

# 12<sup>th</sup> Science

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19 Lessons 2100+ Questions



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## அர்ப்பணிப்பு

அனைத்து போட்டித்தேர்வுகளுக்கும் உதவும் வகையில் உருவாக்கப்பட்ட இந்த புத்தகத்தை

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பெரிய வெற்றியடைய வாழ்த்துக்கள்.

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## 12th Science Lesson 1 Questions in English

## 1] Recent developments in Physics

1. Which of the following statement is correct?

1) Nanoscience is the study of structure and materials of  $10^{-19}$  m scale

2) The mechanical, electrical and optical properties of such size materials vary from their original size.

a) 1 alone

b) 2 alone

c) 1, 2

d) None

2. Which of the following are included in Nanotechnology?

1) Design

2) Production

3) Characterization

a) 1, 2

b) 1, 3

c) 2, 3

d) All the above

3. Which of the following statement is correct?

1) If a particle of a solid is of size less than 100nm, it is said to be a nano solid

2) ZnS can be in both bulk and Solid form

3) When the particle size is exceeds more than 100nm, it is called as bulk solid

a) 1, 2

b) 1, 3

c) 2, 3

d) All the above

4. What is the width of single strand DNA?

a) Three nanometres

b) Four nanometres

c) One nanometre

d) Five nanometres

5. Which of the following statement is correct?

1) Manipulation of colours can be done by adjusting the size of the nanoparticles in the material

2) The scales on the wings of the morpho butterfly contains nanostructures that can change the way light waves interact with each other and gives intelligent metallic blue and green hues

a) 1 alone

b) 2 alone

c) 1, 2

d) None

6. Which of the following statement about parrot fish is correct?

1) It feeds on coral

2) It is only green in colour

3) The powerful bite of parrot fish is due to interwoven fibre nanostructure

a) 1, 2

b) 1, 3

c) 2, 3

d) All the above

7. Which of the following statement is correct?

1) Water repellent nano paints are made based on lotus leaf structures

2) Nano structures in lotus leaf on surface is the reason for its self- cleaning process

a) 1 alone

b) 2 alone

c) 1, 2

d) None

8. When was the 2D material isolated and characterized by Andre Geim and Konstantin Novoselov?

a) 1994

b) 2004

c) 2014

d) 2020

9. Who developed Scanning tunnelling microscope?

1) Gerd Binnig

2) Konstantin Novoselvo

3) Heinrich Rohrer

a) 1, 2

b) 1, 3

c) 2, 3

d) All the above

10. Who coined the term nanotechnology?

- a) Gerd Binning  
 b) Konstantin Novoselvo  
 c) Heinrich Rohrer  
 d) Norio Taniguchi
11. How many xenon atoms were manipulated to spell out IBM logo?  
 a) 32  
 b) 35  
 c) 45  
 d) 25
12. How many ways are there for preparing nanomaterials?  
 a) 4  
 b) 3  
 c) 2  
 d) 1
13. Which of the following is not a method of top-down approach for preparing nanomaterials?  
 a) Ball milling  
 b) Sol-gel  
 c) Plasma etching  
 d) Lithography
14. Which of the following are bottom-up approach of producing nanomaterials?  
 1) Chemical vapour deposition  
 2) Sol-gel  
 3) Plasma etching  
 a) 1, 2  
 b) 1, 3  
 c) 2, 3  
 d) All the above
15. Which of the following are applications of Nano-technology?  
 1) Electronics  
 2) Defence and security  
 3) Textile  
 4) Drug delivery  
 a) 1, 2, 3  
 b) 1, 3, 4  
 c) 2, 3, 4  
 d) All the above
16. Which of the following statement is correct?  
 1) The research on the harmful impact of application of nanotechnology is also equally important and fast developing.  
 2) The major concern here is that the nanoparticles have the dimensions same as that of the biological molecules such as proteins  
 3) They may easily get absorbed onto the surface of living organisms and they might enter the tissues and fluids of the body.  
 a) 1, 2  
 b) 1, 3  
 c) 2, 3  
 d) All the above
17. Which of the following statement is correct?  
 1) The adsorbing nature depends on the surface of the nanoparticle  
 2) The interaction with living systems is not affected by the dimensions of the nanoparticles  
 3) It is possible to deliver a drug directly to a specific cell in the body by designing the surface of a nanoparticle so that it adsorbs specifically onto the surface of the target cell  
 a) 1, 2  
 b) 1, 3  
 c) 2, 3  
 d) All the above
18. Assertion (A): It is also possible for the inhaled nanoparticles to reach the blood, to reach other sites such as the liver, heart or blood cells  
 Reason(R): Nanoparticles can also cross cell membranes  
 a) Both (A) and (R) are correct, but (R) does not explain (A)  
 b) Both (A) and (R) are wrong  
 c) Both (A) and (R) are correct and (R) explains (A)  
 d) (A) is Correct and (R) is wrong
19. Which of the following is not a neurological disease?  
 a) Emphysema  
 b) Parkinson's disease  
 c) Alzheimer's disease  
 d) All the above

20. Robotics is an integrated study of\_\_\_\_\_

- 1) Mechanical engineering
- 2) Electronics engineering
- 3) Computer engineering

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

21. Which of the following statement is correct?

- 1) Robot is a mechanical device designed with electronic circuitry and programmed to perform a specific task.
- 2) They can take up the role of humans in certain dangerous environments that are hazardous to people like defusing bombs, finding survivors in unstable ruins

