues, where low pO_2, high pCO_2, high H^+ concentration and higher temperature exist, the conditions are favourable for dissociation of oxygen from the oxyhaemoglobin.

Q.166 (3)

The glomerular capillary blood pressure causes filtration of blood Through 3 layers, i.e., the endothelium of glomerular blood vessels, the Epithelium of Bowman's capsule and a basement membrane between these Two layers.

Q.167 (4)

The proximity between the Henle's loop And vasa recta, as well as the counter current in them help in maintaining An increasing osmolarity towards the inner medullary interstitium, i.e., From 300 mOsmolL–1 in the cortex to about 1200 mOsmolL–1 in the inner Medulla. This gradient is mainly caused by NaCl and urea.

Q.168 (4)

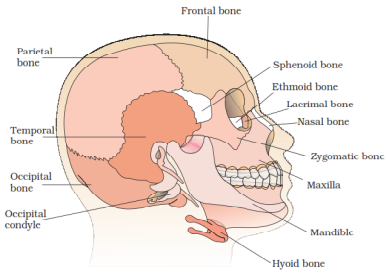
Each middle ear contains three tiny bones – Malleus, Incus and Stapes, collectively called Ear Ossicles.

Q.169 (4)

The vertebral column is differentiated into cervical (7), thoracic (12), lumbar (5), sacral (1-fused) and coccygeal (1-fused) regions starting from the skull.

The number of cervical vertebrae are seven in almost all mammals including human beings.

Q.170 (4)



Q.171 (4)

The thick filaments in the 'A' band are also held together in the middle of this band by a thin fibrous membrane called 'M' line.

Q.172 (1)

The bones of the limbs alongwith their girdles constitute the appendicular skeleton. Each limb is made of 30 bones.

The bones of the hand (fore limb) are humerus, radius and ulna, carpals (wrist bones – 8 in number), metacarpals (palm bones – 5 in number) and phalanges (digits – 14 in number) . Femur (thigh bone – the longest bone), tibia and fibula, tarsals (ankle bones – 7 in number), metatarsals (5 in number) and phalanges (digits – 14 in number) are the bones of the legs (hind limb).

Q.173 (1)

Mechanism of muscle contraction is best explained by the sliding filament theory which states that contraction of a muscle fibre takes place by the sliding of the thin filaments over the thick filaments.

During shortening of the muscle, i.e., contraction, the 'I' bands get reduced, whereas the 'A' bands retain the length

Q.174 (4)

When a neuron is not conducting any impulse, i.e., resting, the axonal membrane is comparatively more permeable to potassium ions (K+) and nearly impermeable to sodium ions (Na+).

Q.175 (4)
When a stimulus is applied at a site on the polarised membrane, the membrane at the site A becomes freely permeable to Na^+.
This leads to a rapid influx of Na^+ followed by the reversal of the polarity at that site, i.e., the outer surface of the membrane becomes negatively charged and the inner side becomes positively charged.

Q.176 (2)
The cerebrum wraps around a structure called thalamus, which is a major coordinating centre for sensory and motor signaling.

Q.177 (3)
The medulla of the brain is connected to the spinal cord. The medulla contains centres which control respiration, cardiovascular reflexes and gastric secretions.

Q.178 (4)
Three major regions make up the brain stem; mid brain, pons and medulla oblongata. Brain stem forms the connections between the brain and spinal cord.

Q.179 (3)
When a stimulus is applied at a site on the polarised membrane, the membrane at the site A becomes freely permeable to Na+ .
This leads to a rapid influx of Na+ followed by the reversal of the polarity at that site, i.e., the outer surface of the membrane becomes negatively charged and the inner side becomes positively charged. The polarity of the membrane at the site A is thus reversed and hence depolarised.

Q.180 (1)
Insulin is a peptide hormone, which plays a major role in the regulation of glucose homeostasis. Insulin acts mainly on hepatocytes and adipocytes (cells of adipose tissue).

Q.181 (4)
Excess secretion of growth hormone in adults especially in middle age can result in severe disfigurement (especially of the face) called Acromegaly.

