Resonance®
Educating for better tomorrow

BHUBANESWAR STUDY CENTRE

SUCCESS COMES WITH SUSTAINED HARD WORK UNDER EXPERTS' GUIDANCE

Toppers in JEE (Advanced) 2018

ADMISSION OPEN for Session 2019-20

CLASSES:

7 8 9 10 11 12

TARGET: JEE (Main + Advanced)

JEE (Main) | AIIMS/ NEET

Pre-foundation

SCHOLARSHIP UPTO 90%

Entrance Test Dates:

17th, 31st March & 7th April 2019

Resonance®
Educating for better tomorrow
Pre-foundation Career Care Programmes (PCCP) Division

PRE-BOARD_SESSION-2018-19

SUBJECT : SCIENCE

CLASS-X (CBSE PATTERN)

Time: 3 Hours **Max. Marks : 80**

Please read the instructions carefully. You are allotted 5 minutes specifically for this purpose.

INSTRUCTIONS

1. The question paper comprises **Five sections, A to E**. You are to attempt both the sections.
2. All questions are compulsory.
3. Write the answer to each question in the given answer-book only
4. All questions of **Section- A to E** are to be attempted separately.
5. There is an internal choice in two questions of three marks each and one question of five marks.
6. **Question numbers 1 and 2 in Section-A** are **one mark** question. They are to be answered in one word or in one sentence.**(Bio. : 1,2)**
7. **Question numbers 3 to 5 in Section- A** are **two marks** questions. These are to be answered in 30 words each. **(Phy.: 3 ; Che.: 4 ; Bio.: 5)**
8. **Question numbers 6 to 15 in Section-A** are **three marks** questions. These are to be answered in about 50 words each. **(Phy.: 6,7,8,9 ; Che.: 10,11,12 ; Bio.: 13, 14, 15)**
9. **Question numbers 16 to 21 in Section-A** are **5 marks** questions. These are to be answered in 70 words each. **(Phy.: 16,17 ; Che.: 18,19 ; Bio.: 20, 21)**
10. **Question numbers 22 to 27 in Section- B** are based on practical skills. **Each question is a two marks question.** These are to be answered in brief. **(Phy.: 22, 23 ; Che.: 24, 25 ; Bio.: 26, 27)**

NAME OF THE CANDIDATE : ……ROLL NO. : ……..…

I have read all the instructions and shall abide by them

I have verified the identity, name and roll number of the candidate.

- -
Signature of the Candidate

- -
Signature of the Invigilator

PCCP Head Office :
Address : Plot No. A-51 [A], IPIA, Near Resonance CG Tower,
Behind City Mall, Jhalawar Road, Kota (Rajasthan)-324005
Contact. No. : +91-0744-6635569, 2777769 ; Fax : 0744-2427146
Website : **www.pccp.resonance.ac.in** E-mail : **pccp@resonance.ac.in**

SCIENCE(Physics, Chemistry & Biology)

Instructions :
(i) Question Number 1 to 2 carry 1 marks.
(ii) Question Number 3 to 5 carry 2 marks.
(iii) Question Number 6 to 15 carry 3 marks.
(iv) Question Number 16 to 21 carry 5 marks.
(v) Question Number 22 to 27 carry 2 marks.

SECTION-A

1. How does Phototrophic movement of stem help the plant ? **(1 mark)**

2. Name the main thinking part of the brain ? **(1 mark)**

SECTION-B

3. For the same angle of incidence in media A,B and C , the angle of refraction are 20º, 45º and 50º respectively.In which medium the speed of light will be maximum? Give reasons to support your answer. **(2 marks)**

4. Solid sodium bicarbonate was placed on a strip of pH paper. What was the change in colour? **(2 marks)**

5. How is reproduction to be achieved from a single cell type, if the organisms itself consists of many cell types ? **(2 marks)**

SECTION-C

6. Name three types of energy that can be obtained from sea. **(3 marks)**

7. State fleming's left hand rule**.** **(3 marks)**

8. How many bulbs of 20W each can be connected in a house having a fuse of 5A rating and a supply of 220 V. **(3 marks)**

9. The refractive index of air with respect to water is 4/3 and that of air with respect to glass is 3/2. Find refractive index of glass with respect to water. **(3 marks)**

10. There are 3 unknown metals - A, B and C. C displaces B from its oxide, while with oxide of A, there is no reaction. Give the reactivity order of A, B and C. **(3 marks)**

11. Predict the period and group to which each of the following elements belong? **(3 marks)**
(i) Al **(ii)** F **(iii)** Be

"OR"

Atomic number of a few elements is given below 10, 20, 7 and 14. **(3 marks)**
(i) Identify the elements.
(ii) Identify the group number of these elements in the period table.
(iii) What would be the electronic configuration for each of these elements?

