1.

With respect to blood, the composition of lymph can be expressed as:

(1) No RBc, No Plateletes, Less proteins, Less calcium and phosphorus, Predominant corpuscles lymphocytes.

(2) No RBc, No Plateletes, Less proteins, More calcium and phosphorus, Predominant corpuscles lymphocytes.

(3) No RBc, Less Plateletes, Less proteins, Less calcium and phosphorus, Predominant corpuscles macrophages.

(4) No RBc, less Plateletes, Less proteins, Less calcium and phosphorus, Predominant corpuscles monocytes.

2.

The portion of human stomach into which the oesophagus opens is the:-
1. Cardia
2. Fundus
3. Corpus
4. Pylorus

3.

Muscularis layer of the wall of the alimentary canal is formed by:-

1. Smooth muscle arranged into an inner longitudinal and an outer circular layer

2. Smooth muscle arranged into an inner circular and an outer longitudinal layer

3. Skeletal muscle arranged into an inner longitudinal and an outer circular layer

4. Skeletal muscle arranged into an inner circular and an outer longitudinal layer

4.

The structural and functional units of the human liver are:-
1. Glisson capsules
2. Hepatic lobes
3. Hepatic Iobules
4. Hepatic sinusoids

5.

The optimum pH for the enzyme salivary amylase is:

(1) 4.5

(2) 6.8

(3) 7.3

(4) 8.2

6.

Intrinsic factor is secreted by the_cells of the human stomach.

1. Mucus neck cells
2. Chief cells
3. Oxyntic cells
4. G-cells

7.

Lipases can be activated by:

1. Enterokinase

2. Enterogastrone

3. Chyme

4. Bile

8.

Which of the following is a sub-mucosal gland ?

(1) Oxyntic glands of stomach

(2) Crypts of Lieberkuhn of small intestine

(3) Brunner's glands of the duodenum

(4) Goblet cells

9.

To move into the intestinal mucosa, fatty acids and glycerol are first incorporated into:

(1) Chyle

(2) Micelles

(3) Chylomicroms

(4) Lipoproteins

10.

A mass peristaltic movement is responsible for:-

1. Release of bile and pancreatic juice into the duodenum
2. Passage of chyme from stomach to duodenum
3. Vomiting
4. Defecation

11.

Which of the following is entirely made of cartilage?

1. Nasal septum

2. Larynx

3. Glottis

4. Trachea

12.

Trachea divides into two a right and left primary bronchi at the level of:

1. Seventh cervical vertebra

2. Third thoracic vertebra

3. Fifth thoracic vertebra

4. Seventh thoracic vertebra

13.

Contraction of diaphragm:

1. Increases the volume of the thoracic chamber in the antero-posterior axis

2. Increases the volume of the thoracic chamber in the dorso-ventral axis

3. Decreases the volume of the thoracic chamber in the antero-posterior axis

4. Decreases the volume of the thoracic chamber in the dorso-ventral axis

14.

Populations subsisting primarily on corn would likely to suffer from:

1. PEM

2. Pellagra

3. Bleeding disorders

4. Beri beri

15.

Which of the following glandular secretions involved in digestion would be most likely released initially as inactive precursors ?

(1) protein-digesting enzymes

(2) fat-solublizing bile salts

(3) acid-neutralising bicarbonate

(4) hormones such as gastrin

16.

Vasa recta in cortical nephrons :

1. Arises from afferent arteriole rather that efferent arteriole

2. Does not get involved in counter current exchange with loop of henle

3. Carries deoxygenated blood rich in urea

4. Is absent or highly reduced

17.

The proximal convoluted tubule is lined by the:
1. Simple cuboidal epithelium
2. Simple columnar epithelium
3. Simple cubodial brush bordered epithelium
4. Simple columnar brush bordered epithelium

18.

During concentration of urine by the human kidneys, NaCl is returned to the medullary interstitium by the:

(a) Descending limb of the loop of Henle

(b) Ascending limb of the loop of Henle

(c) Descending limb of the vasa recta

(d) Ascending limb of the vasa recta

19.

An increase in the blood flow to the atria of the heart can cause the release of:

1. Erythropoeitin

2. Atrial natriuretic factor

3. Renin

4. Aldosterone

20.

On average, what amount of urea is excreted out per day by a healthy human being?

1. 5-10 gm

2. 15-20 gm

3. 25-30 gm

4. 50-60 gm

21.

Identify the correct statement regarding the excretion of acids by the human kidney :
1. The filtered bicarbonate is absorbed by anion transport
2. The intercalated cells of the distal tubule secrete hydrogen ions to reabsorb bicarbonate from the tubular fluid.
3. All of the filtered bicarbonate is normally reabsorbed in the first half of the distal tubule.
4. Urine pH is normally greater than that of plasma.

22.

Blood doping means use of banned substances by athletes that have a favorable effect on erythrocyte count by stimulating the bone marrow. The source of such a hormone can be the human:

1. Spleen

2. Heart

3. Kidney

4. Lungs

23.

The main disadvantage of urea as an excretory product for animals eliminating it would be:

1. its high toxicity

2. Needs lot of water to be eliminated

3. It being an osmolyte

4. Energy expenditure to produce it

24.

Match each item in Column I with one in Column II and choose the correct option from the codes given below:

Column I	Column II
A. Filtration fraction	a. 19%
B. Normal Blood Urea Level	b. 23%
C. GFR	c. 70-100 mg %
	d. 15-40 mg %
	e. 180 ml/min
	f. 125 ml/min

	A	B	C
1.	b	d	f
2.	a	d	f

3.   a   c   e

4.   b   d   e

25.

Oxalates and citrates are used as anticoagulants in stored blood because they:

(a) Chelate calcium ions

(b) Act as competitive inhibitors of vitamin K

(c) Potentiate antithrombin III

(d) Activate Heparin

26.

Which of the following is a correct statement:

1. The volume of blood in pulmonary circulation is more than the volume of blood in systemic circulation at any instant

2. The blood pressure in pulmonary circulation is less than that of the systemic circulation

3. Double circulation is characteristic of all vertebrates

4. A double aortic arch is seen in birds and mammals

27. The normal value of GFR is approximately
1.   650 ml/min
2.   180 ml/min
3.   180 ml/day
4.   125 ml/min

28.

