

- i) The question-cum-answer booklet contains *two* Groups, **Group – I & Group – II**.
- ii) **Group – I** contains two Parts, **Part – A & Part- B** and **Group – II** contains *two* Parts, **Part – C & Part – D**.
- iii) In **Group – I, Part – A** consists of 39 questions and **Part – B** consists of 11 questions. In **Group – II, Part – C** consists of 21 questions and **Part – D** consists of 6 questions.
- iv) Space has been provided in the question-cum-answer booklet itself to answer the questions.
- v) Follow the instructions given in **Part – A** of **Group – I** and **Part – C** of **Group – II** and write the correct answer in full in the space provided below each question.
- vi) For **Part – B** of **Group – I** and **Part – D** of **Group – II** enough space for each question is provided. You have to answer the questions in the space provided.
- vii) **Space for Rough Work** has been printed and provided at the bottom of each page except Page No. 32.

GROUP - I
(Physics & Chemistry)
(Marks : 65)
PART - A

Four alternatives are given for each of the following questions / incomplete statements. Only one of them is correct or most appropriate. Choose the most appropriate alternative and write it in the space provided below each question.

$$39 \times 1 = 39$$

1. A phenomenon in which magnetic field produces electric current in a conductor is
- (A) Magnetic effect (B) Chemical effect
- (C) Electromagnetic induction (D) Photoelectric effect.

Ans :

(SPACE FOR ROUGH WORK)

2. A device converting mechanical energy into electrical energy is

- (A) Dry cell
- (B) Motor
- (C) Dynamo
- (D) Solar cell.

Ans : _____

3. Which one of the following can do photoelectric effect from most of the elements ?

- (A) Gamma radiation
- (B) Common light
- (C) Ultraviolet rays
- (D) X-rays.

Ans : _____

4. The electromagnetic waves that stimulate blood circulation are

- (A) Radio waves
- (B) Infrared rays
- (C) Gamma rays
- (D) X-rays.

Ans : _____

(SPACE FOR ROUGH WORK)

5. The element used extensively in electronic instruments is

- (A) Phosphorus
- (B) Boron
- (C) Aluminium
- (D) Silicon.

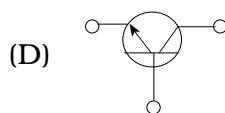
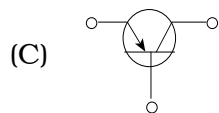
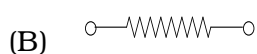
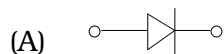
Ans : _____

6. Which of the following are the sides of diode ?

- (A) Anode-Emitter
- (B) Emitter-Collector
- (C) Anode-Cathode
- (D) Cathode-Emitter.

Ans : _____

7. Which one of the following is the circuit symbol of $p-n-p$ transistor ?



Ans : _____

(SPACE FOR ROUGH WORK)

8. Which one of the following is responsible for separation of particles of different densities in a centrifuge ?

- (A) Centrifugal force
- (B) Centrifugal reaction
- (C) Centripetal force
- (D) Centripetal reaction.

Ans : _____

9. If a string whirling with a stone snaps, then the motion of stone will be

- (A) in same circular motion
- (B) towards centre
- (C) in the direction of tangent
- (D) in the extending (expanding) circular path.

Ans : _____

10. The force of attraction between any two objects is not related to the

- (A) physical nature of objects
- (B) mass of the objects
- (C) distance between the objects
- (D) force acting along the line joining two objects.

Ans : _____

(SPACE FOR ROUGH WORK)

11. Weightlessness is experienced in which of the following situations ?

- (A) Travelling in aircraft
- (B) Moving in upward direction in a lift
- (C) Moving up in a giant wheel
- (D) In a spacecraft orbiting around the earth.

Ans : _____

12. "An imaginary line drawn from the sun to planet sweeps equal areas in equal intervals of time." This law is

- (A) First law of planetary motion
- (B) Second law of planetary motion
- (C) Third law of planetary motion
- (D) Universal law of gravitation.