12. Identify the oxidising agent and reducing agent in each of the following reactions: **(3 marks)**
(i) $MnO_2 + 4HCl \longrightarrow MnCl_2 + Cl_2 + 2H_2O$
(ii) $CuO + H_2 \longrightarrow Cu + H_2O$
(iii) $PbO(s) + C(s) \longrightarrow Pb(s) + CO\ (g)$

13. **Explain the terms :** **(3 marks)**
(a) Gastric glands. **(b)** Villi **(c)** Peristaltic Movement

14. "If Progeny plants inherited a single whole gene set from each parent then Mendelian experiment of independent inheritance of two separate traits can not work" Justify this statement. **(3 marks)**

15. Give any two ways in which non-bio degradable substances would affect the environment ? **(3 marks)**

SECTION-D

16. Derive the formula for calculating the effective resistance in series and parallel combination **(5 marks)**

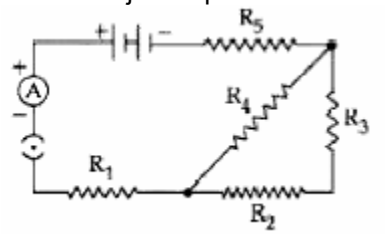
"OR"

State and explain with the help of labelled diagram the working and principal of electric motor?

(i) Write the principle on which DC generator works. **(5 marks)**

(ii) Consider the following circuit diagram. If $R_1=R_2=R_3=R_4=R_5= 3\ \Omega$, find the equivalent resistance of the circuit.

17. Draw ray diagram for various positions of object kept in front of concave mirror **(5 marks)**



18. **(i)** What happens, when **(5 marks)**

(a) Ethanol is heated with alkaline potassium permanganate.

(b) Ethanol is heated with ethanoic acid in presence of concentrated sulphuric acid.

(c) Ethanol burns in air.

(ii) What is homologous series of organic compounds? State any two characteristics homologous series.

19. Describe three industrial uses of caustic soda. What happens when caustic soda reacts with:

(i) ZnO **(ii)** CO_2 **(iii)** HCl **(5 marks)**

"OR"

State reason for the following statements:

(i) Tap water conducts electricity, whereas distilled water does not.

(ii) Dry hydrogen chloride gas does not turn blue litmus red whereas dilute hydrochloric acid does.

(iii) During summer season, milk usually adds a very small amount of baking soda to fresh milk.

(iv) For a dilution of acid, acid is added into water and not water into acid.

(v) Curd and sour substances not to be kept in brass and copper vessels

20. Define two limitations of electrical impulse and respond of over when adrenaline is secreted into the blood ?

"OR"

"It is important for us to have iodised salt in our diet"Justify this statement and why diabetic patients treated by giving injections of insulin. **(5 marks)**

21. **(i)** Name the blood vessel that brings deoxygenated blood to the lungs ? **(5 marks)**

(ii) Which chamber of human heart pump oxygenated blood ?

(iii) Draw schematic representation of transport and exchange of oxygen and carbon dioxide.

"OR"

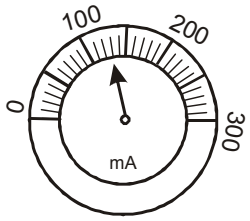
(i) Draw a flow chart for breakdown of glucose by various pathways like in yeast, muscle cell & in mitochondria.

