

11th Science Lesson 3 Questions in English

3] Basic Medical Instruments and Techniques

1. Which of the following are used by doctors to monitor the health conditions of individuals?

- 1) Thermometer
 - 2) Sphygmomanometer
 - 3) Gyroscope
 - 4) Stethoscope
- a) 1, 2, 4
 - b) 2, 3, 4
 - c) 1, 2, 3
 - d) All the above

Explanation

Traditionally doctors employ simple instruments like **thermometer, stethoscope, and sphygmomanometer to monitor the health conditions of individuals**. Medical technology has blossomed during the last few decades and revolutionized medical practices which are immensely influencing life saving means in emergency care of patients.

2. Haematology is the study of_____

- a) Human body
- b) **Cause, prognosis, treatment, and prevention of diseases related to blood**
- c) Bone marrow
- d) Bone

Explanation

Haematology, is the branch of medicine concerned with the **study of the cause, prognosis, treatment, and prevention of diseases related to blood**.

3. _____ is the study of the adverse effects of chemical substances on living organisms

- a) Homeostatis
- b) Haematology
- c) **Toxicology**
- d) Oncology

Explanation

Toxicology is a discipline that involves the study of the adverse effects of chemical substances on living organisms and the practice of diagnosing and treating exposures to toxins and toxicants.

4. Which of the following sounds can be hear using Stethoscope?

- 1) Heart beat
 - 2) Sounds due to inhalation and exhalation of air
 - 3) Foetal movements
- a) 1, 2
 - b) 1, 3
 - c) 2, 3
 - d) **All the above**

Explanation

Stethoscope is a medical device used to hear the internal sounds of the human body such as **heart beat, sounds due to inhalation and exhalation of air in the lungs, stomach, intestinal movements and also foetal movements.**

5. Which of the following statement is correct?

- 1) The modern electronic stethoscope is a high precision instrument used to hear with clarity the internal sounds of the human body even in a noisy environment or through the heavy clothing of the patient
 - 2) A typical stethoscope consists of a disc shaped resonator that is placed against chest with two rubber tubes connected to earpieces
 - 3) It is a simple but an effective diagnostic tool to localize problems and to diagnose diseases
- a) 1, 2
 - b) 1, 3
 - c) 2, 3
 - d) **All the above**

Explanation

The modern electronic stethoscope is a high precision instrument used to hear with clarity the internal sounds of the human body even in a noisy environment or through the heavy clothing of the patient. A typical stethoscope consists of a disc shaped resonator that is placed against chest with two rubber tubes connected to earpieces. This is simply known as binaural stethoscope. It is a simple but an effective diagnostic tool to localize problems and to diagnose diseases.

6. Which of the following diseases can be diagnosed with stethoscope?

- 1) Ulcer
 - 2) Pneumonia
 - 3) Pulmonary edema
 - 4) Bronchitis
- a) 1, 2
 - b) **2, 3, 4**

- c) 1, 3, 4
- d) 1, 2, 3

Explanation

Stethoscope helps to **diagnose lung diseases** such as **pneumonia, pulmonary edema, bronchitis and pleuritis**.

7. Which of the following are the clinical significance of stethoscope?

- 1) Stethoscope helps to find the normal and abnormal heart beat sounds and also to diagnose valve functions
 - 2) Stethoscopes along with sphygmomanometer are used to read the blood pressure
 - 3) It outlines the status of cardiac, respiratory and intestinal disorders.
- a) 1, 2
 - b) 1, 3
 - c) 2, 3
 - d) **All the above**

Explanation

Clinical significance of stethoscope:

- Stethoscope helps to find the normal and abnormal heart beat sounds and also to diagnose valve functions.
- It helps to diagnose lung diseases such as pneumonia, pulmonary edema, bronchitis and pleuritis.
- Stethoscopes along with sphygmomanometer are used to read the blood pressure.
- **It outlines the status of cardiac, respiratory and intestinal disorders.**

8. Which of the following statement about Sphygmomanometer is correct?

- 1) Sphygmomanometer is a device that measures the blood pressure
 - 2) It consists of a rubber cuff which is wrapped around the upper arm and the other end is connected to a mercury manometer which directly measures the pressure in a uniformly graduated scale
 - 3) By gradually increasing and reducing the pressure in the cuff, the systolic and diastolic blood pressure is clearly monitored by the sounds of arterial blood flow
- a) 1, 2
 - b) 1, 3
 - c) 2, 3
 - d) **All the above**