- a) 1 alone
- b) 2 alone
- c) 1, 2
- d) None

22. When the 1<sup>st</sup> was digitally operated programmable robot operated?

- a) 1994
- b) 1954
- c) 1999
- d) 1956

23. Which of the following statement is correct?

- 1) The robotic system mainly consists of sensors, power supplies, control systems, manipulators and necessary software
- 2) Sensor is the brain of the computer
- 3) The Controller gives commands for the moving parts to perform the job

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

24. Which of the following human activities can be replicated by robots?

- 1) Walking
- 2) Lifting
- 3) Sensing

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

25. Which of the following motors can be used in Robots?

- 1) Brushless motor
- 2) Geared DC motor
- 3) AC motor

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

26. How much % does pneumatic air muscles contract when air is sucked inside them?

- a) 100
- b) 40
- c) 60
- d) 26

27. Which of the following works can be brought down by AI?

- 1) Face recognition
- 2) Translate words from one language to another
- 3) Taking decisions based on previous actions

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

28. Which of the following are the applications of Robots?

- 1) Exploring stars
- 2) Investigation of minerology of rocks and soils on mars
- 3) Analysis of elements found in rock and soils

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

29. Which of the following statement is correct?

1) The size of the nano robots is reduced to microscopic level to perform a task in very small spaces.

2) Chinese scientists have created the world's 1st autonomous DNA robots to combat cancer tumours.

3) Nano-robots in blood stream to perform small surgical procedures, to fight against bacteria, repairing individual cell in the body is the future prospect in medicinal field.

a) 1, 2

b) 1, 3

c) 2, 3

d) All the above

30. Which of the following metals are most commonly used in robots?

1) Aluminium

2) Silver

3) Steel

a) 1, 2

b) 1, 3

c) 2, 3

d) All the above

31. Which of the following are the advantages of robotics?

1) The robots are much cheaper than humans

2) In warfare, robots can save human lives

3) Robots can work in extreme environmental conditions

4) Robots are more precise and error free in performing the task

a) 1, 2, 4

b) 1, 3, 4

c) 2, 3, 4

d) All the above

32. Which of the following statement is correct?

1) Robots have no sense of emotions or conscience

2) They have empathy and hence create an emotionless workplace

3) Humans cannot be replaced by robots in decision making

a) 1, 2

b) 1, 3

c) 2, 3

d) All the above

33. Which of the following statement is incorrect?

1) Medical science very much revolves around physics principles.

2) Medical instrumentation has widened the life span due to the technology integrated diagnosis and treatment of most of the diseases

a) 1 alone

b) 2 alone

c) 1, 2

d) None

34. Match the following

I. X-rays - 1. MRI

II. Theory of Radioactivity - 2. Radiology X-ray imaging

III. Artificial Radioactivity - 3. Nuclear Medicine

IV. Nuclear Magnetic Resonance - 4. Scintigraphy

a) 3, 1, 2, 4

b) 1, 2, 4, 3

c) 2, 3, 4, 1

d) 2, 4, 3, 1

35. Match the following

I. LASER - 1. Drug delivery

II. DSCT - 2. Surgical instrument

III. Nuclear medicine - 3. CT

IV. Nanotechnology - 4. Fusion imaging techniques

a) 2, 1, 3, 4

b) 2, 3, 4, 1

c) 4, 1, 2, 3

d) 3, 1, 2, 4

36. Which of the following statement is correct?

1) Medical virtual reality is effectively used to stop the brain from processing pain and cure soreness in the hospitalized patients

2) It helps in the treatment of Autism, Memory loss, and Mental illness

a) 1 alone

b) 2 alone

c) 1, 2

d) None

37. Which of the following customised using precision medicine?

- 1) Healthcare
  - 2) Practises
  - 3) Medical decisions
- a) 1, 2
  - b) 1, 3
  - c) 2, 3
  - d) All the above

38. Which of the following statement is incorrect?

1) A health wearable is a device used for tracking a wearer's vital signs or health and fitness related data, location, etc.

2) Medical wearables with artificial intelligence and big data provide an added value to healthcare with a focus on diagnosis, treatment, patient monitoring and prevention.

- a) 1 alone
- b) 2 alone
- c) 1, 2
- d) None

39. Which of the following statement is correct?

1) An artificial organ is an engineered device or tissue that is implanted or integrated into a human.

2) It duplicates or augments a specific function or functions of human organs so that the patient may return to a normal life

- a) 1 alone
- b) 2 alone
- c) 1, 2
- d) None

40. In which of the following medicinal filed 3D printing is used?

- 1) Audiology
  - 2) Dentistry
  - 3) Orthopaedics
- a) 1, 2
  - b) 1, 3
  - c) 2, 3
  - d) All the above

41. Which of the following can be monitored using wireless brain sensor?

- 1) Intercranial pressure
  - 2) Temperature
  - 3) Nerve signal
- a) 1, 2
  - b) 1, 3
  - c) 2, 3
  - d) All the above

42. Which of the following statement about smart inhalers is correct?

1) Inhalers are the main treatment option for asthma

2) Smart inhalers are designed with health systems and patients in mind so that they can oer maximum benefit

3) Smart inhalers use blue-tooth technology to detect inhaler use, remind patients when to take their medication

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

43. Which of the following statement is correct?

1) Particle physics deals with the theory of fundamental particles of nature and it is one of the active research areas in physics.