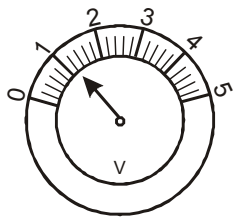
(ii) How are alveoli designed and why ? **(5 marks)**

SECTION-E

PHYSICS

22. The figures given below show the readings of a milliammeter and a voltmeter connected in an electrical circuit. Assuming that the instruments do not have any zero error. The correct readings of the milliammeter and voltmeter will be? **(2 Marks)**





23. Which Figure represents a concave lens : **(2 Marks)**

(A)

(B)

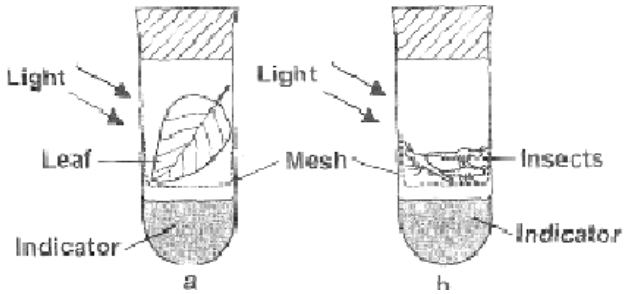
CHEMISTRY

24. A student adds a spoon full of powdered sodium hydrogen carbonate to a flask containing ethanoic acid. List two main observations, he must note in his note book, about the reaction that take place. Also write chemical equation for the reaction. **(2 Marks)**

25. A hosewife wanted her house to be white washed. She bought 10Kg of quick lime from the market and dissolved in 30 L of water. On adding lime to water, she noticed that the water started boling even when it was not being heated. **(2 Marks)**
Give reson for her observations. Write the corresponding equation and name the product formed.

BIOLOGY

26. Two test-tubes are set up as shown. The indicator used here changes from red to yellow when exposed increased levels of carbon dioxide. At the start of the experiment, the indicator in each test-tube was red.



What will be the colour of the indicator in each test-tube after two hours ?

(2 Marks)

27. When we cut open a germinating seed, we saw different parts that give rise to different parts of plant". What are the part we would see in a germinating seed & what would they form. **(2 Marks)**

PRE-BOARD
SUBJECT : SCIENCE
CLASS-X(CBSE PATTERN)

HINTS & SOLUTIONS

SCIENCE(PHYSICS, CHEMISTRY & BIOLOGY)

SECTION-A

1. In Phototropic movement stem respond by bending towards light which is necessary for photosynthesis.

2. Fore brain (it has region which receive sensory impulses from various receptors).

SECTION-B

3. Medium C because in rarest medium angle of refraction will be greatest and hence the speed of light.

4. The colour of the pH paper did not change because solid sodium bicarbonate does not produce ions and thus does not give any colour on pH paper.

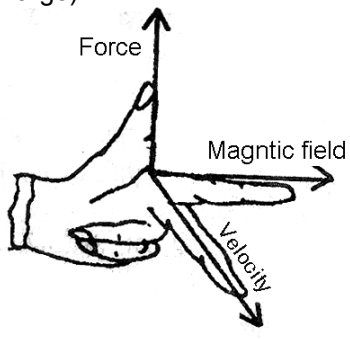
5. There must be a single cell type in the organism that is capable of growing. Proliferating and making other cell types under the right circumstances.

SECTION-C

6. (i) Tidal Energy (ii) Sea waves Energy iii) Ocean Thermal Energy

7. **Fleming's left hand rule :**

If we stretch the forefinger, middle finger and the thumb of our left hand in such a way that mutually perpendicular to each other as shown in figure the forefinger indicates the direction of the magnetic field and the middle finger is in the direction of velocity of the charge, then lorentz force will act in the direction of thumb. (for positive charge)



8. $\because \quad I = \frac{P}{V}$

$$I = \frac{20}{220} A$$

So , $n = \frac{I_{fuse}}{I}$

$\Rightarrow \quad n = \frac{5}{20} \times 220 = 55$

9. $\because \quad {}_{water}n_{glass} = \frac{{}_{air}n_{glass}}{{}_{air}n_{water}} = \frac{\frac{3}{2}}{\frac{4}{3}} = \frac{9}{8}$

10. As C displaces B from its oxide therefore, C is more reactive than B. While, there is no reaction, when C is treated with oxide of A, which means C is less reactive than A. So, the reactivity order of A, B and C is B < C < A.

11. (i) Al belongs to 3rd period and 13th group.
(ii) F belongs to 2nd period and 17th group.
(iii) Be belongs to 2nd period and 2nd group.