Explanation

Sphygmomanometer is a device that measures the blood pressure hence known as blood pressure meter, blood pressure monitor or blood pressure gauge. It consists of a rubber cuff which is wrapped around the upper arm and the other end is connected to a mercury manometer which directly measures the pressure in a uniformly graduated scale. **By gradually increasing and reducing the pressure in the cuff, the systolic and diastolic blood pressure is clearly monitored by the sounds of arterial blood flow. The cuff is smoothly wrapped around the upper arm 3 cm above the elbow.** The resonator of the stethoscope is placed on the brachial artery at the elbow to hear the blood flow sounds.

9. The cuff of sphygmomanometer is then rapidly inflated to_____ mm Hg and is then slowly deflated

- a) 90
- b) 120
- c) 80
- d) 180**

Explanation

The **cuff of sphygmomanometer is then rapidly inflated to 180 mm Hg and is then slowly deflated.** As the pressure in the cuff falls a “whooshing” sound is heard then the blood flow starts again in the artery. This indicates the patient’s systolic pressure. Then the pressure is slowly released until no sound is heard. This is measured as the diastolic blood pressure. For better clinical understanding readings may be taken in both arms.

10. Which of the following sphygmomanometer requires calibration checks?

- a) Mercury sphygmomanometer
- b) Aneuroid sphygmomanometer**
- c) Digital sphygmomanometer
- d) All the above

Explanation

Aneuroid sphygmomanometer is a mechanical type with a dial and it requires calibration checks unlike mercury manometer. Mercury sphygmomanometer shows blood pressure by affecting the height of a column of mercury which does not require calibration.

11. Which of the following sphygmomanometer can be used without training?

- a) Mercury sphygmomanometer
- b) Aneuroid sphygmomanometer
- c) Digital sphygmomanometer**
- d) All the above

Explanation

Digital sphygmomanometer detects systolic and diastolic pressures by an oscillometric detector. It is **easy to use even without training**.

12. The maximum pressure exerted during the ventricular contraction is called_____ pressure
- a) **Systolic**
 - b) Diastolic
 - c) Both a and b
 - d) None

Explanation

The **maximum pressure exerted during the ventricular contraction is called systolic pressure** and the minimum pressure exerted during the ventricular relaxation is called diastolic pressure.

13. Systolic pressure =_____ mm Hg
- a) 100
 - b) **120**
 - c) 80
 - d) 180

Explanation

Normal Blood Pressure = 120/80 mmHg

Systolic pressure = 120 mm Hg

Diastolic pressure = 80 mm Hg

14. WHITE COAT EFFECT is related to_____
- a) Respiratory
 - b) **Blood pressure**
 - c) Neurological
 - d) Digestion

Explanation

White coat hypertension, more commonly known as white coat syndrome, is a phenomenon in which the patients exhibit a blood pressure level above the normal range, in a clinical setting, though they do not exhibit in other settings.

15. Which of the following are the uses of Sphygmomanometer?

- 1) To diagnose pathological conditions such as hypertension and hypotension

- 2) Helps to assess the state of blood circulation
- 3) Provides the functional details of heart
 - a) 1, 2
 - b) 1, 3
 - c) 2, 3
 - d) **All the above**

Explanation

Clinical Significance:

- To diagnose pathological conditions such as hypertension and hypotension
- Helps to assess the state of blood circulation.
- Provides the functional details of heart.

16. _____ is a simple and portable medical device used to record approximate levels of blood glucose

- a) Glycometer
- b) **Glucometer**
- c) Gyroscope
- d) Autoanalyzer

Explanation

Glucometer is a simple and portable medical device used to record the approximate levels of blood glucose. It is a battery-operated digital meter.

17. Most glucometers are based on_____

- a) Biological reaction
- b) Chemical reaction
- c) **Electrochemical reaction**
- d) Physical reaction

Explanation

Most glucometers are based on the electrochemical technology or colour reflectance principle. Based on colour change blood glucose level can be known.