Ans : _____

13. Colours in a pure spectrum are

- (A) mixed
- (B) found to be overlapping
- (C) away from one another
- (D) occupying their respective places distinctly.

Ans : _____

(SPACE FOR ROUGH WORK)

14. The part of the spectroscope that magnifies the image of the spectrum is

- (A) Slit
- (B) Telescope
- (C) Lenses
- (D) Prism.

Ans : _____

15. Which of the following is continuous emission spectrum ?

- (A) Spectrum of light that is emitted by gases
- (B) Spectrum obtained by passing sunlight through semi-transparent medium
(object)
- (C) Spectrum obtained from the flame of burning candle
- (D) Spectrum obtained by passing light of carbon arc lamp through sodium vapour.

Ans : _____

16. Sound propagates with maximum velocity (speed) through which of the following mediums ?

- (A) Solid (B) Gas
- (C) Liquid (D) Vacuum.

Ans : _____

(SPACE FOR ROUGH WORK)

17. Echo-cardiography by using ultrasound waves is helpful to study of which of the following organs ?

- (A) Kidney
- (B) Urinary bladder
- (C) Pancreas
- (D) Heart.

Ans : _____

18. The difference in brightness of two stars having the magnitudes + 1 and + 5, is

- (A) $(2.5)^1$
- (B) $(2.5)^2$
- (C) $(2.5)^3$
- (D) $(2.5)^4$

Ans : _____

19. Sun may turn into black hole if one of the following is very less :

- (A) Emission of energy
- (B) Mass
- (C) Volume
- (D) Brightness.

Ans : _____

(SPACE FOR ROUGH WORK)

20. Which one of the following stars is binary star ?

- (A) Rigel (B) Sun
(C) Sirius (D) Betelgeuse.

Ans : _____

21. Which one of the following is not correct with respect to radioactive emission ?

- (A) Alpha rays are emitted
(B) Beta rays are emitted
(C) Alpha and Beta rays are emitted simultaneously
(D) There may be Gamma rays along with Alpha or Beta rays.

Ans : _____

22. The correct equation which indicates nuclear fission of Uranium-235 is

- (A) ${}_{92}\text{U}^{235} \longrightarrow {}_{56}\text{Ba}^{141} + {}_{36}\text{Kr}^{92} + 3 {}_0\text{n}^1 + \text{energy}$
(B) ${}_{92}\text{U}^{235} + {}_0\text{n}^1 \longrightarrow {}_{56}\text{Ba}^{41} + {}_{36}\text{Kr}^{92} + 3 {}_0\text{n}^1 + \text{energy}$
(C) ${}_{92}\text{U}^{235} + {}_0\text{n}^1 \longrightarrow {}_{56}\text{Ba}^{140} + {}_{36}\text{Kr}^{92} + 3 {}_0\text{n}^1 + \text{energy}$
(D) ${}_{92}\text{U}^{235} + {}_0\text{n}^1 \longrightarrow {}_{56}\text{Ba}^{141} + {}_{36}\text{Kr}^{92} + 3 {}_0\text{n}^1 + \text{energy}.$

Ans : _____

(SPACE FOR ROUGH WORK)

23. 1 mg of mass is converted into energy ; then the liberated energy is equal to

(A) $9 \times 10^{11} \text{ J}$

(B) $9 \times 10^{10} \text{ J}$

(C) $6 \times 10^{10} \text{ J}$

(D) $8.5 \times 10^{10} \text{ J.}$

Ans : _____

24. Which reaction(s) in the sun account(s) for its huge amount of energy ?

(A) Fusion of heavy nuclei

(B) Fission of heavy nuclei

(C) Proton-proton chain and Carbon cycle

(D) Fusion of Carbon nuclei with Helium nuclei.

Ans : _____

25. What is the function of transparent glass plate used in the Solar Cooker ?

(A) Absorbs the Solar radiation

(B) Prevents the Solar radiation to go out of the wooden box

(C) Reflects the Solar radiation into the box

(D) Does not allow the heat energy to flow out of the box.