:An individual who is blood type AB negative

1. can receive any blood type in moderate amounts

2. can receive any blood type in moderate amounts except that with the Rh antigen

3. can donate to all blood types in moderate amounts

4. can receive types A, B and AB but not type O

29.

The first heart sound or the 'lubb' is produced:

1. Near the end of the atrial systole

2. Immediately after the start of the ventricular systole

3. Near the end of the ventricular systole

4. Immediately after the start of the ventricular diastole

30.

Excretion of dilute urine requires

1. relative permeability of the distal tubule to water

2. transport of sodium and chloride ions out of the descending loop of Henle

3. the presence of ADH

4. impermeability of the collecting tubule to water

31.

Which of the following does not help in excretion in *Periplaneta americana*

(1) Fat body

(2) Urecose glands

(3) Nephrocytes

(4) None of these

32.

The condition where urea accumulates in blood is:

1. Glycosuria

2. Uremia

3. Ketonuria

4. Acidosis

33.

Choose the correct order for the steps of hemostasis:

1. Blood coagulation, platelet plug formation, blood vessel spasm

2. Platelet plug formation, blood coagulation, blood vessel spasm

3. Blood vessel spasm, platelet plug formation, blood coagulation

4. Blood vessel spasm, blood coagulation, platelet plug formation

34.

The right atria of the human heart receive:

1. Oxygenated blood

2. Deoxygenated blood

3. Arterial blood

4. Venous blood

35.

Which of the following statements about the kidneys is incorrect?

1. They consume over 20% of the oxygens used by the body at rest.

2. Approximately 1200ml of fluid is filtrated by the kidneys each day.

3. 120-125 ml of plasma is forced into the renal tubules each minutes.

4. They compose less than 1% of the body weight.

36.

Regarding the control of water balance by the kidneys:
1. The renal medulla has an osmotic gradient that decreases from the border with the cortex to the renal papilla.

2. ADH is secreted by anterior pituitary in response to a decrease in the osmolality of the blood.

3. A normal person cannot produce urine with an osmolality greater than 300 mOsmil.kg-1.

4. ADH acts on the cells of the collecting ducts to increase their permeability to water.

37.

What regulates the opening of oesophagus into the stomach?

1. A membranous valve

2. A muscular sphincter

3. A mesodermal septum

4. A cartilaginous flap

38.

Muscularis layer in the wall of the alimentary canal is formed by smooth muscles usually arranged into:-

1. an inner circular and an outer longitudinal layer.
2. an inner longitudinal and an outer circular layer.
3. both circular layers
4. both longitudinal layers

39. A person passes lot of dilute urine and drinks lot of water but does not have glycosuria. He is most likely suffering from:

1.   Type 1 diabetes mellitus

2.   Type 2 diabetes mellitus

3.   Pituitary diabetes

4.   Diabetes insipidus

40.

Describe urine in relationship to glomerular filtration tubular reabsorption and tubular secretion urine :
1. glomerular filtration + tubular reabsorption + tubular secretion
2. glomerular filtration - tubular reabsorption -tubular secretion
3. glomerular filtration + tubular reabsorption -tubular secretion
4. glomerular filtration -tubular reabsorption +tubular secretion

41.

Explain the reason there is a delay in processing the electrical signal from the AV node to the AV bundle. To:

1. allow the atria to complete their contraction prior to ventricular contraction
2. ensure the right and left atria contract at the same time
3. ensure the right and left ventricles contract at the same time
4 prevent an ectopic pacemaker

42.

Consider the following statements:

I.   Many bony fishes, aquatic amphibians and aquatic insects are ammonotelic.

II.   Mammals, many terrestrial amphibians and cartilaginous fishes are ureotelic.

III.   Reptiles, birds, land snails and insects are uricotelic.

Which of the above statements are true?

1.	I and II only	2.	I and III only
3.	II and III only	4.	I, II, and III

43.

Consider the following statements:

I.   The DCTs of many nephrons open into the collecting duct.

II.   In cortical nephrons, loop of Henle is short and does not extend into medulla.

III.   Vasa recta is absent or highly reduced in cortical nephrons.

Which of the above statements are true?

1.	I and II only	2.	I and III only
3.	II and III only	4.	I, II, and III

44. Match each item in Column I with one item in Column II and chose your answer from the codes given below:

	Column I (parameter)	Column II (blood value)
I.	Sodium	1. 15 - 40 mg%
II.	Urea	2. 140 mEq / L
III.	Fasting glucose	3. 9 - 10 mg%
IV.	Calcium	4. 70 - 100 mg%

Codes:

	I	II	III	IV
1.	1	2	3	4
2.	2	1	4	3
3.	2	1	3	4
4.	1	2	4	3

45. Match each item in Column I with one item in Column II and chose your answer from the codes given below:

	Column I (animal)	Column II (excretory product)
I.	Aquatic turtles	1. ammonia and urea
II.	Crocodiles	2. urea and CO2
III.	Humans	3. ammonia and uric acid

Codes:

	I	II	III
1.	1	2	3
2.	2	3	1
3.	2	1	3
4.	1	3	2

46.

Most of the aquatic arthropods respire through:

1. diffusion over entire body surface
2. gills
3. tracheae and tracheoles
4. skin

47.

What prevents the entry of food into the larynx during deglutition?

1. A thin elastic cartilaginous flap
2. A thick fibrous cartilaginous flap
3. A thick elastic cartilaginous flap
4. A thin calcified cartilaginous flap

48.

The trachea divides into a right and a left primary bronchus at the level of:

1. 2nd thoracic vertebra
2. 3rd thoracic vertebra
3. 5th thoracic vertebra
4. 12th thoracic vertebra

49.

the following two statements:
I. The lungs are situated in the thoracic chamber which is anatomically an air-tight chamber.
II. This arrangement is essential as we cannot directly alter the thoracic volume.
1. Both I and II are correct and II correctly explains I
2. Both I and II are correct but II does not explain I
3. I is correct and II is incorrect
4. Both I and II are incorrect

50.