18. The meter reads the blood sample and displays the glucose level in the units of_____

- a) g/mL
- b) mg/mL
- c) **mg/dL**
- d) mg/L

Explanation

A drop of blood is taken from the tip of the finger and placed on the disposable test strip. **The meter reads the blood sample and displays the glucose level in the units of mg/dL.**

19. The glucometer results are displayed in approximately_____ seconds

- a) 10
- b) 20
- c) **40**
- d) 60

Explanation

Significance of glucometer:

- Handy and portable
- **Immediate results, the results are displayed in approximately 40 seconds.**
- Requires no calculation
- No training is required for operating the instrument

20. Match the following

- | | |
|---------------------------------|-------------------|
| I. Normal glucose value | 1. 110 – 140mg/dL |
| II. Random blood sugar | 2. 70 – 100 mg/dL |
| III. Fasting blood sugar | 3. 80 – 120 mg/dL |
| IV. Post – prandial blood sugar | 4. 70 – 110 mg/dL |
- a) 2, 1, 3, 4
 - b) **2, 3, 4, 1**
 - c) 2, 4, 1, 3
 - d) 1, 3, 4, 2

Explanation

Normal Glucose Values in blood:

Normal glucose value: 70 – 100 mg/dL

Random blood sugar: 80 – 120 mg/dL

Fasting blood sugar: 70 – 110 mg/dL

Post – prandial blood sugar: 110 – 140mg/dL

21. Which of the following biochemical parameters can be estimated using auto-analyser?

- 1) Glucose
- 2) Enzymes
- 3) Urea

- 4) Cholesterol
- a) 1, 2, 4
 - b) 2, 3, 4
 - c) 1, 3, 4
 - d) **All the above**

Explanation

Auto-analyser is a computer- controlled device. It is used for quick estimation of several biochemical parameters like glucose, urea, cholesterol, enzymes and other proteins present in body fluids. The analyser is fully integrated with all the necessary controls such as temperature of reaction, volumes of sample, reagents and transfer of fluids.

22. _____ is a test to evaluate the electrical activities of the brain

- a) **EEG**
- b) ECG
- c) CEG
- d) KEG

Explanation

EEG is a test to evaluate the electrical activities of the brain. Brain cells communicate with each other through electrical impulses.

23. Which of the following statement about EEG is correct?

- 1) EEG tracks and records the heart wave patterns
 - 2) It is a graphical recording of the electrical activities of the cortical and sub cortical regions of the brain
 - 3) The electrodes analyse the electrical impulses in the brain and send signals to a computer which records the results.
- a) 1, 2
 - b) 1, 3
 - c) **2, 3**
 - d) All the above

Explanation

EEG tracks and records the brain wave patterns. It is a graphical recording of the electrical activities of the cortical and sub cortical regions of the brain. It is recorded by placing the surface electrodes on the scalp region. The electrodes analyse the electrical impulses in the brain and send signals to a computer which records the results.

24. Which of the following statement is correct?

- 1) In 1929 German scientist Hans Berger was the first to analyse the EEG.
- 2) The electrical activity recorded by EEG may have synchronised or desynchronised waves
- 3) It has three frequency waves/ rhythms namely alpha, beta, delta waves
 - a) 1, 2
 - b) 1, 3
 - c) 2, 3
 - d) All the above

Explanation

In 1929 German scientist Hans Berger was the first to analyse the EEG. Hence, EEG is also known as "Berger Wave". The electrical activity recorded by EEG may have synchronised or desynchronised waves. **It has four frequency waves/ rhythms namely alpha, beta, delta and theta waves.**

25. Which of the following are the uses of EEG?

- 1) EEG provides a means to study the functioning of the brain and its coordination with other parts of the body
- 2) It can be used to diagnosis cardiac arrest
- 3) It is useful in diagnosis of neurological and sleep disorders
 - a) 1, 2
 - b) 1, 3
 - c) 2, 3
 - d) **All the above**

Explanation

Clinical significance of EEG: EEG provides a means to study the functioning of the brain and its coordination with other parts of the body. It is useful in diagnosis of neurological and sleep disorders. EEG is useful in assessing patients with suspected brain death.

