

General Instructions :

- 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 current carrying conductor experiences a mechanical force in a magnetic field." The device which works on this principle is a/an
- (A) electric motor (B) A.C. dynamo
- (C) D.C. dynamo (D) commutator.

Ans :

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2. 'Volt' is the unit of which of the following quantities ?

- (A) Electric current and potential difference
- (B) Potential difference and electromotive force
- (C) Electromotive force and electrical resistance
- (D) Electrical resistance and electric current.

Ans : _____

3. Dr. Sahana has to treat her patient who is suffering from rickets. The electromagnetic radiation to be used for this treatment is

- (A) ultraviolet radiations of high frequency
- (B) infrared rays of high frequency
- (C) ultraviolet radiations of low frequency
- (D) infrared rays of low frequency.

Ans : _____

4. Identify the correct relationship among the three given below with respect to X-rays :

1	2	3
L) William Roentgen	P) heating effect	X) Blood circulation
M) J.W. Ritter	Q) absorbed by ozone layer	Y) Sterilizer
N) W. Herschel	R) passes through the skin	Z) Radiography

- (A) L, R, Z
- (B) M, Q, X
- (C) N, P, Y
- (D) M, R, X.

Ans : _____

(SPACE FOR ROUGH WORK)

5. A reverse biased p - n junction offers a high resistance, because

- (A) charge carriers flow across the junction
- (B) the cell used supplies direct current
- (C) charge carriers flow in the same direction
- (D) charge carriers are repelled away from the junction.

Ans : _____

6. The two major parts in total radio broadcasting system are

- (A) microphone and mixer
- (B) speaker and detector
- (C) transmitter and receiver
- (D) speaker and receiving antenna.

Ans : _____

7. If there is voltage fluctuation in domestic circuit, the device that you use to regulate voltage in an electrical appliance is

- (A) a transducer
- (B) an oscillator
- (C) a diode
- (D) a detector.

Ans : _____

(SPACE FOR ROUGH WORK)

8. A cyclist while going round a curve leans towards the centre of the curve to get necessary

- (A) centrifugal force
- (B) centripetal force
- (C) gravitational force
- (D) centrifugal reaction.

Ans : _____

9. The device that can be fitted to the engine of a bus to prevent the driver from driving it with overspeed is

- (A) centrifugal pump
- (B) centrifuge
- (C) centrifugal drying machine
- (D) centrifugal governor.

Ans : _____

10. For a satellite orbiting the earth, centripetal force is provided by

- (A) the place of launch
- (B) gravitational force
- (C) the size of the satellite
- (D) mass of the satellite.

Ans : _____

(SPACE FOR ROUGH WORK)

11. The value of 'g'

- (A) does not depend on the mass of the object
- (B) is proportional to the mass of the object
- (C) does not depend on the mass of the earth
- (D) does not depend upon the radius of the earth.

Ans : _____

12. The masses of two objects are 'a' and 'b' and the force of attraction between them is 'F'. The distance between them is given by

- (A) $\frac{G ab}{F}$
- (B) $\sqrt{F G ab}$
- (C) $\sqrt{\frac{F}{G ab}}$
- (D) $\sqrt{\frac{G ab}{F}}$

Ans : _____

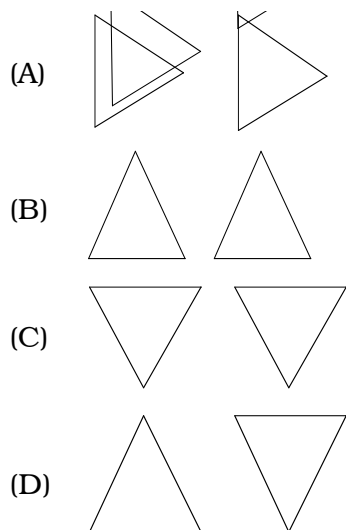
13. The factor that *does not* contribute for the dispersion of light in a glass prism, is

- (A) the prism is transparent
- (B) double refraction takes place
- (C) light gets reflected by the prism
- (D) white light is made of several colours.

Ans : _____

(SPACE FOR ROUGH WORK)

14. The sketch of correct arrangement of prisms for the dispersion and recombination of colours of composite light is



Ans : _____

15. A student wants to get a band of distinct seven colours occupying their respective positions using a glass prism. The device that he can select for this purpose is a

- (A) Telescope
(B) Spectroscope
(C) Microscope
(D) Binocular.

Ans : _____

16. Doppler effect in sound is observed as a change in its

- (A) pitch (B) velocity
(C) amplitude (D) speed.

Ans : _____

(SPACE FOR ROUGH WORK)

17. The ultrasound signal sent in water by sonar takes 3 seconds to return. If the velocity of sound in water is 1.5 kms/sec, the distance travelled by the signal is

- (A) 2.25 kms (B) 4.5 kms
(C) 6 kms (D) 9 kms.

Ans : _____

18. The red shift of galaxies show that the

- (A) universe is contracting
(B) galaxies are coming towards us
(C) velocity of light changes
(D) universe is expanding.