Regarding pulmonary capacities, the maximum volume of air a person can breathe in after a forced expiration can also be defined as:

1. Total volume of air a person can inspire or expire after a normal inspiration or expiration
2. Volume of air that will remain in the lungs after a normal expiration
3. Maximum volume of air a person can breathe out after a forced inspiration
4. Total volume of air accommodated in the lungs at the end of a forced inspiration

51.

Which of the following will not be equal in normal physiological conditions?

1. Partial pressure of oxygen in deoxygenated blood and partial pressure of oxygen in tissues
2. Partial pressure of carbon dioxide in alveoli and partial pressure of carbon dioxide in oxygenated blood
3. Partial pressure of oxygen in oxygenated blood and partial pressure of oxygen in alveoli
4. Partial pressure of carbon dioxide in tissues and partial pressure of carbon dioxide in deoxygenated blood

52.

Binding of oxygen with hemoglobin is primarily related to:

1. Partial pressure of carbon dioxide
2. Partial pressure of oxygen
3. H^+ ion concentration in body fluids
4. Presence of 2,3-DPG in erythrocytes

53.

Under normal physiological conditions, what amount of oxygen is delivered to the tissues?

1. 4 ml
2. 5 ml
3. 15 ml
4. 20 ml

54.

Identify the incorrect statement regarding the enzyme cabonic anhydrase:

1. RBCs contain a very high concentration of this enzyme
2. The enzyme is absent in the plasma
3. It facilitates the reaction catalyzed in both directions
4. It is a metalloenzyme

55.

Pneumotaxic center:

1. moderates the function of the rhythm center
2. establishes the respiratory rhythm
3. is located in medulla oblongata
4. reduces the duration of expiration and thereby alters the respiratory rate

56.

Pulmonary fibrosis is a pathological hallmark of:

1. Chronic obstructive lung disease
2. Bronchial asthma
3. Viral Pneumonia in children
4. Occupational lung diseases

57.

Involuntary hyperventilation during an anxiety attack can cause the person to become faint because of:

1. increased CO_2 levels caused by increase in cellular respiration, reducing brain perfusion and causing ischemia
2. decreased O_2 levels in the blood, causing cells to lack enough ATP
3. effects of increased O_2 levels in the blood and consequent constriction of cerebral blood vessels
4. lowered CO_2 levels in the blood and consequent constriction of cerebral blood vessels

58.

Which of the following is one of the physiological adaptations that occur in the human body at very high altitudes?

2. The kidney releases EPO to stimulate an increase in hematocrit.
3. The heart rate decreases.
4. Because of a lower PO2, the respiratory rate declines.
5. The percentage of hemoglobin saturation increases.

59.

The peripheral chemoreceptors are:

1. more sensitive to a decrease in PCO_2 than to a decrease in PO_2
2. stimulated by hypocapnia
3. located in the medulla oblongata of the brain stem
4. more sensitive to a decrease in PO_2 than to a decrease in PCO_2

60.

In ornithine cycle which of the following wastes are removed form the blood -

1. CO_2 and ammonia

2. Ammonia and urea

3. CO_2 and urea

4. Urea and urine

61.

The net pressure gradient that causes the fluid to filter out of the glomeruli into the capsule is -

1. 20 mm Hg

2. 50 mm Hg

3. 75 mm Hg

4. 30 mm Hg

62.

Match each item in Column I with one in Column II and choose your answer from the codes given below:

Organism	Excretory structure
A. Rotifers	a. Protonephridia
B. Earthworms	b. Nephridia
C. Cockroach	c. Antennal glands
D. Prawns	d. Malpighian tubules

	A.	B.	C.	D.
1.	b	a	c	d
2.	a	c	b	d
3.	a	b	d	c
4.	a	b	c	d

63.

A _____ in GFR can activate _____ to release _____ which converts angiotensinogen to angiotensin I and further to angiotensin II which is a powerful _____ and restores GFR.

1. Rise, JG cells, Renin, Vasoconstrictor

2. Fall, JG cells, Renin, Vasoconstrictor

3. Fall, JGA, Renin, Vasodilator

4. Rise, JGA, Renin, Vasodilator

64.

According to Bohr's effect

1. Hemoglobin oxygen binding affinity is inversely related to acidity.

2. Hemoglobin oxygen binding affinity is inversely related to concentration of CO_2.

3. Hemoglobin oxygen binding affinity is directly related to acidity.

4. Both 1 and 2.

65.

Chloride shift occurs when

1. Blood gives up oxygen and receives CO_2 from tissues.

2. Blood receive oxygen from lungs.

3. When the hemoglobin saturation is minimum in the blood.

4. When the blood pH is maximum.

66.

'Erythroblastosis Foetails' occurs when

I. Mother is Rh^+ and foetus is Rh^-.

II. Mother is Rh^- and foetus is Rh^+.

III. Mother and foetus both are Rh^+.

IV. Mother and foetus both are Rh^-.

1. I & II

2. Only I

3. Only II

4. II, III & IV

67.

In ECG the ventricular contraction occurs

1. Just after P wave and before Q wave.

2. Just after Q wave but before T wave.

3. In between S-T segment.

4. After the end of T wave.

68.

Which of the following can not be expected in the filtrate. When it arrives to descending limb of Henle's loop?

I. Albumin   II. Glucose   III. Urea   IV. Amino acid

1. I, II, III & IV

2. I only

3. II, IV only

4. I, II & IV

69.

Blood present in afferent arteriole and efferent arteriole will differ in

I. Amount of protein.

II. Number if blood cells.

III. Amount of glucose.

IV. Amount of urea.

1. I, II, III & IV

2. III & IV only

3. IV only

4. III only

70.

Cardiac muscles can be best defined as

1. Many cardiac muscle cells assemble in a branding pattern.

2. Single cardiac muscle fibre enclosed by connective tissue layer.

3. Group of multinucleated muscle fibres enclosed by connective tissue layer.

4. Group of unstriated muscle fibres enclosed by endocardium.

71.