Atomic number	Electronic configuration	Group number	Element
10	2, 8	(8 + 10) = 18	Neon
20	2, 8, 8, 2	2	Calcium
7	2, 5	(5+10) = 15	Nitrogen
14	2, 8, 4	(4 + 10) = 14	Silicon

12. (i) MnO_2 loses oxygen, therefore it is and oxidising agent while HCl gains oxygen, therefore it is a reducing agent.
(ii) CuO is oxidising agent, while H_2 is reducing agent.
(iii) PbO is oxidising agent, while C is reducing agent.

13. (a) Gastric glands : It is present in stomach.The stomach wall contains three tubular glands in its walls.The glands present in the walls of the stomach secrete gastric juice.The gastric juice contains three substances : hydrochloric acid, the enzyme pepsin and mucus.
(b) On the inner wall of small intestine numerous finger like projections are found which are called as villi, they increase the surface area for absorption of digested food.
(c) The contraction and expansion movement of the walls of food pipe is called peristaltic movement.
This peristaltic movement of food pipe (or oesophagus) pushes the slightly digested food into the stomach (it moves food in all the digestive organs throughout the alimentary canal).

14. This is because the two characteristics 'R' and 'y' would then be linked to each other and cannot be independently inherited. This is explained by the fact that each gene set is present, not as a single long thread of DNA, but as separate independent pieces, each called a chromosome. Thus, each cell will have two copies of each chromosome, one each from the male and female parents. Every germ cell will take one chromosome from each pair and these may be of either maternal or paternal origin. When two germ cells combine, they will restore the normal number of chromosomes in the progeny, ensuring the stability of the DNA of the species.
In dihybrid cross Mendel crossed genetically pure yellow round seeded (YYRR) pea plant with green wrinkled (yyrr) pea plant.

- All the plants of F_1 were all yellow and round seeded (YyRr) .
- In F_2 generation four types of plants appeared as :
- Yellow rounded - 9• Yellow wrinkled - 3 • Green round - 3 • Green wrinkled – 1

15. **(i)** The non-biodegradable substances get accumulated and doesn't get decomposed hence it remains in the ecosystem and causes pollution, chokes the system of many animals and kill them.
(ii) These substances due to accumulation cause water and soil pollution, e.g., pesticides, detergents, polythene.

SECTION-D

16. **COMBINATION OF RESISTORS**

(i) Equivalent resistance of series combination: Consider three resistors of resistances R_1, R_2 and R_3 connected in series to cell of potential difference V as shown in figure. Since the three resistors are connected in series therefore the current I through each of them is same.

By Ohm's law the potential drop across each resistor is given by $V_1 = IR_1, V_2 = IR_2$ and $V_3 = IR_3$. Since V is the total potential in the circuit, therefore by conservation of energy we have

$$V = V_1 + V_2 + V_3$$

Substituting for V_1, V_2 and V_3 in above equation we have,

$$V = IR_1 + IR_2 + IR_3 \qquad .....(i)$$

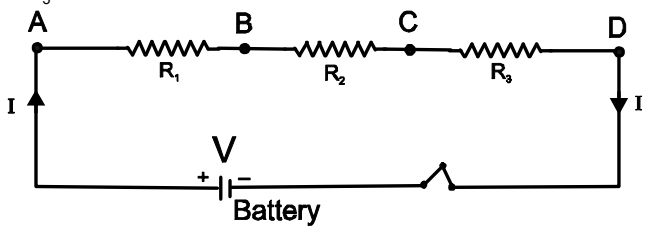
If R_s is the equivalent resistance of the series combination, then by Ohm's law we have

$$V = IR_s \qquad .....(ii)$$

Therefore from equations (i) and (ii) we have

$$IR_s = IR_1 + IR_2 + IR_3$$

Hence $R_s = R_1 + R_2 + R_3$

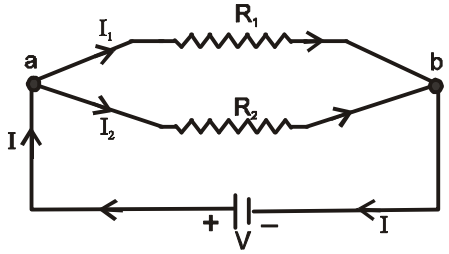


Series combination of resistances

Thus in series combination the equivalent resistance is the sum of the individual resistances. For more resistors, the above expression would have been-

$R_s = R_1 + R_2 + R_3 + ...$

(ii) Equivalent resistance of parallel combination : Consider two resistors $\mathbf{R_1}$ and $\mathbf{R_2}$ connected in parallel as shown in figure. When the current I reaches point 'a', it splits into two parts I_1 going through $\mathbf{R_1}$ and I_2 going through $\mathbf{R_2}$. If $\mathbf{R_1}$ is greater than $\mathbf{R_2}$, then I_1 will be less than I_2 i.e. the current will tend to take the path of least resistance.