2) In 1930s, it was established that atoms are made up of electrons and protons

- a) 1 alone
- b) 2 alone
- c) 1, 2
- d) None

44. Which of the following are made up of quarks?

- 1) Electron
- 2) Proton
- 3) Neutron

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

45. When was God Particle discovered?

- a) 2011
- b) 2013
- c) 2015

d) 2010

46. When was the existence of gravitational waves discovered?

a) 1990

b) 1991

c) 2017

d) 2015

47. Which of the following statement about gravitational waves is correct?

1) Gravitational waves are the disturbances in the curvature of space-time and it travels with speed of light

2) Any accelerated mass emits gravitational waves

3) These waves are very strong even for masses like earth

a) 1, 2

b) 1, 3

c) 2, 3

d) All the above

48. The strongest source of gravitational waves are\_\_\_\_\_

a) Sun

b) Galaxies

c) Black holes

d) Stars

49. Who theoretically proposed the existence of gravitational waves?

a) Newton

b) Einstein

c) Tesla

d) Edison

50. Which of the following statement about blackholes is correct?

1) Black holes are end stage of stars which are highly dense massive object.

2) Every galaxy has black hole at its centre

3) Sagittarius A\* is the black hole at the centre of the Milky Way galaxy.

a) 1, 2

b) 1, 3

c) 2, 3

d) All the above

51. Which of the following statement about blackholes is correct?

1) Its mass ranges from 20 times mass of the sun to 1 million times mass of the sun

2) It has very strong gravitational force such that no particle or even light can escape from it.

a) 1 alone

b) 2 alone

c) 1, 2

d) None

52. How telescopes were stationed to photograph the Black hole M87?

a) 10

b) 9

c) 8

d) 5

53. In which field Jean-Pierre, Fraser and Bernard Feringa won Nobel Prize?

a) Physics

b) Robotics

c) Chemistry

d) Biotechnology

54. Which of the following are used for powering the robots?

a) Solar power

b) Hydraulics

c) Batteries

d) All the above

55. What is the main function of sensors?

a) Improves stability

b) Real-time knowledge

c) Provides temporary power

d) All the above

56. Match

A. Radiology X ray imaging - i) 1934

B. Scintigraphy - ii) 1950

C. Ecography - iii) 1895

D. Nuclear medicine - iv) 1898

a) iii, i, ii, iv

b) ii, iv, iii, i

c) iv, ii, i, iii

d) i, iv, iii, ii

57. Which of these particles gives mass to protons and neutrons?

- a) God particles
- b) Higgs particles
- c) Known particles
- d) None of the above

58. Which is referred as Cosmology?

- a) Origin and evolution of Universe
- b) Discovery of new galaxy
- c) Formation of stars
- d) Movement of stars and galaxies

59. What is the real meaning of the root word of robot?

- a) Energy
- b) Artificial
- c) Work
- d) Power

60. Which of this technology is used in Endoscopy and biomedical sensors?

- a) Optical Fibre
- b) Laser
- c) Nano technology
- d) Nuclear Medicine

#### 1. RECENT DEVELOPMENTS IN PHYSICS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
B	D	B	A	C	B	C	B	B	D	B	C	C	B	D	D	B	C	A	D
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
C	B	B	D	D	B	D	D	D	B	D	B	D	C	B	C	D	D	C	D
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
A	D	A	C	B	D	A	C	B	D	C	C	C	D	B	A	B	A	C	A

## 12th Science Lesson 2 Questions in English

## 2] Atomic and Nuclear Physics

1. In which of these languages atom means as indivisible?

- a) Greek
- b) Latin
- c) Rome
- d) Persian

2. Which of this scientist compared the sizes of atom, apple and earth?

- a) J. J. Thomson
- b) Albert Einstein
- c) Richard P. Feynman
- d) Neil's Bohr

3. Which of the following atom models explained the unsolved issues?

- a) J. J. Thomson model
- b) Bohr model
- c) Rutherford model
- d) All the above

4. Choose the Incorrect statements.

- i) Scientist believed that atom is the fundamental entity for all the matters.
  - ii) Nucleus is made of proton and neutron.
  - iii) Quarks are the fundamental entities for the proton and neutron.
- a) i only
  - b) ii only
  - c) iii only
  - d) None of the above

5. Assertion (A): Gases can conduct electricity only under special arrangements.

Reasoning(R): At normal atmospheric pressure gases don't have free electrons for conduction.

- a) Both A and R is true and R is the correct explanation of A.
- b) Both A and R is true but R is not the correct explanation of A.
- c) A is True but R is False.
- d) Both A and R is False.

6. Which of the following statements are not true regarding the cathode rays?

- a) Cathode rays possess energy and momentum.
- b) Cathode ray travels in a straight line with speed  $10^7 \text{ ms}^{-1}$ .
- c) Cathode rays can be deflected by applying magnetic field only.
- d) The deflected direction of cathode rays indicates the charge of the particles.

7. Choose the Incorrect statements.

- i) Cathode rays produce heat when they are allowed to fall on matter.
  - ii) Cathode rays do not affect the photographic plates.
  - iii) Cathode rays produce fluorescence on certain crystals and minerals.
- a) i only
  - b) ii only
  - c) iii only
  - d) None of the above

8. In which of these materials cathode rays fall to produce x-rays?

- a) High atomic weight
- b) Low density
- c) High energy value
- d) Vacuum space

9. What is the speed of cathode ray in terms of speed of light?

- a) 1/2
- b) 1/3rd
- c) 2/3rd
- d) 1/10th

10. Which of these values of cathode ray is measured by varying the electric and magnetic field?

- a) Charge per unit mass
- b) Specific charge
- c) Normalized charge
- d) All the above

11. Which of these forces does not act on an oil droplet?

- a) Gravitational force
- b) Magnetic force

c) Buoyant force

d) Viscous force

12. Choose the Incorrect statements.

i) J. J. Thomson atom model was based on static distribution of electric charges.

ii) Rutherford proposed the first dynamic model of an atom.