Which of the following is not modified mucosal epithelium?

1. Goblet cells

2. Brunner's glands

3. Crypts of Lieberkuhn

4. Gastric glands

72.

All the following facilitate binding of oxygen to hemoglobin at alveoli except:

1. Low pO_2

2. Low pCO_2

3. Lesser H^+ concentration

4. Lower temperature

73.

When the plasma of a person has both anti A and anti B antibodies the blood group of this person would be:

1. A

2. B

3. AB

4. O

74.

During which stage of the cardiac cycle is the first heart sound produced?

1. Atrial diastole

2. Joint diastole

3. Ventricular systole

4. Ventricular diastole

75.

In order to produce concentrated urine, large amounts of water can be reabsorbed from:

1. Ascending limb of loop of Henle

2. Descending limb of loop of Henle

3. Distal convoluted tubule

4. Collecting duct

76.

Atrial systole increases the flow of blood into the ventricles by about:

1. 10 %

2. 30 %

3. 50 %

4. 70 %

77.

The maximum volume of air a person can breathe in after a forced expiration is called as:

1. Inspiratory capacity

2. Functional residual capacity

3. Vital capacity

4. Total lung capacity

78.

Trypsinogen can be activated by:

1. HCl

2. Enterogastrone

3. Trypsin

4. Bicarbonate ions

79.

When the heart suddenly stops beating, the condition is called as:

1. CAD

2. Heart failure

3. Cardiac arrest

4. Heart attack

80.

Consider the characters of a certain digestive enzyme:
I. It is a proteolytic enzyme secreted as zymogen.

II. It acts in an alkaline pH.
III. It activates many pancreatic enzymes.

The digestive enzyme is:

1. Pepsin

2. Enterokinase

3. Cholecystokinin

4. Trypsin

81.

Consider the following events during a cardiac cycle:
I. Closure of the AV valves
II. Opening of the semilunar valves

These events occur during:

1. Atrial diastole

2. Atrial systole

3. Ventricular diastole

4. Ventricular systole

82.

Consider the following regarding a compound affecting renal physiology:
I. It is secreted when plasma osmolality is increased
II. It makes collecting duct permeable to water
III. It can act as vasoconstrictor at high doses

The compound is:

1. Aldosterone

2. Atrial Natriuretic Factor

3. ADH

4. Angiotensin

83.

Which of the following statement is true?

1. Cardiac output of an athlete is much lower than that of an ordinary man.

2. In each minute a single cardiac cycle is performed.

3. ECG are of no clinical diagnostic significances.

4. Cardiac cycle includes Auricular systole, ventricular systole and joint diastole/complete diastole.

84.

Which option is correct with respect to blood urea content?

1. Hepatic portal vein - less, renal vein - much.

2. Pulmonary artery - less, hepatic vein - much.

3. Hepatic vein - less, renal artery - much.

4. Renal vein - less, hepatic vein - much.

85.

Which of the following situations would result in the greatest degree of O_2 saturation for haemoglobin, assuming PO_2

remains constant-

1. Increased H^+ levels, decreased temperature.

2. Increased CO_2 levels, increased acidity.

3. Decreased CO_2 levels, decreased acidity.

4. Increased CO_2 levels, increased temperature.

86.

A normal event in the process of blood clotting is the

1. production of erythropoietin.

2. conversion of fibrin to fibrinogen.

3. activation of prothrombin to thrombin.

4. increase in platelets.

87.

A doctor puts his stethoscope on a patient's chest over the location of the heart and hears a swishing sound. Which of the following conditions is the best diagnosis for the patient's condition?

1. angina pectoris

2. myocardial infarction

3. incompetent cardiac valve

4. cardiac tamponade

88.

Assertion: In PCT all of the essential nutrient and 70-80 percent of electrolytes and water are reabsorbed.

Reason: PCT is lined by simple cuboidal brush border epithelium which decreases the surface, are for reabsorption.

89.

Assertion: Right atrium and right ventricle of heart are known as pulmonary heart.

Reason: Both right atrium and ventricle pump the deoxygenated blood.

90.

Assertion: Dissociation of CO_2 from carbamino haemoglobin takes place at alveolar level.

Reason: High O_2 concentration at alveolar level promotes the dissociation of carbaminohaemoglobin.

91.

White phosphorous reacts with calcium to form a certain compound which on hydrolysis produces

(1) PH_3

(2) H_3PO_4

(3) P_4O_6

(4) P_4O_{10}

92.

Which one of the following oxides is expected to exhibit paramagnetic behaviour -

1. CO_2

2. ClO_2

3. SO_2

4. SiO_2

93.

Among the cation H^+, Li^+, Na^+ and K^+, the one with highest ionic mobility and another with lowest ionic mobility respectively are :

1. $[H^+,\ K^+]$

2. $[K^+,\ H^+]$

3. $[Li^+,\ Na^+]$

4. $[H^+,\ Li^+]$

94.

The ionisation energy of hydrogen is high as compared to alkali metals because of

1. One electron in outermost shell

2. Small size

3. One proton in its nucleus

4. No Neutron

95.

CO_2 gas along with solid (Y) is obtained when sodium salt (X) is heated. (X) is again obtained when CO_2 gas is passed into aqueous solution (Y). (X) and (Y) are

1. $Na_2CO_3,\ Na_2O$

2. $Na_2CO_3,\ NaOH$

3 $NaHCO_3,\ Na_2CO_3$

4. $Na_2CO_3,\ NaHCO_3$

96.

A compound which can be used in space vehicles both to absorb CO_2 and liberate O_2 is

1. $NaOH$

2. Na_2O

3. Na_2O_2

4. $CaO\ +\ NaOH$

97.

Which nitrate cannot give light brown gas on heating?

1. $LiNO_3$

2. $NaNO_3$

3. $Mg(NO_3)_2$

4. $Ca(NO_3)_2$

98.

