

NEET Scholarship Test Sample Paper

Time: 60 Minutes

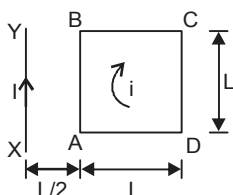
Maximum Marks: 240

- All questions carry equal marks.
- There are 60 questions in the test. For each question you will be **awarded 4 marks** for the correct answer and **zero mark** for unattempted questions. In all other cases, **minus one (-1) mark** will be awarded.

Physics

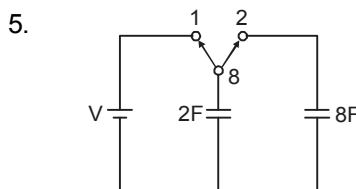
- From a disc of radius R and mass M , a circular hole of diameter R , whose rim passes through the centre is cut. What is the moment of inertia of the remaining part of the disc about a perpendicular axis, passing through the centre ?
 (a) $14 MR^2/32$ (b) $13 MR^2/32$
 (c) $11 MR^2/32$ (d) $9 MR^2/32$

- A square loop ABCD carrying a current i , is placed near and coplanar with a long straight conductor XY carrying a current I , the net force on the loop will be:



- | | |
|-------------------------------|------------------------------|
| (a) $\frac{2\mu_0 iI}{3\pi}$ | (b) $\frac{\mu_0 iI}{2\pi}$ |
| (c) $\frac{2\mu_0 iIL}{3\pi}$ | (d) $\frac{\mu_0 iIL}{2\pi}$ |

- The magnetic susceptibility is negative for
 (a) diamagnetic material only
 (b) paramagnetic material only
 (c) ferromagnetic material only
 (d) paramagnetic and ferromagnetic materials
- A siren emitting a sound of frequency 800 Hz moves away from an observer towards a cliff at a speed of 15 ms^{-1} . Then, the frequency of sound that the observer hears in the echo reflected from the cliff is:
 (Take velocity of sound in air = 330 ms^{-1})
 (a) 765 Hz (b) 800 Hz
 (c) 838 Hz (d) 885 Hz



- A capacitor of $2\mu\text{F}$ is charged as shown in the diagram. When the switch S is turned to position 2, the percentage of its stored energy dissipated is:
 (a) 0% (b) 20%
 (c) 75% (d) 80%

- In a diffraction pattern due to a single slit of width 'a', the first minimum is observed at an angle 30° when light of wavelength 5000 \AA is incident on the slit. The first secondary maximum is observed at an angle of :
 (a) $\sin^{-1}\left(\frac{1}{4}\right)$ (b) $\sin^{-1}\left(\frac{2}{3}\right)$
 (c) $\sin^{-1}\left(\frac{1}{2}\right)$ (d) $\sin^{-1}\left(\frac{3}{4}\right)$

- At what height from the surface of earth the gravitation potential and the value of g are $-5.4 \times 10^7 \text{ J kg}^{-2}$ and 6.0 ms^{-2} respectively? Take the radius of earth as 6400 km:
 (a) 2600 km (b) 1600 km
 (c) 1400 km (d) 2000 km

- Out of the following options which one can be used to produce a propagating electromagnetic wave?
 (a) A charge moving at constant velocity
 (b) A stationary charge
 (c) A chargeless particle
 (d) An accelerating charge

9. Two identical charged spheres suspended from a common point by two massless strings of lengths 1, are initially at a distance d ($d \ll 1$) apart because of their mutual repulsion. The charges begin to leak from both the spheres at a constant rate. As a result, the spheres approach each other with a velocity v . Then v varies as a function of the distance x between the spheres, as :

- (a) $v \propto x^2$ (b) $v \propto x$
 (c) $v \propto x^{-1/2}$ (d) $v \propto x^{-1}$

10. A uniform rope of length L and mass m_1 hangs vertically from a rigid support. A block of mass m_2 is attached to the free end of the rope. A transverse pulse of wavelength λ_1 is produced at the lower end of the rope. The wavelength of the pulse when it reaches the top of the rope is λ_2 . The ratio λ_2/λ_1 is :

- (a) $\sqrt{\frac{m_1}{m_2}}$ (b) $\sqrt{\frac{m_1 + m_2}{m_2}}$
 (c) $\sqrt{\frac{m_2}{m_1}}$ (d) $\sqrt{\frac{m_1 + m_2}{m_1}}$