iii) Thomson and Rutherford models explained the stability of the atom.

a) i only

b) ii only

c) iii only

d) None of the above

13. Which of this atomic model was proposed by Neil's Bohr?

a) Hydrogen atom

b) Oxygen atom

c) Carbon atom

d) Nitrogen atom

14. Which of this explains that no stable equilibrium points in electrostatic configuration?

a) Einstein's theorem

b) J. J. Thomson Atomic model

c) Earnshaw's theorem

d) Neil's Bohr Atomic model

15. Who conducted the scattering of alpha particles by gold foil experiment?

a) Geiger and Marsden

b) J. J. Thomson

c) Neil's Bohr

d) Earnshaw

16. What is the size of nucleus according to Rutherford?

a)  $10^2$  m

b)  $10^{12}$  m

c)  $10^{-14}$  m

d)  $10^{-5}$  m

17. Choose the correct statements about Nucleus.

i) Most of the mass of the atom is concentrated in electrons.

ii) Nucleus is surrounded by negatively charged electrons.

iii) Electrons are at rest position around the nucleus.

a) i only

b) ii only

c) iii only

d) All the above

18. What is the minimum distance between the nucleus center and the reflected alpha particle?

a) Contact distance

b) Minimum distance

c) Saturated point

d) Excited state

19. What is the range of nucleus radius calculated by Rutherford?

a)  $10^{-11}$  m to  $10^{-15}$  m

b)  $10^{-14}$  m to  $10^{-15}$  m

c)  $10^{-1}$  m to  $10^{-9}$  m

d)  $10^{-8}$  m to  $10^{-15}$  m

20. In which of these conditions the impact parameter is defined?

a) At equilibrium

b) At a large distance

c) Inside a vacuum space

d) At rest

21. Which of these values is decreased with increase in the impact parameter value?

a) Scattering angle

b) Radius of nucleus

c) Number of electrons

d) All the above

22. Which of these values were found by the Rutherford model?

a) Size of the atom

b) Stability of atom

c) Number of protons

d) None of the above

23. What are the drawbacks of the Rutherford model?

a) Distribution of electrons around nucleus

b) Stability of the atom

c) Mass of the nucleus

d) Both a and b

24. Choose the correct statements.

- i) According to electrodynamics theory accelerated charge emits electromagnetic radiations.
  - ii) The radius of orbit becomes smaller when the charge loses its energy.
- a) i only
  - b) ii only
  - c) Both i and ii
  - d) Neither i nor ii

25. What is the pattern of radiation emission according to the electrodynamics model?

- a) Discrete
- b) Continuous
- c) Pulse
- d) Hyperbola

26. Who was the first to give the theoretical model of the atom structure?

- a) Neil's Bohr
- b) Rutherford
- c) Marsden
- d) J. J. Thomson

27. Which of the following is not a postulate of Bohr atom model?

- a) Electron moves around the nucleus in circular orbits in an atom.
- b) The Coulomb force gives the centripetal force for the circular motion of electron.
- c) Electrons revolve around the nucleus in all the orbits.
- d) The discrete orbits do not radiate electromagnetic energy is stable orbits.

28. Which is known as the angular momentum quantization condition?

- a)  $h/2\pi$
- b)  $2\pi h$
- c)  $2h$
- d)  $2\pi r$

29. Which is known as the de Broglie wavelength?

- a)  $h$
- b)  $v$
- c)  $\lambda$
- d)  $\epsilon$

30. What is the energy value of the photon in the quantization of energy?

- a)  $E$
- b)  $\Delta E$
- c)  $\pi r$
- d)  $E/2\pi r$

31. In which of this state the velocity of electron is maximum?

- a) Ground state
- b) Excited state
- c) Both a and b
- d) Neither a nor b

32. Choose the Incorrect statements.

- i) The atomic mass of deuterium is thrice as the atomic mass of hydrogen atom.
- ii) Bohr atomic model does not explain the isotopic shift.
- iii) The Bohr atomic model considers the nuclear movement for calculating the wave length between hydrogen and deuterium.

- a) i only
- b) ii only
- c) iii only
- d) None of the above

33. What is the difference between the hydrogen and deuterium atom?

- a) Number of proton
- b) Number of neutron
- c) Number of electron
- d) All the above

34. Assertion (A): Excitation energy is used to excite an electron from lower energy state to higher energy.

Reasoning(R): The first excitation energy excites an electron from first excited state to the ground state.

- a) Both A and R is True and R is the correct explanation of A.
- b) Both A and R is True but R is not the correct explanation of A.
- c) A is True but R is False.
- d) Both A and R is False.