Ans : _____

(SPACE FOR ROUGH WORK)

26. In relation to the use of hard water, which of the following does not cause energy crisis ?

- (A) Not using drinking water for other uses
- (B) Not switching off the electrical instrument while not in use
- (C) Not encouraging the use of other alternating energy sources
- (D) Not using the improvised heating facilities.

Ans : _____

27. If you have to use electrical energy very efficiently, then you need to select

- (A) Fluorescent tubelight
- (B) Compact Fluorescent (tube) lamp
- (C) Incandescent lamp
- (D) Electric arc lamp.

Ans : _____

28. Which of the following elements gives its oxide quickly when kept in air ?

- (A) Magnesium
- (B) Iron
- (C) Sodium
- (D) Copper.

Ans : _____

(SPACE FOR ROUGH WORK)

29. Which of the following is the correct arrangement in the purification of copper by electrolytic refining ?

- (A) Both Cathode and Anode are pure Copper plates
- (B) Only Anode is made up of pure Copper
- (C) Only Cathode is an impure Copper plate
- (D) Impure Copper is Anode and pure Copper is Cathode.

Ans : _____

30. Copper + Zinc + Nickel — This composition of metals is helpful in producing

- (A) Surgical instruments
- (B) Resistance coils
- (C) Heating coils
- (D) Cutting tools.

Ans : _____

31. The substance that acts as an insulator at 0 K, but conducts electric current as the temperature increases is

- (A) Carbon
- (B) Indium
- (C) Germanium
- (D) Phosphorus.

Ans : _____

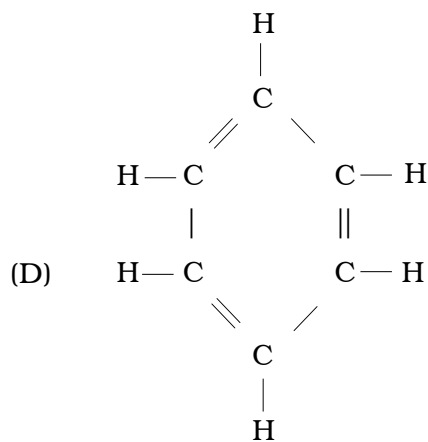
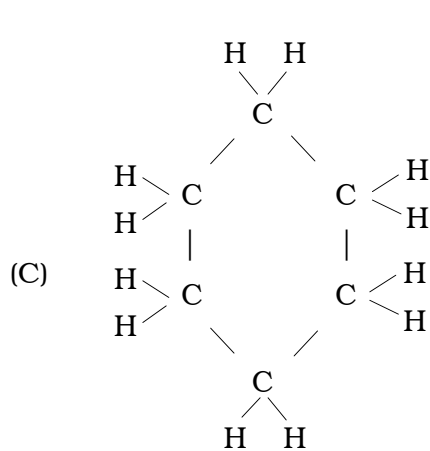
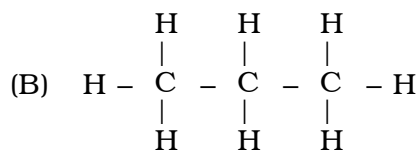
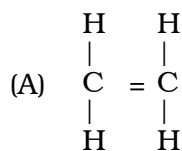
(SPACE FOR ROUGH WORK)

32. Compound of Silicon used in glass cutting is

- (A) Silicon carbide
- (B) Silicon dioxide
- (C) Sodium silicate
- (D) Calcium silicate.

Ans : _____

33. Which one of the following is the covalent structure (structural formula) of benzene ?



Ans : _____

(SPACE FOR ROUGH WORK)

34. For the production of glass that absorbs radiation, which one of the following is used ?

- (A) Aluminium oxide
- (B) Lead oxide
- (C) Boron
- (D) Carbon.

Ans : _____

35. Which one of the following is made up of a plastic that does not turn soft or melt on heating ?

- (A) Plastic bucket
- (B) Plastic insulation on electric wires
- (C) Plastic water pipes
- (D) Handle of the electric iron.