Since charge must be conserved, therefore the current I that enters at point 'a' must be equal to the current that leaves that point. Therefore we have

$$I = I_1 + I_2 \qquad .....(i)$$

Since the resistors are connected in parallel therefore the potential across each resistor must be same, hence by Ohm's law we have

$$I_1 = \frac{V}{R_1} \text{ and } I_2 = \frac{V}{R_2}$$

substituting in equation (i) we have,

$$I = \frac{V}{R_1} + \frac{V}{R_2} \qquad .....(ii)$$

Let R_P be the equivalent resistance of the parallel combination, then by Ohm's law we have,

$$I = \frac{V}{R_P} \qquad .....(iii)$$

Hence from equations (ii) and (iii) we have,

$$\frac{V}{R_P} = \frac{V}{R_1} + \frac{V}{R_2} \quad \text{or} \quad \frac{1}{R_P} = \frac{1}{R_1} + \frac{1}{R_2}$$

An extension of this analysis to three or more resistors in parallel gives the following general expression

$$\frac{1}{R_P} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} +$$

"OR"

(i) When an electric current is passed through a conductor, a magnetic field is produced around the conductor. Faraday thought that as a magnetic field is produced by electric current, it should be possible to produce an electric current by the magnetic field. According to him, whenever there is a change in the magnetic lines of force associated with a conductor, an electromotive force (e.m.f.) is set up at the ends of the conductor which lasts as long as the change is taking place. This phenomenon is called electromagnetic induction.

(ii) R_2 and R_3 are in series.

So $R_S = R_2 + R_3$

$R_S = 3 + 3 = 6\ \Omega$

Then R_S and R_4 are in parallel thus –

$$\frac{1}{R_P} = \frac{1}{R_S} + \frac{1}{R_4}$$

$$\frac{1}{R_P} = \frac{1}{6} + \frac{1}{3}$$

$R_P = 2\ \Omega$

Then R_P, R_1 and R_5 are in series

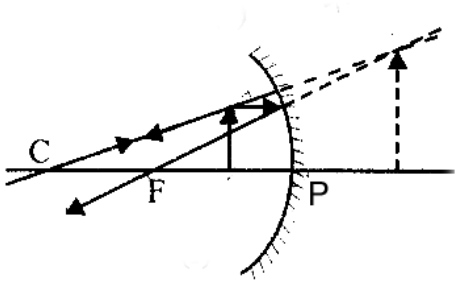
Thus, $R_{eq} = R_P + R_1 + R_5$

$R_{eq} = 2 + 3 + 3$

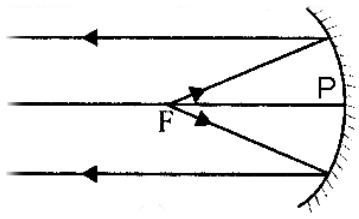
$R_{eq} = 8\ \Omega$

17. Formation of images by concave mirror :

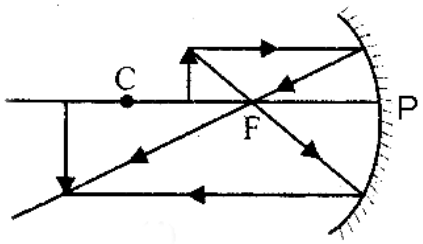
(i) When the object is placed between the pole and the focus, then the image formed is virtual, erect and magnified.



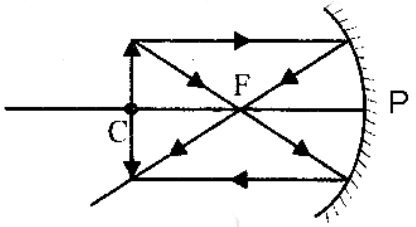
(ii) When the object is placed at the focus then the image is formed at infinity. The image is extremely magnified.



