

COMMON P.G. ENTRANCE TEST - 2021 (CPET-2021)

Test Booklet No.:

204101

HIGHER EDUCATION DEPARTMENT, GOVT. OF ODISHA

TEST BOOKLET

Subject Code : 55

Entrance Subject : MATERIAL SCIENCE

Time Allowed: 90 Minutes

Full Marks : 70

INSTRUCTIONS TO CANDIDATES

1. Please do not open this Question Booklet until asked to do so.
2. Check the completeness of the Question Booklet immediately after opening.
3. Enter your Hall Ticket No. on the Test Booklet in the box provided alongside. Do not write anything else on the Test Booklet.
4. Fill up & darken Hall Ticket No. & Test Booklet No. in the Answer Sheet as well as fill up Test Booklet Serial No. & Answer Sheet Serial No. in the Attendance Sheet carefully. Wrongly filled up Answer Sheets are liable for rejection.
5. Each question has four answer options marked (A), (B), (C) & (D).
6. Answers are to be marked on the Answer Sheet, which is provided separately.
7. Choose the most appropriate answer option and darken the oval completely, corresponding to (A), (B), (C) or (D) against the relevant question number.
8. Use only **Blue/Black Ball Point Pen** to darken the oval for answering.
9. Please do not darken more than one oval against any question, as scanner will read such markings as wrong answer.
10. Each question carries equal marks. There will be no negative marking for wrong answer.
11. Electronic items such as calculator, mobile, etc., are not permitted inside the examination hall.
12. Don't leave the examination hall until the test is over and permitted by the invigilator.
13. The candidate is required to handover the original OMR sheet to the invigilator and take the question booklet along with the candidate's copy of OMR sheet after completion of the test.
14. Sheet for rough work is appended in the Test Booklet at the end.

1. Which of the following material used first by human?
 - (A) Steel
 - (B) Iron
 - (C) Bronze
 - (D) Gold
2. The crystal structure of any material is studied by
 - (A) X-ray diffraction
 - (B) Optical microscope
 - (C) Spectrophotometer
 - (D) Photoluminescence
3. In general, different three dimensional lattice types are classified into
 - (A) 8 systems
 - (B) 14 systems
 - (C) 7 systems
 - (D) 5 systems
4. The repeatable entity of a crystal structure is called as
 - (A) unit cell
 - (B) lattice
 - (C) miller indices
 - (D) crystal
5. The Miller indices of the crystal planes cutting through the crystal axes (2a, 3b, c) is
 - (A) (012)
 - (B) (326)
 - (C) (231)
 - (D) (100)

6. The vacant space in BCC lattice cell is
- (A) 26%
 - (B) 68%
 - (C) 32%
 - (D) 74%
7. The elements of symmetry in a crystal are
- (A) plane of symmetry
 - (B) axis of symmetry
 - (C) centre of symmetry
 - (D) All of these
8. Which of the following is an amorphous material?
- (A) Brass
 - (B) Rubber
 - (C) Gold
 - (D) Copper
9. Which of the following property makes the copper as an electrical conductor?
- (A) Ductile
 - (B) Low resistance
 - (C) Corrosion resistance
 - (D) Low cost
10. What is meant by malleability?
- (A) Metals undergo plastic deformation under pressure
 - (B) Metals can be broken into small pieces
 - (C) Both (A) and (B)
 - (D) None of the above

11. Biosensors are used in
- (A) medical field
 - (B) agricultural field
 - (C) pollution monitoring
 - (D) All of these
12. Which one of the following is the best heat and corrosion resistant material?
- (A) Metals
 - (B) Polymers
 - (C) Ceramics
 - (D) None of these
13. How is Ester produced?
- (A) Addition polymerization
 - (B) Condensation polymerization
 - (C) Substitutional polymerization
 - (D) None of these
14. Which type of materials are used as bridges between human tissues and metals?
- (A) Polymeric biomaterials
 - (B) Ceramic biomaterials
 - (C) Metallic biomaterials
 - (D) All of these
15. Which of the following is used to determine surface morphology?
- (A) X-ray diffraction
 - (B) Electron microscope
 - (C) Both (A) and (B)
 - (D) None of the above
16. The elastic stress strain behaviour of rubber is
- (A) linear

- (B) nonlinear
(C) magnetic
(D) none of these
17. In order to convert Si into a n-type semiconductor, one need to dope the same with element having the valence of
(A) 2 (B) 3
(C) 4 (D) 5
18. When reversed biased, the width of the depletion region in a PN junction
(A) increases
(B) decreases
(C) remains the same
(D) None of these
19. In a p-type semiconductor, the Fermi surface appears
(A) just below the conduction band
(B) just above the valence band
(C) in the middle of the valence and conduction band
(D) none of the above
20. A semiconductor diode consists of
(A) the junction of n and p-type semiconductor
(B) the junction of two p-type semiconductor
(C) the junction of two n-type semiconductor
(D) none of the above
21. The sequence of layers in a FCC crystal structure is
(A) ABCABC...
(B) ABABAB....
(C) AAAAAA....
(D) BBBBBB....