26. Which of the following can be diagnosed using EEG?

- 1) Brain tumour
- 2) Cerebral infection
- 3) Epilepsy
 - a) 1, 2
 - b) 1, 3
 - c) 2, 3
 - d) **All the above**

Explanation

EEG has proved to be a useful diagnostic tool in cases of serious head injuries, brain tumours and cerebral infections. It also helps to find the diseases like epilepsy and various degenerative disease of the nervous system.

27. Which of the following can record real-time data on various physiological conditions?

- 1) Fitness trackers
- 2) Helmet worn impact checkers
- 3) Filament implant
 - a) 1, 2
 - b) 1, 3
 - c) 2, 3
 - d) **All the above**

Explanation

Wearable Healthcare devices include smart watches, fit-bit wristbands, fitness trackers, helmet-worn impact checkers, back pain posture checkers, necklaces, clip-ons, smart clothing and filament implant. These medical devices with select sensors can record real-time data on various physiological conditions and electronically send them to doctor, or via apps on smart phone.

28. Which of the following statement is correct?

- 1) Radiography is the use of X-rays to visualize the internal structures of a patient
- 2) X-Rays are a form of electromagnetic radiation, produced by an X-ray tube
- 3) The X-rays are passed through the body and captured behind the patient by a detector
 - a) 1, 2
 - b) 2, 3
 - c) 1, 3
 - d) **All the above**

Explanation

Radiography is the use of X-rays to visualize the internal structures of a patient (Figure12.6). X-Rays are a form of electromagnetic radiation, produced by an X-ray tube. The X-rays are passed through the body and captured behind the patient by a detector; film sensitive to x-rays or a digital detector.

29. Which of the following statement is correct?

- 1) There is variation in absorption of the X-rays by different tissues within the body
- 2) Dense bones absorb more radiation, while soft tissue allows more rays to pass through
- 3) This variation produces contrast image within the image to give a 2D representation of all the structures. It is invasive.
 - a) 1, 2
 - b) 1, 3

- c) 2, 3
- d) **All the above**

Explanation

There is variation in absorption of the X-rays by different tissues within the body. Dense bones absorb more radiation, while soft tissue allows more rays to pass through. This variation produces contrast image within the image to give a 2D representation of all the structures. It is invasive. It is also available as a portable X ray unit. It is less costly when compared to the other imaging units like MRI or CT.

30. Which of the following are the clinical significance of X-ray?

- 1) X- ray imaging is used for diagnosing the disease of the heart, lungs and fractures of bones and joints
 - 2) Fluoroscopy for real time images
 - 3) X-rays are used in radiation therapy to shrink cancerous tumours
- a) 1, 2
 - b) 1, 3
 - c) 2, 3
 - d) **All the above**

Explanation

Clinical significance of X-ray:

- X- ray imaging is used for diagnosing the disease of the heart, lungs and fractures of bones and joints
- Fluoroscopy for real time images
- X-rays are used in radiation therapy to shrink cancerous tumours

31. _____ is a special type of X-ray imaging to create detail images of the breast tissues

- a) **Mammography**
- b) Manography
- c) Avography
- d) Polygraphy

Explanation

Mammography is a special type of X-ray imaging to create detail images of the breast tissues. X-ray is also used to visualise hollow organs and blood vessels by filling them with certain chemical formulations containing barium and iodine.

32. Who discovered X-ray?

- a) Marie curie
- b) Irre curie
- c) **Roentgen**
- d) Einstein

Explanation

'X rays were discovered by German physicist Sir Wilhelm Conard Roentgen in 1895, while he was studying on high voltage discharge phenomenon in a Crooker's tube. He noticed fluorescence of a barium platino cyanide screen lying several feet away in the same room.

33. Which of the following statement is incorrect?

- 1) Ultrasound literally means sound beyond the range of human hearing. Ultrasound waves are produced by a physical phenomenon known as Piezo-electric effect
- 2) When an electric potential is applied to certain crystals they become excited, vibrate and produce ultrasound.
 - a) 1 alone
 - b) 2 alone
 - c) 1, 2
 - d) **None**

Explanation

Ultrasound literally means sound beyond the range of human hearing. Ultrasound waves are produced by a physical phenomenon known as **Piezo-electric effect**. When an electric potential is applied to certain crystals for example: Lead zirconate, they become excited, vibrate and produce ultrasound. When the ultrasound waves are introduced through homogenous tissue, they pass unimpeded until they meet another tissue or organ. A part or whole of the ultrasound wave is reflected and received back by the same crystal and is converted into an electrical signal. This signal denoting reflecting interface is shown on the oscilloscope screen as a deflection from the base line.