11. A refrigerator works between 4°C and 30°C . It is required to remove 600 calories of heat every second in order to keep the temperature of the refrigerated space constant. The power required is:

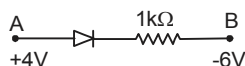
(Take 1 cal = 4.2 Joules)

- (a) 2.365 W (b) 23.65 W
 (c) 236.5 W (d) 2365 W

12. An air column, closed at one end and open at the other, resonates with a tuning fork when the smallest length of the column is 50 cm. The next larger length of the column resonating with the same tuning fork is:

- (a) 66.7 cm (b) 100 cm
 (c) 150 cm (d) 200 cm

13. Consider the junction diode as ideal. The value of current flowing through AB is :



- (a) 0 A (b) 10^{-2} A (c) 10^{-1} A (d) 10^{-3} A

14. The charge flowing through a resistance R varies with time t as $Q = at - bt^2$, where a and b are positive constants. The total heat produced in R is:

- (a) $\frac{a^3R}{6b}$ (b) $\frac{a^3R}{3b}$ (c) $\frac{a^3R}{2b}$ (d) $\frac{a^3R}{b}$

15. A black body is at a temperature of 5760 K. The energy of radiation emitted by the body at wavelength 250 nm is U_1 , at wavelength 500 nm is U_2 and that at 1000 nm is U_3 . Wien's constant $b = 2.88 \times 10^6$ nm.K. Which of the following is correct?

- (a) $U_1 = 0$ (b) $U_3 = 0$
 (c) $U_1 > U_2$ (d) $U_2 > U_1$

Chemistry

16. If the average velocity of He is $\sqrt{8}$ times that of O_2 gas, then

- (a) $T_{\text{He}} = T_{\text{O}_2}$ (b) $T_{\text{He}} > T_{\text{O}_2}$
 (c) $T_{\text{He}} < T_{\text{O}_2}$ (d) None of these

17. Total number of stereoisomers of the compound 2, 4-dichloroheptane is

- (a) 2 (b) 3
 (c) 4 (d) 6

18. In which case, the energy released is minimum?

- (a) $\text{Cl} \rightarrow \text{Cl}^-$ (b) $\text{P} \rightarrow \text{P}^-$
 (c) $\text{N} \rightarrow \text{N}^-$ (d) $\text{C} \rightarrow \text{C}^-$

19. How many grams of dibasic acid (mol. wt. 200) should be present in 100 mL of the aqueous solution to give strength of 0.1 N?

- (a) 10 g (b) 2 g
 (c) 1g (d) 20g

20. The presence of five -OH groups in glucose is established by its reaction with

- (a) $(\text{CH}_3\text{CO})_2\text{O}/\text{ZnCl}_2$ (b) NH_2OH
 (c) $\text{H}_2\text{NNHC}_6\text{H}_5$ (d) HNO_3

21. $\text{Me}_2\text{Si}(\text{OH})_2$ on hydrolysis produces

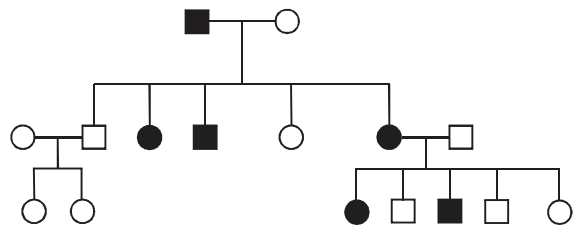
- (a) $\text{Me}_2\text{Si}(\text{OH})_2$ (b) $\text{Me}_2\text{Si} = \text{O}$
 (c) $\{-\text{O}-\text{Me}_2\text{Si}-\text{O}-\}_n$ (d) $\text{Me}_2\text{SiCl}(\text{OH})$

22. Which of the following statement does not form a part of Bohr's model of hydrogen atom?

- (a) Energies of the electron in the orbits are quantized.
 (b) The electron in the orbit nearest the nucleus has the lowest energy.
 (c) Electrons revolve in different orbits around the nucleus.
 (d) The position and velocity of the electrons in the orbit cannot be determined simultaneously.