Na_2CO_3 can be manufactured by Solvay's process but K_2CO_3 cannot be prepared because

1. K_2CO_3 is more soluble

2. K_2CO_3 is less soluble

3. $KHCO_3$ is more soluble than $NaHCO_3$

4. $KHCO_3$ is less soluble than $NaHCO_3$

99.

Which of the following metal bicarbonates does not exist as solid?

1. $LiHCO_3$

2. $KHCO_3$

3. $Ca(HCO_3)_2$

4. $NaHCO_3$

100.

Which of the following metal is most commonly used in photochemical cells?

1. Lithium

2. Calcium

3. Caesium

4. Francium

101.

Which of the following is 'dead burnt plaster'?

1. $CaCO_3$

2. $CaSO_4 \cdot \frac{1}{2} H_2O$

3. $CaSO_4 \cdot 2H_2O$

4. $CaSO_4$

102.

A pair of metals which dissolves in sodium hydroxide solution is

1. Cu, K

2. Fe, Mg

3. Ag, Cu

4. Sn, Zn

103.

Which of the following substances can be used for drying gas?

1. Calcium carbonate

2. Sodium carbonate

3. Sodium bicarbonate

4. Calcium oxide

104.

Lewis acid character of boron trihalides follows the order

1. $BF_3 > BCl_3 > BBr_3 > BI_3$

2. $BCl_3 > BF_3 > BBr_3 > BI_3$

3. $BI_3 > BBr_3 > BCl_3 > BF_3$

4. $BI_3 > BBr_3 > BF_3 > BCl_3$

105.

When we heat borax strongly then it will yield the compound

1. $NaBO_2$

2. B_2O_3

3. $Na_2B_4O_7$

4. Both (1) and (2)

106.

Which one of the following compounds has similar structure to that of graphite?

1. Boron nitride

2. Boron carbide

3. Aluminium oxide

4. Aluminium carbide

107.

$Si_2O_7^{6-}$ is known as

1. Chain silicate

2. Pyrosilicate

3. Sheet silicate

4. Ring silicate

108.

In borax, the hybridised state of boron is

1. sp^2

2. sp^3

3. sp^2 as well as sp^3

4. sp

109.

The best reducing agent is

1. $GeCl_2$

2. $SnCl_2$

3. $PbCl_2$

4. $PbCl_4$

110.

NO_2 is the anhydride of

1. HNO_3

2. HNO_2

3. $HNO_3 + HNO_2$

4. None of these

111.

Which is not hydrolysed with water?

1. PCl_3

2. NF_3

3. NCl_3

4. BCl_3

112.

When PCl_3 is hydrolysed then oxyacid of phosphorous is obtained. The basicity of oxyacid is

1. One

2. Two

3. Three

4. Four

113.

Which set of oxide of nitrogen is paramagnetic in nature?

1. NO, N_2O

2. NO_2, NO, N_2O

3. NO, NO_2

4. NO_2, N_2O

114.

Correct order of boiling point of group 16 hydrides

1. $H_2O < H_2S < H_2Se < H_2Te$

2. $H_2Te < H_2Se < H_2S < H_2O$

3. $H_2S < H_2Se < H_2Te < H_2O$

4. $H_2O < H_2Te < H_2Se < H_2S$

115.

$S - S$ bond is present in

1. $H_2S_2O_7$

2. $H_2S_2O_8$

3. H_2SO_5

4. $H_2S_2O_6$

116.

Which is incorrectly given according to order indicated?

1. $F_2 > Cl_2 > Br_2 > I$ (Oxidising Power)

2. $HI > HBr > HCl > HF$ (Acidic Strength)

3. $F_2 > Cl_2 > Br_2 > I_2$ (Bond Energy)

4. $HF > HI > HBr > HCl$ (Boiling Point)

117.

The correct order of acidic strength of oxyacid of phosphorous is

1. $H_3PO_2 > H_3PO_3 > H_3PO_4$

2. $H_3PO_4 > H_3PO_3 > H_3PO_2$

3. $H_3PO_3 > H_3PO_2 > H_3PO_4$

4. $H_3PO_2 > H_3PO_4 > H_3PO_3$

118.

Which has the highest bond angle?

1. NH_3

2. H_2O

3. H_2S

4. PH_3

119.

Which is mismatched regarding the shape?

1. XeF_4 = Square planar

2. $XeOF_4$ = Square Pyramidal

3. XeF_6 = Distorted Octahedral

4. XeO_3 = Bent Shape

120.

Conc. HNO_3 reacts with I_2 to give

1. HI

2. HOI

3. HIO_3

4. $HOIO_2$

121.

The number of sigma bonds in P_4O_{10} is

1. 6

2. 16

3. 20

4. 7

122.

Which are true statements among the following?

1. PH_5 does not exist

2. $p\pi$-$d\pi$ bonds are present in SO_2

3. SeF_4 and CH_4 have same shape

4. I_3^+ has bent geometry

123.

Which does not show inert pair effect

1. Al

2. Sn

3. Pb

4. Thallium

124.

Identify the correct sequence of increasing number of π-bonds in structure of the following molecules

(i) $H_2S_2O_6$ (ii) H_2SO_3 (iii) $H_2S_2O_5$

1. (i), (ii), (iii)

2. (ii), (iii), (i)

3. (ii), (i), (iii)

4. (i), (iii), (ii)

125.

Paramagnetic oxides are :-

1. N_2O_4, NO_2

2. NO, ClO_2

3. P_4O_6, P_4O_{10}

4. N_2O_5, O_2^+

126.

Oxyacid with maximum P–H bond is :-

1. hypophosphorous acid.

2. cyclotrimeta phosphoric acid.

3. hypophosphoric acid.

4. orthophosphorous acid.

127.

Ozone can be quantitatively estimated by :-

1. Kl, Na_2SO_4

2. PbS, Na_2SO_4

3. NO, l

4. Kl, $Na_2S_2O_3$

128.

In NO_3^- Ion, number of bond pairs and lone pairs of electrons on nitrogen atom are :-

1. 2, 2

2. 3, 1

3. 1, 3

4. 4, 0

129.

Predict the product of reaction of I_2 with H_2O_2 in basic medium.