35. What is the minimum energy required to remove an electron from an atom?

- a) Binding energy  
 b) Electrostatic energy  
 c) Frictional energy  
 d) Magnetic energy
36. What is the ionization potential for a hydrogen atom?  
 a)  $13.6 / n^2$  volt  
 b)  $13 n$  volt  
 c)  $13.6$  volt  
 d)  $n^2$  volt
37. Define the spectrum of the electromagnetic radiations from any heated materials?  
 a) Pulse spectrum  
 b) Continuous spectrum  
 c) Discrete spectrum  
 d) None of the above
38. By which of these emission electrons jump back to the ground state?  
 a) Spontaneous emission  
 b) Continuous emission  
 c) Long-term emission  
 d) Discrete emission
39. What is the value of the Rydberg constant?  
 a)  $2.0945 \times 10^{-7} \text{ m}^{-1}$   
 b)  $1.548 \times 10^8 \text{ m}^{-2}$   
 c)  $1.09737 \times 10^7 \text{ m}^{-1}$   
 d)  $10.737 \times 10^{-8} \text{ m}$
40. In which of the regions the Lyman series lies?  
 a) Ultra violet region  
 b) Infra-red region  
 c) Visible region  
 d) Far Infra-red region
41. Which of these series have the value of  $n$  as 2?  
 a) Lyman series  
 b) Paschen series  
 c) Balmer series  
 d) Brackett series
42. Which of the following is not a limitation of the Bohr atomic model?  
 a) Bohr model is suitable for Hydrogen and some complex atoms.  
 b) The fine structure of hydrogen spectrum is not explained by the Bohr model.  
 c) Bohr atom model fails to explain the intensity variations in the spectral lines.  
 d) The electron distribution is not completely explained by Bohr atom model.
43. Choose the correct statements.  
 i) Atoms have a nucleus surrounded by electrons.  
 ii) The number of protons and electrons are equal.  
 iii) Neutrons are electrically neutral and protons have positive charge.  
 a) i only  
 b) ii only  
 c) iii only  
 d) All the above
44. What is the value of the mass number if the number of neutrons is  $N$  and atomic number is  $Z$ ?  
 a)  $Z + N$   
 b)  $Z * N$   
 c)  $Z - N$   
 d)  $Z / N$
45. Which of these are collectively called as nucleons?  
 a) Electrons and Neutrons  
 b) Protons and Nucleus  
 c) Neutrons and Protons  
 d) Protons and Electrons
46. Choose the correct statements.  
 i) The mass of a proton is greater than the mass of the electron.  
 ii) Mass of a neutron is slightly lesser than the mass of the proton.  
 a) i only  
 b) ii only  
 c) Both i and ii  
 d) Neither i nor ii
47. What does  $X$  represent in the notation  $Z A X$ ?  
 a) Multiply  
 b) Mass number  
 c) Number of protons  
 d) Chemical symbol of the element
48. Choose the incorrect statement about the atoms.

i) Nucleus contains positively charged protons and electrically neutral neutrons.

ii) The overall charge of the nucleus is positive.

iii) The number of electrons in the atom is equal to the number of nucleus.

- a) i only
- b) ii only
- c) iii only
- d) All the above

49. Define isotope.

- a) Same number of electrons and different number of protons.
- b) Equal number of neutrons and electrons.
- c) Same atomic number and different mass number.
- d) Different number of protons and atomic number.

50. Which of these used to determine the chemical properties of any atom?

- a) Atomic number
- b) Electrons
- c) Nucleus structure
- d) Number of protons

51. Isobars are the atoms of different elements having same \_\_\_\_ and different \_\_\_\_\_.

- a) Mass number, Atomic number
- b) Number of protons, Mass number
- c) Atomic number, Number of electrons
- d) Number of neutrons, Number of protons

52. Assertion (A): Isobars are chemically different elements.

Reasoning(R): Isobars have same chemical property and different physical property.

- a) Both A and R is True and R is the correct explanation of A.
- b) Both A and R is True but R is not the correct explanation of A.
- c) A is True but R is False.
- d) Both A and R is False.

53. Which of the value is same for various isotone elements?

- a) Number of neutrons
- b) Number of protons
- c) Number of Atomic number

d) Number of electrons

54. Assertion (A): Atomic Mass unit is used to represent the mass of nuclei.

Reasoning(R): The mass of nuclei is very small which is about 10-25 kg or less.

- a) Both A and R is True and R is the correct explanation of A.
- b) Both A and R is True but R is not the correct explanation of A.
- c) A is True but R is False.
- d) Both A and R is False.

55. Which is the most abundant natural isotope of carbon?

- a)  ${}_6^{12}\text{C}$
- b)  ${}_{10}^{20}\text{C}$
- c)  ${}_2^8\text{C}$
- d)  ${}_4^{10}\text{C}$

56. Which of this instrument determines the atomic mass experimentally?

- a) Bainbridge Mass Spectrometer
- b) Electron Microscope
- c) Emission spectroscopy
- d) Aneroid barometer

57. What is the approximate shape of nuclei?

- a) Spherical
- b) Parabola
- c) Hemisphere
- d) Hyperbola

58. Which of this value is independent of the nuclear density?

- a) Mass Number
- b) Atomic Number
- c) Atomic Mass
- d) All the above

59. Choose the correct statements.

i) Above  $Z > 100$  all the nuclei have same density and it is an important characteristic.

ii) The mass of any nuclei is always less than the sum of the mass of its individual constituents.

- a) i only
- b) ii only
- c) Both i and ii

d) Neither i nor ii

60. What is the difference between the total mass value and the individual constituents mass?

- a) Mass defect
- b) Mass number
- c) Atomic Mass
- d) Nucleus Mass number

61. According to Einstein theory which of this value is converted to energy and vice versa?

- a) Mass
- b) Intensity
- c) Temperature
- d) Mole

62. Choose the correct statements.

i) Binding energy is released by the mass defect when protons and neutrons combine to form the nucleus.

ii) To separate the nucleus into individual constituents we must supply energy greater than the binding energy of the nucleus.

- a) i only
- b) ii only
- c) Both i and ii
- d) Neither i nor ii

63. In which of these units the atomic mass unit is expressed?

- a) MeV
- b) J/s
- c) J
- d) Both a and c

64. Which energy is required to separate single nucleon from the nucleus?

- a) Average Binding energy
- b) Mass defect
- c) Atomic Mass
- d) Average Mass value

65. Assertion (A): The strong nuclear is the attractive force holds the nucleus together.

Reasoning(R): A strong attractive force is needed to overcome the repulsive Coulomb's force between protons.

a) Both A and R is True and R is the correct explanation of A.

b) Both A and R is True but R is not the correct explanation of A.

c) A is True but R is False.

d) Both A and R is False.