23. Westron and westrosol are respectively
 (a) $\text{CHCl}_2 - \text{CHCl}_2$ and $\text{CHCl} = \text{CCl}_2$
 (b) $\text{CHCl} = \text{CCl}_2$ and $\text{CHCl}_2 - \text{CHCl}_2$
 (c) both are the names of $\text{CHCl}_2 - \text{CHCl}_2$
 (d) both are the names of $\text{CHCl} = \text{CCl}_2$
24. Water gas is produced by
 (a) passing steam through a red hot coke bed
 (b) saturating hydrogen with moisture
 (c) mixing oxygen and hydrogen in the ratio of 1:2
 (d) heating a mixture of CO_2 and CH_4 in petroleum refineries.
25. The correct order in which O – O bond length increases in the following is
 (a) $\text{O}_3 < \text{H}_2\text{O}_2 < \text{O}_2$ (b) $\text{O}_2 < \text{O}_3 < \text{H}_2\text{O}_2$
 (c) $\text{O}_2 < \text{H}_2\text{O}_2 < \text{O}_3$ (d) $\text{H}_2\text{O}_2 < \text{O}_2 < \text{O}_3$
26. The most suitable method for separation of a mixture of ortho and para-nitrophenols mixed in the ratio of 1 : 1 is
 (a) vaporisation (b) crystallisation
 (c) distillation (d) colour spectrum
27. Which of the following is expected to be acidic?
 (a) CrO (b) CrO_2
 (c) Cr_2O_3 (d) CrO_3
28. In an experiment, 4g of M_2O_x oxide was reduced to 2.8 g of the metal. If the atomic mass of the metal is 56 g mol^{-1} , the number of O-atoms in the oxide is
 (a) 1 (b) 2
 (c) 3 (d) 4
29. In the following reaction, the organic product is
 $\text{CH}_3\text{CH}_2\text{NH}_2 + \text{CS}_2 + \text{HgCl}_2 \xrightarrow{\Delta} ?$
 (a) ethyl isocyanide (b) ethyl cyanide
 (c) diethyl thiourea (d) ethyl isothiocyanate
30. Which of the following complexes is paramagnetic with two unpaired electrons?
 (a) $\text{K}_3[\text{Fe}(\text{CN})_6]$ (b) $\text{K}_2[\text{NiCl}_4]$
 (c) $\text{K}_2[\text{CoCl}_4]$ (d) $\text{Na}_2[\text{Ni}(\text{CN})_4]$
- Biology**
31. The segment of DNA which acts as the instrumental manual for the synthesis of the protein is
 (a) Nucleoside (b) Nucleotide
 (c) Ribose (d) Gene
32. Which of the following hormones contains iodine?
 (a) Thyroxine (b) Insulin
 (c) Testosterone (d) Adrenaline
33. Which one of the following has haplontic life cycle?
 (a) Wheat (b) Funaria
 (c) Polytrichum (d) Ustilago
34. Which one of the following is commonly used in transfer of foreign DNA into crop plants?
 (a) *Penicillium expansum*
 (b) *Trichoderma harzianum*
 (c) *Meloidogyne incognita*
 (d) *Agrobacterium tumefaciens*
35. Mannitol is the stored food in
 (a) Gracillaria (b) Chara
 (c) Porphyra (d) Fucus
36. Which one of the following is a vascular cryptogram?
 (a) Cedrus (b) Equisetum
 (c) Ginkgo (d) Marchantia
37. Phylogenetic system of classification is based on
 (a) Floral characters
 (b) Evolutionary relationships
 (c) Morphological features
 (d) Chemical constituents
38. Which one of the following groups of animals is bilaterally symmetrical and triploblastic?
 (a) Sponges
 (b) Coelenterates (Cnidarians)
 (c) Aschelminthes (round worms)
 (d) Ctenophores
39. Peripatus is a connecting link between
 (a) Coelenterata and Porifera
 (b) Ctenophora and Platyhelminths
 (c) Mollusca and Echinodermata
 (d) Annelida and Arthropoda
40. Which one of the following pairs of animals comprises 'jawless fishes'?
 (a) Guppies and hag fishes
 (b) Lampreys and eels
 (c) Mackerals and Rohu
 (d) Lampreys and hag fishes
41. If a live earthworm is pricked with a needle on its outer surface without damaging its gut, the fluid that comes out is
 (a) Slimy mucus
 (b) Excretory fluid
 (c) Coelomic fluid
 (d) Haemolymph
42. Plasmodesmata are
 (a) Connections between adjacent cells
 (b) Lignified cemented layers between cells
 (c) Locomotary structures
 (d) Membranes connecting the nucleus with plasmalemma