Ans : _____

36. Which of the following is prepared by synthetic material ?

- (A) Gravel
- (B) Wooden chair
- (C) Window rods
- (D) Fuse box.

Ans : _____

(SPACE FOR ROUGH WORK)

37. Which one of the following is not correct with respect to the use of hard water ?

- (A) Clothes are easily washed when used with soap and hard water
- (B) Pulses are not cooked properly in hard water
- (C) Hard water used for bathing makes the skin dry and leaves whitish residue on skin
- (D) Boiler gets corroded when hard water is boiled inside.

Ans : _____

38. Which of the following substances are formed in the process of saponification ?

- (A) Fat and Oil
- (B) Soap and Sodium hydroxide
- (C) Glycerol and Sodium hydroxide
- (D) Soap and Glycerol.

Ans : _____

39. Even though the cleansing property of detergent is better than soap, you have to limit the use of detergents. Why ?

- (A) The cost of detergent is more than soap
- (B) It effects on the hands of the user
- (C) The production is more complicated
- (D) It polutes both water and land.

Ans : _____

(SPACE FOR ROUGH WORK)

PART – B

40. a) Name the force experienced by a current carrying conductor if it is kept in magnetic field.

- b) Define the Fleming's left hand rule. 2

41. Draw a neat sketch of Laser tube. 2

(SPACE FOR ROUGH WORK)

42. a) Explain how the principle of conservation of momentum is involved in rocket working.

- b) What do you mean orbital velocity ? Why is the period of revolution of geostationary satellite more or less than 24 hours ? 4

(SPACE FOR ROUGH WORK)

43. Write any two differences between the Petrol engine and the Diesel engine. 2

44. Draw a neat sketch of petrol engine. (Internal combustion engine) 2

(SPACE FOR ROUGH WORK)

45. Explain the Big bang theory which caused expansion of universe.

2

46. Name any two radio-isotopes and write one use of every isotope.

2

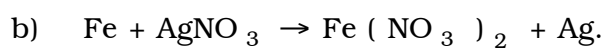
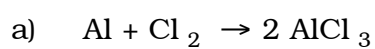
(SPACE FOR ROUGH WORK)

47. Draw a neat sketch of nuclear power plant.

2

48. Balance the following chemical reactions :

2



(SPACE FOR ROUGH WORK)

49. a) What is isomerism ? Name two isomers of butane.

b) What is the meaning of thermal cracking ? Why is petroleum cracking being done ? 4

50. Suggest any four methods of conserving water. 2

(SPACE FOR ROUGH WORK)

GROUP - II**(Biology)****(Marks : 35)****PART - C**

Four alternatives are given for each of the following questions / incomplete statements. Only one of them is correct or most appropriate. Choose the most appropriate alternative and write it in the space provided below each question.

$$21 \times 1 = 21$$

51. Rhizoids are present in

- (A) Pteridophyta
- (B) Bryophyta
- (C) Gymnosperms
- (D) Angiosperms.

Ans : _____

52. The animal group with dry skin and horny scales is

- (A) amphibia
- (B) reptiles
- (C) birds
- (D) mammals.

Ans : _____

(SPACE FOR ROUGH WORK)

53. The egg laying mammal among the following is

- (A) Platypus (B) Bat
(C) Giraffe (D) Kangaroo.

Ans : _____

54. The pigment which gives red colour to polysiphonia is

- (A) Phycocyanin
(B) Chlorophyll
(C) Xanthophyll
(D) Phycoerythrin.

Ans : _____

55. Diaphragm is a muscular membrane that separates which of the following from each other ?

- (A) Heart and Lungs
(B) Stomach and Urinary bladder
(C) Thoracic and Abdominal cavities
(D) Stomach and Liver.

Ans : _____

(SPACE FOR ROUGH WORK)

56. From the functional point of view the white blood cells may be compared to

- (A) an army (B) scavengers
(C) distributors (D) messengers.