1. I^-

2. I_2O_3

3. IO_3^-

4. I_3^-

130.

Choose the wrong set :-

1. $XeOF_2$ – 'T' shape –sp^3d

2. $XeOF_4$ – Square pyramidal –sp^3d^2

3. XeO_2F_2 = distorted trigonal bipyramidal –sp^3d

4. XeO_3F_2= octahedral –sp^3d

131.

The most powerful reducing agent is

1. H_3PO_3

2. H_3PO_4

3. $H_4P_2O_7$

4. $H_4P_2O_6$

132.

A mixed anhydride is

1. N_2O_5

2. NO_2

3. N_2O_3

4. N_2O

133.

Oxidising product of the substance Na_3AsO_3 would be:-

1. $As_2O_3^{-3}$

2. AsO_3^{-3}

3. AsO_2^{-4}

4. AsO_4^{-3}

134.

Which of the following is correct?

1. HCO_3^- shows amphoteric behaviour.

2. White phosphorus has 6 P-P bond.

3. Thermodynamic stability of diamond < thermodynamic stability of graphite.

4. All of the above are correct.

135.

Extra pure N_2 gas can be obtained by heating:

1. NH_3 and CuO

2. NH_4NO_2

3. $(NH_4)_2Cr_2O_7$

4. $Ba(N_3)_2$

136. **A planet revolves in elliptical orbit around the sun. The linear speed of the planet will be maximum at :**
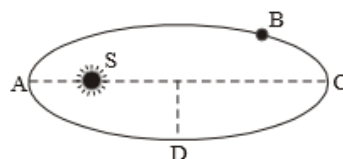
1. A
2. B
3. C
4. D

137.

At what altitude will the acceleration due to gravity be 25% of that at the earth's surface (given radius of earth is R)?

1. R/4
2. R
3. 3R/8
4. R/2

138.

At what distance from the centre of the moon is the point at which strength of the resultant field of earth's and moon's gravitational field is equal to zero. The earth's mass is 81 times that of moon and the distance between centres of these planets is 60R where R is the radius of the earth

1. 6 R
2. 4 R
3. 3 R
4. 5 R

139.

Two masses m_1 and m_2 are initially at rest and are separated by a very large distance. If the masses approach each other subsequently, due to gravitational attraction between them, their relative velocity of approach at a separation distance of d is :
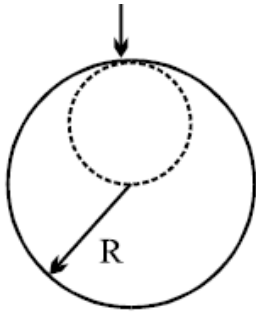
1. $\frac{2\,Gd}{(m_1+m_2)}$

2. $\frac{(m_1+m_2)G}{2d}$

3. $\left[\left(m_1+m_2\right)\frac{2G}{d}\right]^{1/2}$

4. $\left(m_1+m_2\right)^{1/2}2\,Gd$

140.

A spherical hole of radius R/2 is excavated from the asteroid of mass M as shown in fig. The gravitational acceleration at a point on the surface of the asteroid just above the excavation is

1. GM/R^2

2. $GM/2R^2$

3. $GM/8R^2$

4. $7GM/8R^2$

141.

If the radius of the earth be increased by a factor of 5, by what factor its density be changed to keep the value of g the same?
1. 1/25

2. 1/5

3. $1/\sqrt{5}$

4. 5

142.

An infinite number of masses, each of one kg are placed on the +ve X axis at 1m, 2m, 4m _____ from the origin. The magnitude of the gravitational field at origin due to this distribution of masses is:
1. 2G

2. $\frac{4G}{3}$

3. $\frac{3G}{4}$

4. ∞

143.

A satellite revolves in the geostationary orbit but in a direction east to west. The time interval between its successive passing about a point on the equator is :
1. 48 hrs
2. 24 hrs
3. 12 hrs
4. never

144.

A satellite of the earth is revolving in circular orbit with a uniform velocity V. If the gravitational force suddenly disappears, the satellite will

1. Continue to move the same velocity in the same orbit.
2. move tangentially to the original orbit with velocity V.
3. fall down with increasing velocity.
4. come to a stop somewhere in its original orbit.

145.

At what height above the earth's surface does the

acceleration due to gravity fall to 1% of its value at the earth's surface?
1. 9R
2. 10R
3. 99R
4. 100R

146.

Two concentric shells of uniform density of mass M_1 and M_2 are situated as shown in the figure. The forces experienced by a particle of mass m when placed at position A, B, C respectively are (given OA = p, OB = q and OC = r)
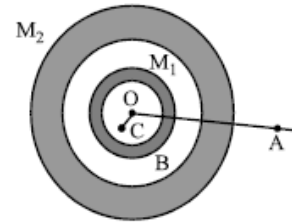
1. Zero, $G\frac{M_1 m}{q^2}$ and $G\frac{(M_1 + M_2)m}{p^2}$

2. $G\frac{(M_1 + M_2)m}{p^2}$, $G\frac{(M_1 + M_2)m}{q^2}$ and $G\frac{M_1 m}{r^2}$

3. $G\frac{M_1 m}{q^2}$, $G\frac{(M_1 + M_2)m}{p^2}$ and Zero

4. $G\frac{(M_1 + M_2)m}{p^2}$, $G\frac{M_1 m}{q^2}$ and Zero

147.

A newly discovered planet has a density eight times the density of the earth and a radius twice the radius of the earth. The time taken by 2 kg mass to fall freely through a distance S near the surface of the earth is 1 second. Then the time taken for a 4 kg mass to fall freely through the same distance S near the surface of the new planet is
1. 0.25 sec.
2. 0.5 sec.
3. 1 sec.
4. 4 sec.

148.

The radius of a planet is R. A satellite revolves around it in a circle of radius r with angular velocity ω_o. The acceleration due to the gravity on planet's surface is

1. $\frac{r^3 \omega_0}{R}$

2. $\frac{r^3 \omega_0^3}{R^2}$

3. $\frac{r^3 \omega_0^2}{R}$

4. $\frac{r^3 \omega_0^2}{R^2}$

149.