Ans : _____

19. The matter that streams out of the sun's surface in bursts like thunderstorms is

- (A) granulation
(B) spicule
(C) solar flare
(D) solar prominence.

Ans : _____

(SPACE FOR ROUGH WORK)

20. The magnitudes of four stars P , Q , R and S are respectively 0, -5 , $+5$ and -10 . The brightest star among them is

- (A) S (B) R
(C) Q (D) P .

Ans : _____

21. Machine parts in an industry are to be checked for defects. The radio-isotope used for this purpose is

- (A) Radio-Iodine
(B) Radio-Iridium
(C) Radio-Carbon
(D) Radio-Phosphorous.

Ans : _____

22. Which of the following has 146 neutrons ?

- (A) ${}_{92}\text{U}^{235}$
(B) ${}_{88}\text{Ra}^{226}$
(C) ${}_{86}\text{Rn}^{222}$
(D) ${}_{92}\text{U}^{238}$

Ans : _____

(SPACE FOR ROUGH WORK)

23. Tritium nucleus contains

- (A) three protons
- (B) one proton and two neutrons
- (C) two protons and one neutron
- (D) three neutrons.

Ans : _____

24. The light absorbing material used in a solar cell is

- (A) silicon
- (B) phosphorous
- (C) carbon
- (D) radium.

Ans : _____

25. The technique which established that the sun is made of mostly hydrogen is

- (A) spectrum analysis
- (B) chemical analysis
- (C) scanning
- (D) laser ranging.

Ans : _____

(SPACE FOR ROUGH WORK)

26. The fuel used in gobar gas plant is

- (A) animal dung
- (B) firewood
- (C) coal
- (D) charcoal.

Ans : _____

27. Brass, German silver and Gunmetal are the alloys of copper. Apart from copper the other common metal in them is

- (A) zinc
- (B) tin
- (C) iron
- (D) nickel.

Ans : _____

28. You are required to arrange Fe, Zn and Mg in the increasing order of their reactivity. The correct arrangement is

- (A) Mg, Zn, Fe
- (B) Fe, Mg, Zn
- (C) Fe, Zn, Mg
- (D) Zn, Mg, Fe.

Ans : _____

(SPACE FOR ROUGH WORK)

31. During the extraction of silicon from quartz, unchanged silica is removed by using

- (A) Hydrochloric acid
- (B) Hydrofluoric acid
- (C) Nitric acid
- (D) Sulphuric acid.

Ans : _____

32. The permitted level of emission of carbon monoxide of my vehicle is 3%. My vehicle is

- (A) a scooter
- (B) a lorry
- (C) an auto-rickshaw
- (D) a car.

Ans : _____

33. The chemical which is mixed with L.P.G. to detect the leakage of the gas is

- (A) Methyl Mercaptan
- (B) Benzyl Mercaptan
- (C) Ethyl Mercaptan
- (D) Propyl Mercaptan.

Ans : _____

(SPACE FOR ROUGH WORK)

34. During the manufacture of glass, molten glass is cooled slowly to make it

- (A) more brittle
- (B) colourful
- (C) withstand high temperature
- (D) lose brittleness.

Ans : _____

35. The polymer that can be used as gasket of a pressure cooker is

- (A) thiokol
- (B) teflon
- (C) nylon
- (D) neoprene.

Ans : _____

36. Raw materials used in the manufacture of cement are

- (A) clay and washing soda
- (B) clay and limestone
- (C) washing soda and limestone
- (D) calcium silicate and clay.

Ans : _____

(SPACE FOR ROUGH WORK)

37. Which of the following is a soap ?

- (A) Sodium sulphate
- (B) Sodium stearate
- (C) Sodium chloride
- (D) Sodium nitrate.

Ans : _____

38. Which among the following is *not* a method of conservation of water ?

- (A) Growing trees and conserving soil
- (B) Using improved method of farming
- (C) Removing the forests and constructing lakes
- (D) Collecting the roof water and using it.

Ans : _____

39. During the preparation of soap the liquid separated by distillation is

- (A) sodium hydroxide
- (B) oil
- (C) stearic acid
- (D) glycerol.

Ans : _____

(SPACE FOR ROUGH WORK)

PART – B

40. Draw a neat diagram of a D.C. dynamo.

2

41. Name the electromagnetic waves that lie in between Radiowaves and Infrared rays in electromagnetic spectrum. Mention any three applications of these waves. 2

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42. The period of revolution of a satellite around the earth is 24 hours. What is that satellite called ? Mention the main objective of launching such satellites. Write the equation showing the relationship between orbital velocity and escape velocity. 2

43. Draw a neat diagram of a "single stage rocket".

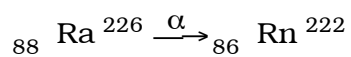
2

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44. What are sun-spots ? How are they caused ? Why do they appear dark ? 2

45. What is Transmutation ? Identify the parent nucleus and daughter nucleus in the following transmutation : 2



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46. Mention any *four* hazards to human health that may be caused due to radioactive radiations. 2

47. Mention any *two* differences between "Alkanes" and "Alkynes". 2

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48. How does boiling remove the temporary hardness of water ? Explain it, with balanced chemical equations. 2

49. a) What are Heat Engines ? How are they classified broadly ?