34. Which of the following are significance of Ultrasound?

- 1) Ultrasound waves are used to image the foetus at different stages of pregnancy to study the progress of the developing foetus
- 2) They are used to hear foetal heart sound, blood flow, etc
- 3) Used for diagnosis of tumours, gall stones, kidney stones, obstructions in the genital tracts
 - a) 1, 2
 - b) 1, 3
 - c) 2, 3
 - d) **All the above**

Explanation

Clinical significance:

1. Ultrasound waves are used to image the foetus at different stages of pregnancy to study the progress of the developing foetus.
2. They are used to hear foetal heart sound, blood flow, etc.
3. Used in echocardiography to diagnose the damages in heart.
4. Used for diagnosis of tumours, gall stones, kidney stones, obstructions in the genital tracts

35. Which of the following statement about CT scanning is incorrect?

- 1) Computed tomography is originally known as computed axial tomography
- 2) It is a medical imaging technology employing tomography, where digital geometry processing is used to generate a three dimensional image of the internals of an object from a large series of two dimensional X ray images taken around a single axis of rotation
 - a) 1 alone
 - b) 2 alone
 - c) 1, 2
 - d) **None**

Explanation

Computed tomography is originally known as computed axial tomography (CAT or CT Scan). The word tomography is derived from the Greek word tomos means slice and graphe means to write. It is a medical imaging technology employing tomography, where digital geometry processing is used to generate a three dimensional image of the internals of an object from a large series of two dimensional X ray images taken around a single axis of rotation. CT produces volumes of data which can be manipulated through a process known as windowing in order to demonstrate various structures based on their ability to block the X ray beam.

36. Which of the following statement is correct?

- 1) PET is also computerized imaging technique unlike CT
- 2) Positron emission tomography (PET) is a nuclear medicine procedure based on the measurement of positron emission from radiolabelled tracer molecules
- 3) A PET image gives quantitative regional information on the metabolic and physiological processes.
 - a) 1, 2
 - b) 1, 3
 - c) 2, 3
 - d) **All the above**

Explanation

PET is also computerized imaging technique unlike CT. Positron emission tomography (PET) is a nuclear medicine procedure based on the measurement of positron emission from radiolabelled tracer molecules. These radiotracers allow biologic processes to be measured and whole-body images to be obtained which demonstrates sites of radiotracer accumulation. A PET image gives quantitative regional information on the metabolic and physiological processes. PET uses positron emitting radio isotopes (^{11}C ^{13}N ^{15}O ^{18}F) which are generated by the cyclotron.

37. The most common radiotracer in use today is_____

- a) Uranium 235
- b) Uranium 238
- c) Thorium
- d) **^{18}F -fluorodeoxyglucose**

Explanation

PET uses positron emitting radio isotopes (^{11}C ^{13}N ^{15}O ^{18}F) which are generated by the cyclotron. The **most common radiotracer in use today is ^{18}F -fluorodeoxyglucose (^{18}F -FDG) which is a radio labelled sugar (glucose) molecule.** These atoms are then incorporated by chemical methods into biological molecules like glucose, amino acids and ammonia.

38. PET imaging is effectively used in the measurement of_____

- a) Regional cerebral blood volume
- b) Blood flow
- c) Metabolic rates for glucose
- d) **All the above**

Explanation

PET imaging is effectively used in the measurement of regional cerebral blood volume, blood flow, metabolic rates for glucose and oxygen in humans.