66. Which of these is not a property of strong nucleus force?

a) The short range of nucleus force acts up to a few Fermi distance.

b) Strong nuclear force acts on the electrons to alter the chemical properties of atom.

c) Coulomb forces are weaker than the strong nuclear force.

d) Strong nucleus forces are repulsive and acts with unequal strength between the constituents.

67. Above which of the atomic number value the elements have a unstable nuclei?

- a) 82
- b) 42
- c) 70
- d) 25

68. Which of these particles are emitted by radioactive nuclei?

- a)  $\alpha$  decay
- b)  $\beta$  decay
- c)  $\gamma$  decay
- d) All the above

69. Which of these are called as radio isotopes?

- a) Isotopes of lighter elements
- b) Isotopes of heavy elements
- c) All isotopes
- d) Both a and b

70. Choose the correct statements.

i) After the decaying of the radioactive materials the mass of the nuclei is reduced.

ii) According to Einstein's relation the mass difference between the initial and final nuclei is greater than zero, it appears as the energy.

iii) Radioisotopes have various applications like carbon dating and cancer treatment.

- a) i only
- b) ii only

- c) iii only  
d) All the above
71. Who discovered the radioactivity phenomenon in 1896?  
a) Henri Becquerel  
b) Albert Einstein  
c) Marie Curie  
d) J. J. Thomson
72. In which of this place the Saha Institute of Nuclear Physics is situated?  
a) Bangalore  
b) New Delhi  
c) Kolkata  
d) Patna
73. Choose the Incorrect statements.  
i) The radioactive nucleus emits both electron and positron.  
ii) The positron is an anti-particle of an electron with same mass and opposite charge.  
iii) Positron and electron are referred as beta particles.  
a) i only  
b) ii only  
c) iii only  
d) None of the above
74. Which of this decay is used in the smoke detectors?  
a) Alpha decay  
b) Gamma decay  
c) Beta decay  
d) All the above
75. What is the purpose of the third particle proposed by W. Pauli?  
a) To control the amount of decay  
b) To neutralize charge differences  
c) Carry away the missing charge and momentum  
d) Compensate the mass difference of the nucleus.
76. Who named the third particle as neutrino?  
a) Fermi  
b) Bohr  
c) Einstein  
d) Pauli
77. Who was awarded Nobel Prize for the experiment discovery of neutrino?  
a) W. Pauli  
b) Henry Becquerel  
c) Fredrick Reines  
d) Neil's Bohr
78. Which of the following is not a property of a neutrino?  
a) Tiny mass  
b) Negative charge  
c) Weak interaction with matter  
d) Anti-neutrino is the antiparticle of neutrino
79. What is the life time of the excited state of the daughter nucleus of  $\alpha$  and  $\beta$  decay?  
a)  $10^{-11}$ s  
b)  $10^{15}$ s  
c)  $10^{-9}$ s  
d)  $10^5$ s
80. Which of these emits a high energetic proton of energy when returning to ground state?  
a) Atom  
b) Electron  
c) Nucleus  
d) Neutron
81. The decay rate of a radioactive material is directly proportional to\_\_\_\_\_.  
a) Number of Nuclei  
b) Number of protons  
c) Mass Number  
d) Atomic Number
82. What is the polarity of the decay constant of a radioactive material?  
a) Neutral  
b) Positive  
c) Zero  
d) Negative
83. Assertion (A): The half-life of a radioactive material is the time required for the number of atoms reduces to one half of the initial amount.  
Reasoning(R): The shorter half-life sample will have a higher radio activity.

- a) Both A and R is True and R is the correct explanation of A.  
 b) Both A and R is True but R is not the correct explanation of A.  
 c) A is True but R is False.  
 d) Both A and R is False.

84. What is the range of the life time for each radioactive nucleus?

- a) Zero to infinity  
 b) One to Hundred  
 c) Zero to negative value  
 d) None of the above

85. Which is known as the ratio of integration of all life times to the total number of initial nuclei?

- a) Average life time  
 b) Mean life time  
 c) Total life time  
 d) Active life time

86. Choose the correct statements.

- i) The beta decay of radioactive material is used in carbon dating applications.  
 ii) All living organism absorbs carbon dioxide in which very small part of  ${}^6_{12}\text{C}$  is radioactive.  
 a) i only  
 b) ii only  
 c) Both i and ii  
 d) Neither i nor ii

87. Assertion (A): The ratio of  ${}^6_{14}\text{C}$  to  ${}^6_{12}\text{C}$  is nearly constant in all the living organisms.

Reasoning(R): The continuous production and decay of  ${}^6_{14}\text{C}$  in the atmosphere keeps the carbon ratio constant.

- a) Both A and R is True and R is the correct explanation of A.  
 b) Both A and R is True but R is not the correct explanation of A.  
 c) A is True but R is False.  
 d) Both A and R is False.

88. Choose the correct statements.

- i) Keezhadi is an important archeological places of Tamil Nadu located at the banks of river Vaigai.

ii) The artifacts unearthed in Keezhadi gave a substantial evidence for an ancient urban civilization.

iii) A 200g charcoal was used for the carbon dating to determine the age of the materials found in Keezhadi.

- a) i only  
 b) ii only  
 c) iii only  
 d) All the above

89. Which of this material was bombarded with a particle in the experiment conducted by Bothe and Becker in the year 1930?