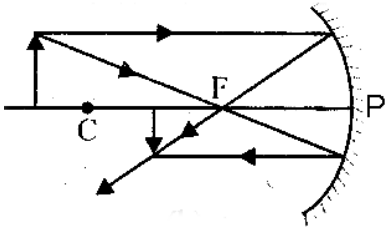
(iii) When the object is placed between the focus and the centre of curvature then the image is formed beyond the centre of curvature. The image formed is real, inverted and bigger than the object.



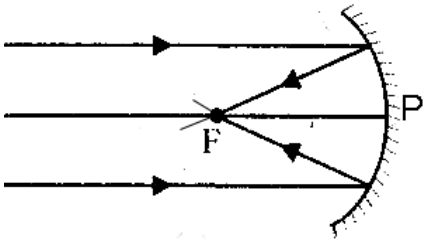
(iv) When the object is placed at the centre of curvature, then the image is formed at the centre of curvature. The image formed is real, inverted and equal to the size of the object.



(v) When the object is placed beyond the centre of curvature, then the image is formed between the focus and centre of curvature. The image formed is real, inverted and diminished.



(vi) When the object is placed at infinity then the image is formed at the focus. The image formed is real, inverted and extremely diminished in size.



18. (i) (a) $\underset{\text{Ethanol}}{C_2H_5OH} \xrightarrow{Alk.KMnO_4} \underset{\text{Ethanoic acid}}{CH_3COOH}$

(b) $\underset{\text{Ethanol}}{C_2H_5OH} + \underset{\text{Ethanoic acid}}{CH_3COOH} \xrightarrow{Conc.H_2SO_4} \underset{\text{Ethyl ethanoate}}{CH_3COOC_2H_5} + H_2O$

(c) $\underset{\text{Ethanol}}{C_2H_5OH} + 3O_2 \longrightarrow \underset{\text{Carbon dioxide}}{2CO_2} + 3H_2O$

(ii) A series of compounds in which the same functional group substitutes for hydrogen in a carbon chain is called homologous series.

Characteristics of homologous series :

(a) The molecular formulae of any two successive numbers of a homologous series differ by $–CH_2$.

(b) There is regular gradation in physical properties of members of a homologous series.

19. Caustic soda (sodium hydroxide) is used :

- for mercerizing cotton fabrics in textile industry.
- to manufacture the soap, paper, dyes, etc.
- in petroleum refining

Reaction of caustic soda with following gives :

(i) Reaction with ZnO $ZnO + 2NaOH \longrightarrow \underset{\text{Sodium zincate}}{Na_2ZnO_2} + H_2O$

(ii) Reaction with CO_2 $2NaOH + CO_2 \longrightarrow \underset{\text{Sodium carbonate}}{Na_2CO_3} + H_2O$

(iii) Reaction with HCl $HCl + NaOH \longrightarrow \underset{\text{Sodium chloride}}{NaCl} + H_2O$

"OR"

(i) Tap water contains ions which conduct electricity. Distilled water does not contain ions.

(ii) Dry HCl does not produce ions but dilute HCl gives H^+ and Cl^-.

(iii) Baking soda does not allow milk to change into lactic acid, which makes milk sour.

(iv) Diluting and acid is highly exothermic. Water should not be added to concentrated acid because the heat generated may cause the mixture to splash out and cause burns. Thus, acid is added to water.

(v) Curd and sour substance contain acid which react with Cu brass to form certain salts that are poisonous in nature and can cause food poisoning.

20.

- Electrical impulses are an excellent means for this. But there are limitations to the use of electrical impulses. Firstly, they will reach only those cells that are connected by nervous tissue, not each and every cell in the animal body. Secondly, once an electrical impulse is generated in a cell and transmitted, the cell will take some time to reset its mechanisms before it can generate and transmit a new impulse.

- Adrenaline is secreted directly into the blood and carried to different parts of the body. The target organs or the specific tissues on which it acts include the heart. As a result, the heart beats faster, resulting in supply of more oxygen to our muscles. The blood to the digestive system and skin is reduced due to contraction of muscles around small arteries in these organs. This diverts the blood to our skeletal muscles. The breathing rate also increases because of the contractions of the diaphragm and the rib muscles. All these responses together enable the animal body to be ready to deal with the situation.