39. Which of the following statement is correct about MRI?

- 1) Unlike conventional X-ray examinations and computed tomography (CT) scans, MRI does not utilize ionizing radiation
 - 2) MRI uses a powerful magnetic field, radio frequency pulses and a computer to produce detailed pictures of organs, soft tissues, bone and virtually all other internal body structures
 - 3) The radio frequency pulses re-align hydrogen atoms that naturally exist within the body while the patient is in the scanner without causing any chemical changes in the tissues
- a) 1, 2
 - b) 1, 3
 - c) 2, 3
 - d) **All the above**

Explanation

Unlike conventional X-ray examinations and computed tomography (CT) scans, MRI does not utilize ionizing radiation. **MRI uses a powerful magnetic field, radio frequency pulses and a computer to produce detailed pictures of organs, soft tissues, bone and virtually all other internal body structures.** The radio frequency pulses re-align hydrogen atoms that naturally exist within the body while the patient is in the scanner without causing any chemical changes in the tissues. As the hydrogen atoms return to their usual alignment, they emit different amounts of energy that vary according to the type of body tissue from which they come. The MR scanner captures this energy and creates a picture of the tissues scanned based on this information.

40. Which is better in differentiation of abnormal (diseased) tissue from normal tissues?

- a) **MRI**
- b) CT
- c) X-ray
- d) Ultra-sound

Explanation

Frequently, the differentiation of abnormal (diseased) tissue from normal tissues is better with MRI than with other imaging modalities such as X-ray, CT and ultrasound. Detailed MR images allow physicians to evaluate various parts of the body and determine the presence of certain diseases.

41. Which of the following organs can be evaluated using MR imaging?

- 1) Chest
- 2) Abdomen
- 3) Lymph node
- a) 1, 2
- b) 1, 3
- c) 2, 3
- d) **All the above**

Explanation

MR imaging of the body is performed to evaluate organs of the chest and abdomen, pelvic organs including the bladder and the reproductive organs, blood vessels and lymph nodes.

42. Which of the following statement is correct?

- 1) Pacemaker is a medical device which uses electrical impulses, delivered by electrodes contracting the heart muscles, to regulate the beating of the heart

- 2) The primary purpose of a pacemaker is to maintain an adequate heart rate, either because the heart's natural pacemaker is not fast enough, or because there is a block in the heart's electrical conducting system
- a) 1 alone
 - b) 2 alone
 - c) 1, 2
 - d) None

Explanation

Pacemaker is a medical device which uses electrical impulses, delivered by electrodes contracting the heart muscles, to regulate the beating of the heart. The primary purpose of a pacemaker is to maintain an adequate heart rate, either because the heart's natural pacemaker is not fast enough, or because there is a block in the heart's electrical conducting system.

43. Pacemaker batteries last between ___ and ___ years

- a) 3, 13
- b) 4, 14
- c) 5, 15
- d) 7, 17

Explanation

Pacemaker batteries last between 5 and 15 years (average 6 to 7 years), depending on how active the pacemaker is. The wires of the pacemaker also may need to be replaced eventually.

44. Which of the following statement is correct?

- 1) Sick sinus syndrome (SSS) is characterized by dysfunction of the sinoatrial (SA) node
 - 2) Treatment of SSS is directed at symptoms and typically involves the implantation of an artificial pacemaker
- a) 1 alone
 - b) 2 alone
 - c) 1, 2
 - d) None

Explanation

Sick sinus syndrome (SSS) is characterized by dysfunction of the sinoatrial (SA) node. Treatment of SSS is directed at symptoms and typically involves the implantation of an artificial pacemaker.

45. Normally, the heart beats ____ to ____ times a minute when you are at rest

- a) 60, 100
- b) 50, 100

- c) 20, 50
- d) 70, 90

Explanation

Generally, heart rate is low when resting. It's a sign of good health. When it is too low the condition is called bradycardia. **Normally, the heart beats 60 to 100 times a minute when you are at rest.** But with bradycardia, it goes down to less than 60 beats a minute. When the heart beat is too high it is called tachycardia.

46. Which of the following statement is correct about laser?

- 1) Lasers are devices that emit a single, coherent wavelength of electromagnetic radiation
 - 2) It is used to cut, coagulate, or ablate tissue for a variety of clinical applications
 - 3) The term "LASER" stands for light amplification by stimulated emission of radiation.
- a) 1, 2
 - b) 1, 3
 - c) 2, 3
 - d) **All the above**

Explanation

Lasers are devices that emit a single, coherent wavelength of electromagnetic radiation that is used to cut, coagulate, or ablate tissue for a variety of clinical applications. The term "LASER" stands for light amplification by stimulated emission of radiation.