- a) Beryllium  
 b) Gold  
 c) Tungsten  
 d) Boron

90. Who discovered the neutrons in the year 1932?

- a) James Chadwick  
 b) Henry Becquerel  
 c) Marie Curie  
 d) Neil's Bohr

91. Assertion (A): Neutrons are stable only inside the nucleus and unstable outside the nucleus.

Reasoning(R): The free neutron outside the nucleus decays with the emission of proton.

- a) Both A and R is True and R is the correct explanation of A.  
 b) Both A and R is True but R is not the correct explanation of A.  
 c) A is True but R is False.  
 d) Both A and R is False.

92. Based on which property neutrons are classified?

- a) Stability  
 b) Chemical reactions  
 c) Kinetic energy  
 d) Mass

93. Thermal neutrons are neutrons with \_\_\_\_\_ energy in \_\_\_\_\_.

- a) High, Stable  
 b) Peak, Atmosphere

c) Low, Vacuum

d) Average, Thermal equilibrium

94. Who discovered the idea of high energy release when breaking nucleus with neutron?

a) Murray Gellman and George Zweig

b) Otto Hahn and F. Strassman

c) Murray Gellman and George Zweig

d) Bothe and Becker

95. Which of these constitutes for the energy release in the nuclear fission?

a) Neutrons

b) Protons

c) Electrons

d) All the above

96. Choose the correct statements.

i) Energy released in the nuclear fission is greater than a chemical reaction.

ii) Uranium undergoes nuclear fission in 90 different ways.

a) i only

b) ii only

c) Both i and ii

d) Neither i nor ii

97. Choose the Incorrect statements.

i) Huge amount of energy released even by one nucleus in a nuclear fission process.

ii) Each one of a fission reaction releases more neutrons which further reacts and produces more neutrons.

iii) The number of neutrons in a nuclear fission goes on increasing in a geometric progression.

a) i only

b) ii only

c) iii only

d) None of the above

98. How many types of chain reaction are possible in a nuclear fission?

a) 2

b) 4

c) 3

d) 5

99. Assertion (A): The Atom bomb is an example of nuclear fission by an uncontrolled chain reaction.

Reasoning(R): The neutrons multiply indefinitely in an uncontrolled chain reaction and the energy releases in a fraction of a second.

a) Both A and R is True and R is the correct explanation of A.

b) Both A and R is True but R is not the correct explanation of A.

c) A is True but R is False.

d) Both A and R is False.

100. Choose the correct statements.

i) In the controlled chain reaction the average numbers of neutrons are released in each stage so as to store the released energy.

ii) Nuclear Reactors use the controlled chain reaction to produce energy for power generation and research purposes.

a) i only

b) ii only

c) Both i and ii

d) Neither i nor ii

101. Assertion (A): The energy produced in a nuclear reactor is through the nuclear fission in a self-sustained controlled manner.

Reasoning(R): The Nuclear reactor produces the energy for power generation or for the research purpose.

a) Both A and R is True and R is the correct explanation of A.

b) Both A and R is True but R is not the correct explanation of A.

c) A is True but R is False.

d) Both A and R is False.

102. Which country built the first nuclear reactor?

a) USA

b) Germany

c) Soviet Union

d) China

103. Which of the following is not an important part of a Nuclear reactor?

a) Moderator

b) Transformer

c) Control rods

d) Fuel

104. Choose the Incorrect statements.

i) Uranium and plutonium are the fuels used as a fissionable material.

ii) Additional neutron source is added to the fuel to initiate the chain reaction initially.

iii) Fast neutrons are preferred for the sustained nuclear reactions.

a) i only

b) ii only

c) iii only

d) None of the above

105. Which of the following is used to convert fast neutrons to slow neutrons?

a) Control rod

b) Steam

c) Moderator

d) Coolant

106. Assertion (A): Moderators are chosen to be very light nucleus with comparable mass of the neutrons.

Reasoning(R): The Light nuclei collide with fast neutrons to reduce the speed of the neutrons.

a) Both A and R is True and R is the correct explanation of A.

b) Both A and R is True but R is not the correct explanation of A.

c) A is True but R is False.

d) Both A and R is False.

107. Which of these is not used as a moderator?

a) Heavy water

b) Carbon

c) Graphite

d) Normal water

108. What is the main purpose of the control rod?

a) Reaction rate control

b) Control the energy release

c) Temperature of the reaction

d) All the above

109. Which material is used as a control rod?

a) Boron

b) Carbon

c) Lead

d) Manganese

110. Choose the Incorrect statements.

i) The average number of neutrons produced per fission depends on the insertion depth of the control rod.

ii) If the average number of neutrons produced per fission is greater than one it is in critical state.

iii) In the super-critical state the reactor may explode and cause massive destruction.

a) i only

b) ii only

c) iii only

d) All the above

111. Which of these are used as the coolant?

a) Heavy water

b) Liquid sodium

c) Normal water

d) All the above

112. How many nuclear reactors are operated in India?

a) 22

b) 2

c) 18

d) 35

113. Choose the correct statements.

i) In Nuclear fusion two or more light nuclei combine to form a heavy nucleus.

ii) The mass of the resultant nuclei is greater than the sum of the masses of original light nuclei.

iii) The nuclear fusion occurs at room temperature.

a) i only

b) ii only

c) iii only

d) All the above

114. In which of this temperature value the thermonuclear fusion reaction occurs?

a) Less than 303 K

b) Equal to 0 K

c) Greater than 107K

d) Less than 100K

115. Assertion (A): The cores of the stars are the natural place where nuclear fusion occurs.

Reasoning(R): Most of the stars including Sun fuse hydrogen into helium by this nuclear fusion.

- a) Both A and R is True and R is the correct explanation of A.
- b) Both A and R is True but R is not the correct explanation of A.
- c) A is True but R is False.
- d) Both A and R is False.