"OR"

- Iodine is necessary for the thyroid gland to make thyroxin hormone.Thyroxin regulates carbohydrate, protein and fat metabolism in the body so as to provide the best balance for growth.Iodine is essential for the synthesis of thyroxin. In case iodine is deficient in our diet, there is a possibility that we might suffer from goitre. One of the symptoms in this disease is a swollen neck.

- Insulin is a hormone which is produced by the pancreas and helps in regulating blood sugar levels.If it is not secreted in proper amounts, the sugar level in the blood rises causing many harmful effects like weight lose, damage to the large blood vessels of the heart, brain and lungs, small blood vessels also be affected, eye diseases, kidney damage etc.

21. (i) Pulmonary artery
(ii) Left ventricle

(iii)

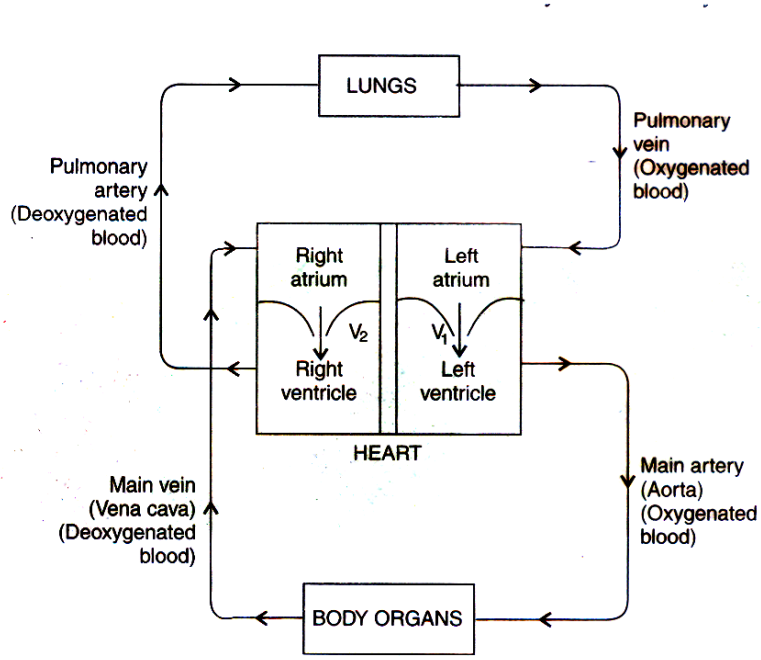
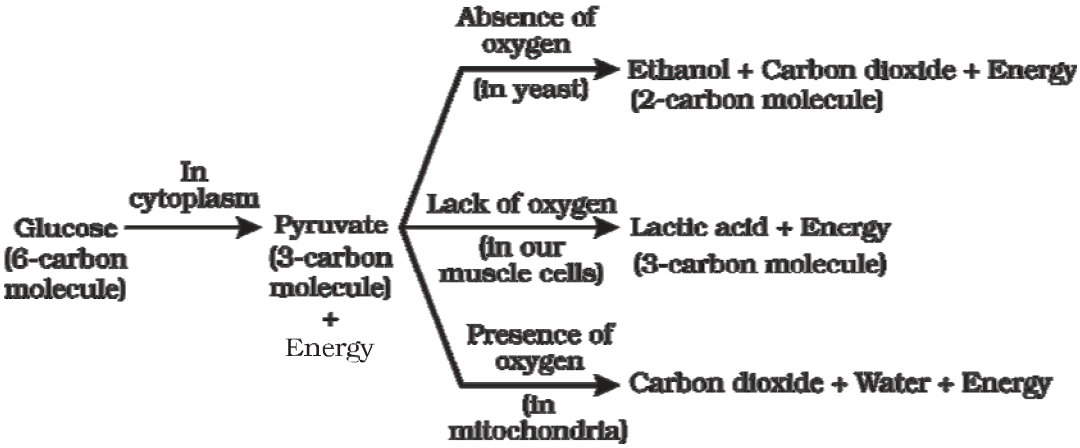


Diagram to show blood circulation in human body.

"OR"

(i)



(ii) At the end of bronchioles alveolar sacs or alveoli are present which are rich in blood capillaries, thin walled & increase surface area for exchange of oxygen and carbondioxide.