47. Which of the following statement is correct?

- 1) Laser surgery uses ionizing radiation
 - 2) Laser systems produce a variety of wavelengths of varying pulse duration and energy levels.
- a) 1 alone
 - b) **2 alone**
 - c) 1, 2
 - d) None

Explanation

Laser surgery uses non-ionizing radiation, so it does not have the same long-term risks as X-rays or other types of ionizing radiation. Laser systems produce a variety of wavelengths of varying pulse duration and energy levels.

48. Which of the following statement is correct?

- 1) Ordinary light, such as that from a light bulb, has many wavelengths and spreads in all directions.
- 2) It is focused in a narrow beam and creates a very high-intensity light.

- 3) Although lasers are commonly used superficially for cutaneous and ocular applications, smaller efficient laser delivery systems are available for minimally invasive applications, including endoscopy, bronchoscopy, laparoscopy, and endovenous ablation
- a) 1, 2
 - b) 1, 3
 - c) 2, 3
 - d) **All the above**

Explanation

Ordinary light, such as that from a light bulb, has many wavelengths and spreads in all directions. **Laser light, on the other hand, has a specific wavelength.** It is focused in a narrow beam and creates a very high-intensity light. Computer-based imaging and guidance systems allow procedures to be performed precisely, quickly, and with greater control. Although lasers are commonly used superficially for cutaneous and ocular applications, smaller efficient laser delivery systems are available for minimally invasive applications, including endoscopy, bronchoscopy, laparoscopy, and endovenous ablation.

49. Which of the following statement is correct?

- 1) The haemocytometer is a thick glass slide with a counting chamber in the middle.
 - 2) The counting chamber contains two grids with improved Neubaur rulings of 4 by 4 mm primary square.
- a) **1 alone**
 - b) 2 alone
 - c) 1, 2
 - d) None

Explanation

The haemocytometer is a thick glass slide with a counting chamber in the middle. The **counting chamber contains two grids with improved Neubaur rulings of 3 by 3 mm primary square.**

50. Which of the following statement is correct?

- 1) The blood cells are diluted in specific diluting fluid to keep the cells intact
 - 2) RBC diluting fluid (Hayem's) is isotonic with blood, hence haemolysis does not occur
 - 3) The blood is diluted 1:200 times with RBC diluting fluid and the cells are counted under 45X objective of the microscope
- a) 1, 2
 - b) **1, 3**
 - c) 2, 3
 - d) All the above

Explanation

The blood cells are diluted in specific diluting fluid to keep the cells intact. RBC diluting fluid (Hayem's) is hypertonic with blood, hence haemolysis does not occur. The blood is diluted 1:200 times with RBC diluting fluid and the cells are counted under 45X objective of the microscope.

51. Which of the following statement is correct?

- 1) The diluting fluid used for WBC count is Turk's solution which contains glacial acetic acid and Gentian violet.
- 2) The glacial acetic acid lyses the red blood cells and the Gentian violet stains the nuclei of the leucocytes
- 3) The total number of cells counted is expressed in mm^3
 - a) 1, 2
 - b) 1, 3
 - c) 2, 3
 - d) All the above

Explanation

The diluting fluid used for WBC count is Turk's solution which contains glacial acetic acid and Gentian violet. The glacial acetic acid lyses the red blood cells and the Gentian violet stains the nuclei of the leucocytes. The blood is diluted 1:20 times and the cell are counted under 10X objective of the microscope. **The total number of cells counted is expressed in mm^3 .**

52. Match the following

- | | |
|----------------|-----------|
| I. Neutrophil | 1. 2-8% |
| II. Eosinophil | 2. 50-70% |
| III. Basophil | 3. 1-4% |
| IV. Monocyte | 4. 0-1% |

- a) 2, 1, 3, 4
- b) 1, 3, 2, 4
- c) **2, 3, 4, 1**
- d) 3, 1, 2, 4

Explanation

Cell	Differential Count
 Neutrophil	50-70%
 Eosinophil	1-4%
 Basophil	0-1%
 Monocyte	2-8%
 Lymphocyte	20-40%