A particle starts from rest at a distance R from the centre and along the axis of a fixed ring of radius R & mass M. Its velocity at the centre of ring is :
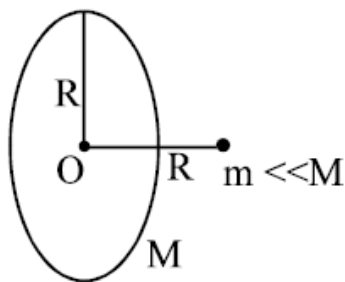
1. $\sqrt{\dfrac{\sqrt{2}\,GM}{R}}$

2. $\sqrt{\dfrac{2\,GM}{R}}$

3. $\sqrt{\left(1-\dfrac{1}{\sqrt{2}}\right)\dfrac{GM}{R}}$

4. $\sqrt{\left(2-\sqrt{2}\right)\dfrac{GM}{R}}$

150.

A spherical uniform planet is rotating about its axis. The velocity of a point on its equator is V. Due to the rotation of planet about its axis the acceleration due to gravity g at equator is 1/2 of g at poles. The escape velocity of a particle on the planet in terms of V.

1. $V_e = 2V$

2. $V_e = V$

3. $V_e = V/2$

4. $V_e = \sqrt{3}V$

151.

Two point masses of mass $4m$ and m respectively separated by d distance are revolving under mutual force of attraction. Ratio of their kinetic energies will be :

1. 1 : 4
2. 1 : 5
3. 1 : 1
4. 1 : 2

152.

Two planets A and B have the same material density. If the radius of A is twice that of B, then the ratio of the escape velocity $\dfrac{V_A}{V_B}$ is
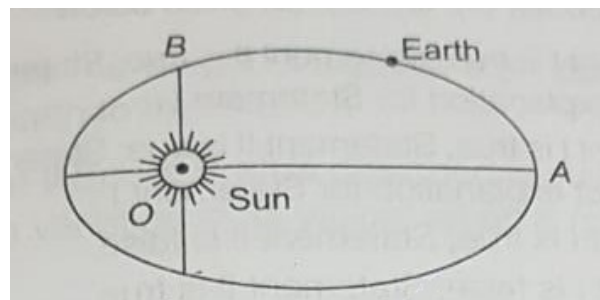
1. 2

2. $\sqrt{2}$

3. $1/\sqrt{2}$

4. $1/2$

153.

The earth moves around the sun in an elliptical orbit as shown in the figure. The ratio $\dfrac{OA}{OB} = x$. The ratio of the speeds of the earth at B and at A is

1. $\sqrt{x}$
2. x
3. x^2
4. $x\sqrt{x}$

154.

A body is released from a point distance r from the centre of earth. If R is the radius of earth and r > R, then the velocity of the body at the time of striking the earth will be

1. $\sqrt{gR}$

2. $\sqrt{2gR}$

3. $\sqrt{\dfrac{2gR}{r-R}}$

4. $\sqrt{\dfrac{2gR(r-R)}{r}}$

155.

A straight rod of length L extends from x = a to x = L+a. The gravitational force, it exerts on a point mass m at x = 0, if mass per unit length is $A + Bx^2$ is

(a) $Gm\left[A\left(\dfrac{1}{a+1}-\dfrac{1}{a}\right)+BL\right]$

(b) $Gm\left[A\left(\dfrac{1}{a}-\dfrac{1}{a+1}\right)+BL\right]$

(c) $Gm\left[A\left(\dfrac{1}{(a+1)}-\dfrac{1}{a}\right)-BL\right]$

(d) $Gm\left[A\left(\dfrac{1}{a}-\dfrac{1}{a+1}\right)-BL\right]$

156.

For a satellite moving in an orbit around the earth, the ratio of kinetic energy to potential energy is -

1. $\dfrac{1}{\sqrt{2}}$

2. 2

3. $\sqrt{2}$

4. $\dfrac{1}{2}$

157.

Imagine a new planet having the same density as that of earth but it is 3 times bigger than the earth in size. If the acceleration due to gravity on the surface of earth is g and that on the surface of the new planet is g', then -

1. g' = 3g

2. g' = 9g

3. g' = g/9

4. g' = 27g

158.

A body is falling under gravity from rest. Its loses 200 J of gravitational potential energy, when its speed is 10 ms^{-1}. Mass of body is

1. 3 kg

2. 4 kg

3. 5 kg

4. 7 kg

159.

The values of the acceleration on the surfaces of two planets are equal, the planets must have same

1. Mass

2. Radius

3. $\dfrac{\text{Mass}}{\text{Radius}}$

4. $\dfrac{\text{Mass}}{(\text{Radius})^2}$

160.

A body is projected up with a velocity equal to escape velocity of earth at angle of 60° with the horizontal, then

1. Body comes back to the surface

2. Body first go up than returns back after 5 second

3. Never come back

4. Depends upon mass of the body

161.

Infinite number of masses each of 1.5 kg are placed along a straight line at distance of 1 m, 2 m, 4 m, 8 m ..... from a point O on the same line. What is the magnitude of gravitational field at O?

1. 0.5 G
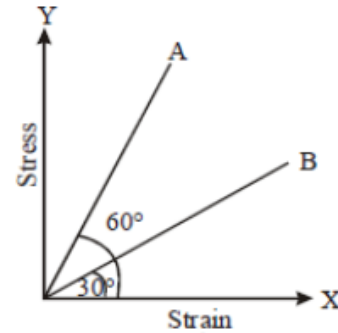
2. 1.0 G

3. 1.5 G

4. 2 G

162.

The length of elastic string, obeying Hooke's law is l_1 metres when the tension 4N and l_2 metres when the tension is 5N. The length in metres when the tension is 9N is-

1. $5l_1 - 4l_2$

2. $5l_2 - 4l_1$

3. $9l_1 - 8l_2$

4. $9l_2 - 8l_1$

163.

The stress versus strain graphs for wires of two materials A and B are as in the figure. If $Y_A \ and \ Y_B$ are the Young's moduli of the materials, then-

1. $Y_B = 2Y_A$

2. $Y_A = Y_B$

3. $Y_B = 3Y_A$

4. $Y_A = 3Y_B$

164.