SECTION-E

22. 130 mA and 1.2 V (Since least count of ammeter is10mA and voltmeter is 0.2V)

23. **(A)** Because convex lense produces a virtual and enlarged image when object is placed between focus and optical center, while concave lense produces diminished image for the same setup.

24. Two main observations about the reaction:
(a) Brisk effervescence of CO_2 which turns lime water milky.
(b) It is a neutralisation reaction and heat is released.

$$CH_3COOH + NaHCO_3 \longrightarrow CH_3COONa + H_2O + CO_2$$

25. $CaO(s) + H_2O(l) \longrightarrow Ca(OH)_2(aq) +$ Heat
Since, the reaction is highly exothermic, the solution started boling although, it was not being heated. The solution of slaked lime is allowed to cool for some time, preferbly overnight. It is then dencanted and the liquid obtained is used for white washing.

26. (**a)** Red (**b)** Yellow

27. There are two part in a germinating seed, one is radicle which give rise to root of the plant and another one is plumule which give rise to shoot of the plant.

Resonance®
Educating for better tomorrow

SUCCESS AT JEE MAIN 2019
(January Attempt)

Resonites create history with

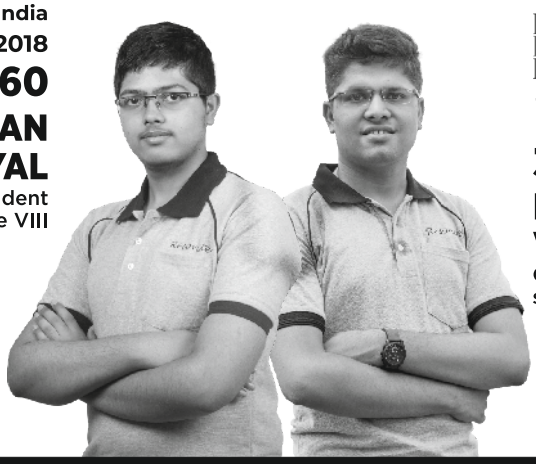
100 percentile

performance for

3 consecutive years in JEE Main.

100 PERCENTILE
JEE Main 2019 (Jan. Attempt)
SHUBHANKAR GAMBHIR
Classroom student since X

Highest score in India in JEE Main 2018
350/360
PAWAN GOYAL
Classroom student since VIII

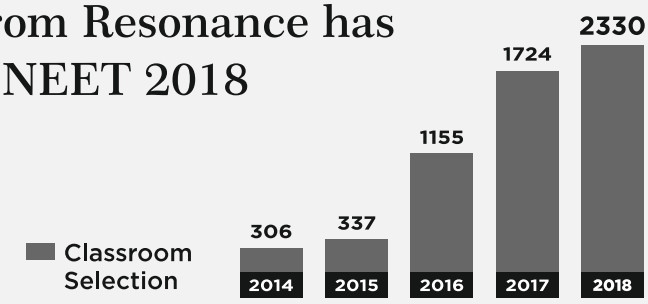


LIMCA BOOK of RECORDS
for perfect score in JEE Main 2017
360/360
KALPIT VEERWAL
Classroom student since VIII

SUCCESS at NEET 2018

Every 2nd student from Resonance has Qualified in NEET 2018

AIR 175 **AKSHAT SHARMA**
Roll number : 13400721
Resonance Classroom Student



KVPY	NTSE	OLYMPIADS	IJSO
2162 FELLOWSHIP WINNER since 2006	1874 SCHOLARS since 2006	47 MEDALISTS since 2006	11 MEDALISTS since 2006

Resonance Eduventures Limited - BHUBANESWAR STUDY CENTRE

ACHARYA VIHAR CAMPUS: Plot No - 21/5, Near Regional Science Centre, Acharya Vihar, Bhubaneswar (Odisha) - 751013

Tel. No.: 07446655055 | **E-mail:** bbsr@resonance.ac.in

CHANDRASEKHARPUR CAMPUS: Athena", Plot No - 189, Chandrasekharpur, Near Patia Square, Bhubaneshwar (Odisha) - 751024

Tel. No.: 07446655055 | **E-mail:** bbsr@resonance.ac.in

Registered & Corporate Office: CG Tower, A-46 & 52, IPIA, Near City Mall, Jhalawar Road, Kota (Rajasthan) - 324005 | CIN: U80302RJ2007PLC024029