116. Which of the following statements is not true regarding the nuclear fusion of stars?

- a) Stars are early in the form of cloud and dust.
- b) The Gravitational energy of stars is converted into kinetic energy and to heat.
- c) The Thermonuclear fusion is initiated in the stars when the temperature starts cooling down.
- d) The enormous energy release of stars stabilizes the star and prevents it from further collapse.

117. What will happen when the Sun enters into a Red giant phase?

- a) Total hydrogen is burnt out.
- b) The size of Sun will shrink.
- c) Helium and Hydrogen fuse to become carbon.
- d) Carbon is burnt to produce helium.

118. How many steps are involved in the fusion reaction cycle of the sun according to Hans Bethe?

- a) 10
- b) 3
- c) 7
- d) 5

119. Which of this scientist theoretically proposed quark as the elementary particle?

- a) Murray Gellman and George Zweig
- b) Hans Bethe
- c) Otto Hahn and F. Strassman
- d) Bothe and Becker

120. Which of these is an elementary particle?

- a) Atom
- b) Nucleus

- c) Electrons
- d) Protons

121. Which of this organization discovered the quarks?

- a) The University of Cambridge
- b) Stanford Linear Accelerator Center
- c) The French National Centre for Scientific Research
- d) Helmholtz Association of German Research Centers

122. How many quarks are classified with their antiparticles?

- a) 5
- b) 7
- c) 4
- d) 6

123. State the combinations of proton according to quark model?

- a) Two up quarks and Two down quarks
- b) One up quark and Two down quarks
- c) Two up quarks and One down quark
- d) One up quark and One down quark

124. Assertion (A): A gravitational force is universal in nature.

Reasoning(R): Planets are bound to the sun through the gravitational force.

- a) Both A and R is True and R is the correct explanation of A.
- b) Both A and R is True but R is not the correct explanation of A.
- c) A is True but R is False.
- d) Both A and R is False.

125. Which of these is not the fundamental force of nature?

- a) Gravitational forces
- b) Frictional forces
- c) Weak forces
- d) Electromagnetic forces

2. ATOMIC AND NUCLEAR PHYSICS																			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
A	C	B	A	A	C	B	A	D	D	B	C	A	A	A	C	B	A	B	B
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
A	A	D	C	A	A	C	A	C	B	A	A	B	C	A	A	B	A	C	A
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
C	A	D	A	C	A	D	C	C	B	A	C	A	A	A	A	A	A	B	A
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
A	A	D	A	A	D	A	D	D	D	A	C	A	A	C	A	C	B	A	C
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
A	D	A	A	B	C	A	D	A	A	A	C	D	B	A	C	A	A	A	C
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
A	A	B	C	C	A	B	A	A	B	D	A	A	C	A	C	A	B	A	C
121	122	123	124	125															
B	D	C	A	B															

## 12th Science Lesson 3 Questions in English

## 3] Electrostatics

1. The forces we experience in everyday life are electromagnetic in nature except \_\_\_\_

- a) Friction
- b) Gravity
- c) Repulsion
- d) All the above

2. Which among the following statement is correct?

1) When an object is pushed, the atoms in our hand interact with the atoms in the object and this interaction is basically electromagnetic in nature. When we stand on Earth's surface, the gravitational force on us acts downwards and the normal force acts upward to counter balance the gravitational force.

2) It arises due to the electromagnetic interaction of atoms on the surface of the Earth with the atoms present in the feet of the person. Though, we are attracted by the gravitational force of the Earth, we stand on Earth only because of electromagnetic force of atoms.

3) When an object is moved on a surface, static friction resists the motion of the object. This static friction arises due to electromagnetic interaction between the atoms present in the object and atoms on the surface. Kinetic friction also has similar origin. This branch of electricity which deals with stationary charges is called Electrostatics.

- a) Both 1 and 2
- b) Both 1 and 3
- c) Both 2 and 3
- d) All 1, 2 and 3

3. Two millenniums ago, Who noticed that amber after rubbing with animal fur attracted small pieces of leaves and dust?

- a) Aryans
- b) Greeks
- c) Romans
- d) None of the above

4. Which among the following statement is correct?

1) Consider a charged rubber rod hanging from a thread. Suppose another charged rubber rod is brought near the first rubber rod; the rods repel each

other. Now if we bring a charged glass rod close to the charged rubber rod, they attract each other.

2) At the same time, if a charged glass rod is brought near another charged glass rod, both the rods repel each other. From these observations, the following inferences are made (i) The charging of rubber rod and that of glass rod are different from one another. (ii) The charged rubber rod repels another charged rubber rod, which implies that 'like charges repel each other'.

3) We can also arrive at the same inference by observing that a charged glass rod repels another charged glass rod. (iii) The charged rubber rod attracts the charged glass rod, implying that the charge in the glass rod is same kind of charge present in the rubber. Thus, like charges attract each other

- a) Both 1 and 2
- b) Both 1 and 3
- c) Both 2 and 3
- d) All 1, 2 and 3

5. In the 18th century, who called one type of charge as positive (+) and another type of charge as negative (-) ?

- a) J. J. Thomson
- b) Benjamin Franklin
- c) Rutherford
- d) John Dalton

6. Charging the objects through rubbing is called \_\_\_\_\_

- a) Cosmoelectric charging
- b) Triboelectric charging
- c) Neoelectric charging
- d) Hostelectric charging

7. The SI unit of charge is \_\_\_\_

- a) Newton
- b) Joule
- c) Coulomb
- d) Pascal

8. Which among the following statement is correct?