Ans : _____

57. The tissue that consists of fat cells which also provides protection to some organs is

- (A) adipose tissue (B) areolar tissue
(C) muscular tissue (D) nervous tissue.

Ans : _____

58. Xylem tissue is associated with

- (A) Conduction of water
(B) Transpiration of water
(C) Absorption of water
(D) Storage of water.

Ans : _____

59. The part of the brain which is responsible for the maintenance of the equilibrium of the body is

- (A) Pons
(B) Cerebellum
(C) Medulla oblongata
(D) Cerebrum.

Ans : _____

(SPACE FOR ROUGH WORK)

60. The endocrine gland which is present on the upper surface of the kidney is

- (A) Thyroid gland
- (B) Parathyroid gland
- (C) Pituitary gland
- (D) Adrenal gland.

Ans : _____

61. The abnormality that occurs in newborn babies due to hypothyroidism is

- (A) myxoedema
- (B) acromegaly
- (C) simple goitre
- (D) cretinism.

Ans : _____

62. The incubation period of HIV in children is

- (A) 10 to 12 months
- (B) 12 to 14 months
- (C) 16 to 22 months
- (D) 18 to 24 months.

Ans : _____

(SPACE FOR ROUGH WORK)

63. ELISA test helps to detect

- (A) HIV
- (B) Diabetes
- (C) Hepatitis-B
- (D) Glaucoma.

Ans : _____

64. When the skin, sclera and urine turn yellow in colour, it indicates

- (A) Liver Cancer
- (B) Cirrhosis
- (C) AIDS
- (D) Jaundice.

Ans : _____

65. As an adulterant, argemone oil causes

- (A) Laziness
- (B) Body pain
- (C) Dropsy
- (D) Giddiness.

Ans : _____

(SPACE FOR ROUGH WORK)

66. Metanil yellow is used as an adulterant to brighten the colour of

- (A) Pulse
- (B) Jowar
- (C) Fruit
- (D) Bakery product.

Ans : _____

67. When the lactometer is made to float in unadulterated milk, it shows the reading of

- (A) 1.016
- (B) 1.026
- (C) 1.036
- (D) 1.046.

Ans : _____

68. Drosera traps and digests insects in order to get the compounds of

- (A) Sulphur
- (B) Phosphorus
- (C) Nitrogen
- (D) Carbon.

Ans : _____

(SPACE FOR ROUGH WORK)

69. The pollution that can be controlled by the use of unleaded petrol is

- (A) water pollution
- (B) thermal pollution
- (C) air pollution
- (D) radioactive pollution.

Ans : _____

70. Oxygen transportation in the blood is affected due to the addition of

- (A) Carbon monoxide with haemoglobin
- (B) Oxygen with haemoglobin
- (C) Nitrogen with haemoglobin
- (D) Carbon dioxide with white blood cells.

Ans : _____

71. The correct sequence of carbon cycle is

- (A) Photosynthesis, Nutrition, Respiration and Decomposition
- (B) Nutrition, Respiration, Decomposition and Photosynthesis
- (C) Respiration, Decomposition, Photosynthesis and Nutrition
- (D) Decomposition, Photosynthesis, Nutrition and Respiration.

Ans : _____

(SPACE FOR ROUGH WORK)

PART - D

Instructions : i) Answer the following questions.

ii) Write the answers in brief according to the questions.

72. Write any two differences between monocot and dicot plants.

2

73. a) What is the organ of corti ?

b) Name the liquids that are present in the inner ear.

2

(SPACE FOR ROUGH WORK)

74. Draw a sketch of collenchyma tissue and label its parts.

2

75. Mention any two applications of tissue culture.

2

76. A farmer applied enriched rhizobium to his paddy field and got good yield.

Give scientific reason.

2

(SPACE FOR ROUGH WORK)

77. Draw a neat diagram of vertical section of human brain and label the following parts.

4

a) Cerebrum

b) Pons

c) Cerebellum

d) Thalamus.

(SPACE FOR ROUGH WORK)

(SPACE FOR ROUGH WORK)