- b) Explain the Power stroke of a petrol engine.

- c) Write the formula for the efficiency of a heat engine.

4

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50. a) Draw a neat diagram of the blast furnace used to extract Iron from Haematite.

b) Draw a neat diagram to show the Electrolytic refining of blister copper.

4

(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. Two chambered heart is found in

- (A) pisces (B) amphibians
(C) reptiles (D) aves.

Ans : _____

52. Which one of the following is deliberate adulteration ?

- (A) Coating of pesticides on fruits
(B) Rice like stones in rice
(C) Grass in coriander
(D) Dust in foodgrains.

Ans : _____

53. Prothallus is an independent structure of

- (A) gametophyte of bryophytes (B) sporophyte of bryophytes
(C) gametophyte of pteridophytes (D) sporophyte of pteridophytes.

Ans : _____

(SPACE FOR ROUGH WORK)

(A) meristem
(B) parenchyma
(C) collenchyma
(D) sclerenchyma.

Ans : _____

(A) Carbon cycle

(B) Oxygen cycle

(C) Phosphorus cycle

(D) Nitrogen cycle.

Ans : _____

(A) ragi

(B) mustard dia.

(C) wheat

(D) maize.

Ans : _____

(SPACE FOR ROUGH WORK)

57. While developing a good public hospital, the management gives priority to

- (A) large open field around the hospital
- (B) parking space for all types of public vehicles
- (C) a garden with good number of shady trees
- (D) space for caterer who supply food at cheap rates.

Ans : _____

58. Epithelium tissue in Alveoli and blood capillaries referred as endothelium is

- (A) columnar epithelium
- (B) squamous epithelium
- (C) ciliated epithelium
- (D) cuboid epithelium.

Ans : _____

59. Adulteration of food means

- (A) processing of food
- (B) transportation of food
- (C) storage of food
- (D) removing nutritive value of food.

Ans : _____

(SPACE FOR ROUGH WORK)

60. Denitrification is the process of

- (A) fixing nitrogen in the soil
- (B) changing proteins into ammonium salts
- (C) conversion of ammonium salts into nitrates
- (D) changing nitrates into free nitrogen.

Ans : _____

61. Due to low secretion of insulin in the body, a person will have

- (A) low blood pressure
- (B) high blood pressure
- (C) high sugar level in the blood
- (D) low sugar level in the blood.

Ans : _____

62. Now the government policy is to discourage use of plastic bags. The scientific reason for this is that they are

- (A) non-biodegradable but non-toxic
- (B) biodegradable
- (C) non-biodegradable
- (D) biodegradable but toxic.

Ans : _____

(SPACE FOR ROUGH WORK)

63. One of the main symptoms of Hepatitis-B is

- (A) body weight loss
- (B) profuse sweating
- (C) burning sensation in trachea
- (D) indication of jaundice.

Ans : _____

64. When concentrated nitric acid is added to a sample of cooking oil to detect the adulteration it turns

- (A) yellow in colour
- (B) black in colour
- (C) reddish brown in colour
- (D) yellowish brown in colour.

Ans : _____

65. Production of genetically similar organisms inside or outside the body is

- (A) tissue culturing
- (B) cloning
- (C) genetic engineering
- (D) recombinant DNA technology.

Ans : _____

(SPACE FOR ROUGH WORK)

66. The tissue that helps in defence of the body by engulfing bacteria and digesting toxic substances is

- (A) adipose tissue
- (B) reticular tissue
- (C) areolar tissue
- (D) cartilage tissue.

Ans : _____

67. Cerebrum controls which one of the following functions ?

- (A) Reasoning
- (B) Mastication
- (C) Walking
- (D) Vomiting.

Ans : _____

68. HIV ultimately destroys which one of the following ?

- (A) Liver and pancreas
- (B) Production of proteins
- (C) Defence mechanism
- (D) Enzyme secretion.

Ans : _____

(SPACE FOR ROUGH WORK)

69. Genetic relation between a father and a son is determined by a technique of

- (A) genetic engineering
- (B) DNA fingerprint technology
- (C) tissue culturing
- (D) cloning.

Ans : _____

70. The outermost layer of the eyeball is

- (A) conjunctiva
- (B) sclera
- (C) choroid
- (D) retina.

Ans : _____

71. An HIV positive mother should not

- (A) kiss the child
- (B) breast-feed the child
- (C) carry the child
- (D) bathe the child.

Ans : _____

(SPACE FOR ROUGH WORK)

PART - D

Instructions : i) Answer the following questions.

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

72. Which characteristic of vertebrates made them get ready to live on land ? Give one example. 2

73. Draw a sketch to show the structure of pistil in a typical flower and label the parts. 2

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74. Why are xylem tubes considered as complex permanent tissue ?

2

75. As per government regulations it is compulsory to wear a helmet which covers up to the neck region. Give scientific reason.

2

76. A farmer mixes *Anabena* and *Nostoc* along with the manure in his paddy field. What will be the effect on yield and why ?

2

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77. Draw a diagram to show the vertical section of the human brain and label any *four* parts.

4

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