43. Stroma in the chloroplasts of higher plant contains
 (a) Chlorophyll
 (b) Light-independent reaction enzymes
 (c) Light-dependent reaction enzymes
 (d) Ribosomes
44. Synapsis occurs between
 (a) Two homologous chromosomes
 (b) A male and a female gamete
 (c) mRNA and ribosomes
 (d) Spindle fibres and centromere
45. Middle lamella is composed mainly of
 (a) Phosphoglycerides (b) Hemicellulose
 (c) Muramic acid (d) Calcium pectate
46. Cytoskeleton is made up of
 (a) Proteinaceous filaments
 (b) Calcium carbonate granules
 (c) Callose deposits
 (d) Cellulosic microfibrils
47. The cell junctions called tight, adhering and gap junctions are found in
 (a) Neural tissue (b) Muscular tissue
 (c) Connective tissue (d) Epithelial tissue
48. The kind of tissue that forms the supportive structure in our pinna (external ears) is also found in
 (a) Tip of the nose (b) Vertebrae
 (c) Nails (d) Ear ossicles
49. The epithelial tissue present on the inner surface of bronchioles and fallopian tubes is
 (a) Squamous (b) Cuboidal
 (c) Glandular (d) Ciliated
50. Given below is a schematic break-up of the phases/stages of cell cycle. Which one of the following is the correct indication of the stage/phase in the cell cycle?
 (a) A-Cytokinesis (b) B-Metaphase
 (c) C-Karyokinesis (d) D-Synthetic phase
51. What is not true for genetic code?
 (a) It is unambiguous
 (b) A codon in mRNA is read in a non-contiguous fashion
 (c) It is nearly universal
 (d) It is degenerate
52. Removal of introns and joining the exons in a defined order in a transcription unit is called
 (a) Capping (b) Splicing
 (c) Tailing (d) Transformation
53. Semiconservative replication of DNA was first demonstrated in
 (a) Salmonella typhimurium
 (b) Drosophila melanogaster
 (c) Escherichia coli
 (d) Streptococcus pneumoniae
54. Whose experiments cracked the DNA and discovered unequivocally that a genetic code is a "triplet"?
 (a) Beadle and Tatum
 (b) Nirenberg and Mathaei
 (c) Hershey and Chase
 (d) Morgan and Sturtevant.
55. Point mutation involves
 (a) Deletion
 (b) Insertion
 (c) Change in single base pair
 (d) Duplication
56. In the case of peppered moth (*Biston betularia*) the black-coloured form became dominant over the light-coloured form in England during industrial revolution. This is an example of
 (a) Inheritance of darker colour character acquired due to the darker environment
 (b) Natural selection whereby the darker forms were selected
 (c) Appearance of the darker coloured individuals due to very poor sunlight
 (d) Protective mimicry
57. Sickle cell anemia is
 (a) Characterized by elongated sickle like RBCs with a nucleus
 (b) An autosomal linked dominant trait
 (c) Caused by substitution of valine by glutamic acid in the beta globin chain of haemoglobin
 (d) Caused by a change in a single base pair of DNA
58. Study the pedigree chart given below



What does it show?

- (a) Inheritance of a recessive sex-linked disease like haemophilia
 (b) Inheritance of a sex-linked inborn error of metabolism like phenylketonuria
 (c) Inheritance of a condition like phenylketonuria as an autosomal recessive trait
 (d) The pedigree chart is wrong as this is not possible

59. The most popularly known blood grouping is the ABO grouping. It is named ABO and not ABC because "O" in it refers to having
- (a) No antigens A and B on RBCs
 - (b) Other antigens besides A and B on RBCs
 - (c) Overdominance of this type on the genes for A and B types
 - (d) One antibody only—either anti-A or anti-B on the RBCs
60. Select the incorrect statement from the following
- (a) Baldness is a sex-limited trait
 - (b) Linkage is an exception to the principle of independent assortment in heredity
 - (c) Galactosemia is an inborn error of metabolism
 - (d) Small population size results in random genetic drift in a population
-