A steel wire of uniform cross-sectional area $2mm^2$ is heated up to $50°C$ and is stretched by clamping its two ends rigidly. The change in tension when the temperature falls from $50°C \ to \ 30°C$ is given by- $\left(\alpha = 1.1 \times 10^{-5} \ °C, \ Y = 2.0 \times 10^{11} \ N/m^2\right)$

1. 88 N

2. 5 N

3. $1.5 \times 2.0^{10} N$

4. $2.5 \times 2.0^{10} \ N$

165.

A metallic rod of young's modulus $2 \times 10^{11} \ Nm^{-2}$ undergoes a strain of 0.05%. The energy stored per unit volume of the rod will be-

1. $2.5 \times 10^8 Jm^{-3}$

2. $0.5 \times 10^4 Jm^{-3}$

3. $2.5 \times 10^4 Jm^{-3}$

4. $0.5 \times 10^8 Jm^{-3}$

166.

The following four wire (length L and diameter D) are made of the same material. Which of these will have the largest extension when the same tension is applied?

1. L=50 cm, D=0.5 mm

2. L=100 cm, D=1 mm

3. L=200 cm, D=2 mm

4. L=300 cm, D=0.5 mm

167.

To break a wire, a force of $10^6\ N/m^2$ is required. If the density of the material is $3 \times 10^3\ kg/m^3$, then the length of the wire which will break by its own weight will be :

1. 34 m

2. 30 m

3. 300 m

4. 3 m

168.

The diameter of a brass rod is 4 mm and Young's modulus of brass is $9 \times 10^{10}\ N/m^2$. The force required to stretch by 0.1% of its length is :

1. 360 pN

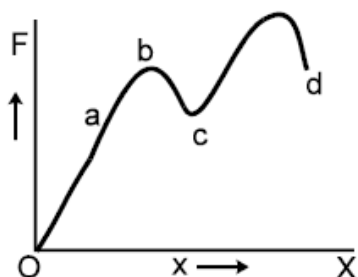2. 36 N

3. $144\ p \times 10^3 N$

4. $36\ p \times 10^5 N$

169.

The Young's modulus of a wire of length L and radius r is = Y N/m^2. If the length and radius are reduced to L/2 and r/2, then its Young's modulus will be :

1. Y/2

2. Y

3. 2 Y

4. 4 Y

170.

The graph is drawn between the applied force F and the strain (x) for a thin uniform wire. The wire behaves as a liquid in the part :

1. ab

2. bc

3. cd

4. oa

171.

An Indian rubber cord L metre long and area of cross-section 'a' $metre^2$ is suspended vertically. Density of rubber is D kg / $metre^3$ and Young's modulus of rubber is E newton/ $metre^2$. If wire extends by l metre under its own weight, then extension l is:

1. $L^2 Dg/E$

2. $L^2 Dg/2E$

3. $L^2 Dg/4E$

4. L

172.

Mass and radius of earth is M and R respectively then gravitational potential at a distance R/3 from the centre of earth is

1. $-\dfrac{GM}{R}$

2. $-\dfrac{3\,GM}{R}$

3. $-\dfrac{11}{9}\dfrac{GM}{R}$

4. $-\dfrac{13}{9}\dfrac{GM}{R}$

173.

Kinetic energy of satellite in its orbit is K then its binding energy is

1. -K

2. -2K

3. 2K

4. K

174.

A particle is projected at angle θ with the horizontal. At a certain instant the velocity is $\overrightarrow{v}$ and gravitational force on the particle is $\overrightarrow{F}$. The value of $\overrightarrow{F} . \overrightarrow{v}$ is

1. Positive during upward journey.

2. Negative during downward journey.

3. Zero at the highest point.

4. All of these.

175.

At a certain point of the circular orbit of a satellite; if some mass is dropped from the satellite then

1. It will revolve in same orbit with same orbital velocity in opposite direction of satellite.

2. Revolve in same orbit with same orbital velocity in same direction of satellite.

3. Mass drop to earth.

4. Escape from orbit linearly.

176.

If a particle is dropped from a height h = 3 R

from earth surface, the speed with which the particle will strike the ground is

1. $\sqrt{3\ gR}$

2. $\sqrt{2\ gR}$

3. $\sqrt{1.5\ gR}$

4. $\sqrt{gR}$

177.

A satellite is moving round the earth with a velocity v. To make the satellite escape, the minimum percentage increase in its velocity is nearly:-

1. 62.1%

2. 41.4%

3. 82.8%

4. 100%

178.

A projectile is fired vertically upwards from the surface of the earth with a velocity nv_e, where v_e is the escape velocity and n < 1. If R is the radius of the earth, the maximum height from the centre of the earth to which the projectile will rise will be: (Neglect air resistance):-

1. $R\left(1 - n^2\right)$

2. $R\left(1 + n^2\right)$

3. $\left(\frac{Rn^2}{1-n^2}\right)$

4. $\frac{R}{\left(1+n^2\right)}$

179.

The magnitudes of gravitational flied at distance r_1 and r_2 from the centre of a uniform sphere of radius R and mass M are F_1 and F_2 respectively.
Then :-

1. $\frac{F_1}{F_2} = \frac{r_1}{r_2}$ if $r_1 < R$ and $r_2 < R$.

2. $\frac{F_1}{F_2} = \frac{r_1}{r_2}$ if $r_1 > R$ and $r_2 > R$.

3. $\frac{F_1}{F_2} = \frac{r_1^2}{r_2^2}$ if $r_1 < R$ and $r_2 < R$.

4. $\frac{F_1}{F_2} = \frac{r_1^2}{r_2^2}$ if $r_1 > R$ and $r_2 > R$.

180.

A satellite is moving round the earth with a speed of v in a circular orbit of radius r. If the orbit's radius is reduced by 1% its speed will:-

1. Increase by 1%

2. Increase by 0.5%

3. Decrease by 1%

4. Decrease by 0.5%

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