Q.182 (2)
Peptide, polypeptide, protein hormones (e.g., insulin, glucagon, pituitary hormones, hypothalamic hormones, etc.).

Q.183 (3)
The pineal gland is located on the dorsal side of forebrain. Pineal secretes a hormone called melatonin.
Melatonin plays a very important role in the regulation of a 24-hour (diurnal) rhythm of our body. For example, it helps in maintaining the normal rhythms of sleep-wake cycle, body temperature. In addition, melatonin also influences metabolism, pigmentation, the menstrual cycle as well as our defense capability.

Q.184 (2)
Neurohypophysis (pars nervosa) also known as posterior pituitary, stores and releases two hormones called oxytocin and vasopressin, which are actually synthesised by the hypothalamus and are transported axonally to neurohypophysis.

Q.185 (1)
Adrenaline hormone increase the heart beat, the strength of heart contraction and the rate of respiration.

Q.186 (1)
A chemosensitive area is situated adjacent to the rhythm centre which is highly sensitive to CO_2 and hydrogen ions. Increase in these substances can activate this centre,

Q.187 (1)
The conducting part transports the atmospheric air to the alveoli, clears it from foreign particles, humidifies and also brings the air to body temperature.

Q.188 (2)
Diffusion rate is inversely proportional to thickness of respiratory membrane

Q.189 (2)
Each artery and vein consists of three layers: an inner lining of squamous endothelium, the tunica intima, a middle layer of smooth muscle and elastic fibres.

Q.190 (3)
The blood pumped by the right ventricle enters the pulmonary artery, whereas the left ventricle pumps blood into the aorta.
The deoxygenated blood pumped into the pulmonary artery is passed on to the lungs from where the oxygenated blood is carried by the pulmonary veins into the left atrium. This pathway constitutes the pulmonary circulation.

Q.191 (3)
The unit contains a coiled cellophane tube surrounded by a fluid (dialysing fluid) having the same composition as that of plasma except The nitrogenous wastes.

Q.192 (1)
The cortex extends in between the medullary pyramids as renal columns called Columns of Bertini.

Q.193 (4)
Scapula is a large triangular flat bone situated in the dorsal part of the thorax between the second and the seventh ribs.

Q.194 (3)
Visceral muscles are located in the inner walls of hollow visceral organs of the body like the alimentary canal, reproductive tract, etc. They do not exhibit any striation and are smooth in appearance.

Q.195 (1)
Each myofibril has alternate dark and light bands on it. the striated appearance is due to the distribution pattern of two important proteins – Actin and Myosin.

Q.196 (1)
Different types of ion channels are present on the neural membrane. These ion channels are selectively permeable to different ions.

Q.197 (2)
A synapse is formed by the membranes of a pre-synaptic neuron and a post-synaptic neuron, which may or may not be separated by a gap called synaptic cleft.

Q.198 (2)
Vasopressin acts mainly at the kidney and stimulates resorption of water and electrolytes by the distal tubules and thereby reduces loss of water through urine (diuresis). Hence, it is also called as anti-diuretic hormone (ADH).

Q.199 (4)
Parathyroid hormone (PTH) increases the Ca^{2+} levels in the blood. PTH acts on bones and stimulates the process of bone resorption (dissolution/ demineralisation).
PTH also stimulates reabsorption of Ca^{2+} by the renal tubules and increases Ca^{2+} absorption from the digested food. It is, thus, clear that PTH is a hypercalcemic hormone, i.e., it increases the blood Ca^{2+} levels.

Q.200 (4)
Glucagon is a peptide hormone, and plays an important role in maintaining the normal blood glucose levels.
Glucagon acts mainly on the liver cells (hepatocytes) and stimulates glycogenolysis resulting in an increased blood sugar (hyperglycemia). In addition, this hormone stimulates the process of gluconeogenesis which also contributes to hyperglycemia. Glucagon reduces the cellular glucose uptake and utilisation. Thus, glucagon is a hyperglycemic hormone.