22. Crystals of inert gas atoms are bound by
- (A) Van der Waals interaction
 - (B) electrostatic interaction
 - (C) strong interaction
 - (D) None of these
23. Which among the following is the characteristic of polymers?
- (A) High tensile strength
 - (B) High coefficient of friction
 - (C) Low density
 - (D) All of these
24. The window of aircraft is made of _____.
- (A) PMMA
 - (B) PVC
 - (C) PVDF
 - (D) None of these
25. Which of the following is the hardest material?
- (A) Ceramic
 - (B) Diamond
 - (C) Gold
 - (D) Steel
26. The weight percentage of carbon present in mild steels is
- (A) 0.008 to 0.3
 - (B) 10 to 20
 - (C) 0.8 to 2.11
 - (D) None of these
27. Which of the following is not a metal?
- (A) Sulphur
 - (B) Phosphorous
 - (C) Nitrogen
 - (D) None of these

28. The valence of the element A in the oxide AO_3 is
- (A) 2
 - (B) 4
 - (C) 6
 - (D) 8
29. Red litmus paper is turned to blue when immersed in a solution of type.
- (A) acidic
 - (B) basic
 - (C) salt
 - (D) None of these
30. The atoms of elements having different atomic number but same mass number are called
- (A) isotopes
 - (B) isobars
 - (C) isotones
 - (D) isomers
31. Which of the following is the example of emulsion?
- (A) Water
 - (B) Air
 - (C) Milk
 - (D) None of these
32. The susceptibility of diamagnetic substances is
- (A) positive
 - (B) negative
 - (C) zero
 - (D) None of these

33. As compared to the magnetic moment of electrons, the magnetic moment of nuclei are
- (A) smaller
 - (B) greater
 - (C) equal
 - (D) None of these
34. Which of the following feature is present in all materials?
- (A) paramagnetism
 - (B) diamagnetism
 - (C) ferromagnetism
 - (D) antiferromagnetism
35. Which of the followings relates dielectric constant to electron polarizability?
- (A) Clausius-Mossotti relation
 - (B) Debye T^3 law
 - (C) Curie-Weiss law
 - (D) None of these
36. All dielectrics are
- (A) metals
 - (B) insulators
 - (C) semimetals
 - (D) None of these
37. Which arrangement of electrons leads to antiferromagnetism?
- (A) $\uparrow\uparrow\uparrow$
 - (B) $\uparrow\downarrow\uparrow\downarrow$
 - (C) Both (A) and (B)
 - (D) None of these

38. The conductivity shown by MgCl_2 in its molten state is
- (A) electronic
 - (B) thermal
 - (C) ionic
 - (D) p-type
39. At absolute temperature, semiconductor behaves as
- (A) a superconductor
 - (B) a semiconductor
 - (C) a conductor
 - (D) an insulator
40. Which of the following converts solar energy into electrical energy?
- (A) Fuel cell
 - (B) Light emitting diode
 - (C) Photovoltaic cell
 - (D) Galvanic cell
41. Which of the following exhibits magnetic hysteresis loop?
- (A) Ferroelectric materials
 - (B) Pyroelectric materials
 - (C) Ferromagnetic materials
 - (D) None
42. The electrode for a battery must be
- (A) a semiconductor
 - (B) an insulator
 - (C) a good conductor of electricity
 - (D) a bad conductor of electricity
43. Solder is a metal alloy consisting of
- (A) Sn and Pb
 - (B) Sn and Cu
 - (C) Sn and Zn
 - (D) Zn and Pb

44. Which of the following is a renewable source of energy?
- (A) Wind energy
 - (B) Nuclear energy
 - (C) Fossil fuel energy
 - (D) None of these
45. Which of the following is not an inorganic functional material?
- (A) Ferroelectric
 - (B) Magnetic sensor
 - (C) Light detector
 - (D) Reverse micelles
46. Which type of material expands and contract in response to an applied electric field?
- (A) Piezoelectric materials
 - (B) Biomaterials
 - (C) Nanomaterials
 - (D) None of these
47. Which of the following is a radioactive substance?
- (A) Gadolinium
 - (B) Francium
 - (C) Carbon
 - (D) Zirconium
48. Which of the following is true for ionic compounds?
- (A) Conduct electricity when dissolved in water
 - (B) Conduct electricity in solid state
 - (C) Conduct electricity in gaseous state
 - (D) None of the above
49. The ionic compound has
- (A) High melting and boiling points
 - (B) Low melting and boiling points
 - (C) Weak inter-atomic forces
 - (D) None of these

50. If a material generates electricity due to deformation, it is called
- (A) photochromic
 - (B) photovoltaic
 - (C) piezoelectric
 - (D) liquid crystal
51. Which of the following is in pure form?
- (A) Distilled water
 - (B) LPG
 - (C) Gasoline
 - (D) Air
52. When magnetic field is removed, which types of materials maintain magnetic properties?
- (A) Ferromagnetic materials
 - (B) Diamagnetic materials
 - (C) Paramagnetic materials
 - (D) All of the above
53. Maximum surface hardening is achieved by
- (A) refluxing
 - (B) carburizing
 - (C) flame hardening
 - (D) nitriding
54. Which of the following gas has the highest rate of diffusion?
- (A) CO_2
 - (B) O_2
 - (C) N_2
 - (D) NH_3

55. The substances strongly repelled by the magnetic field are
- (A) paramagnetic
 - (B) superconducting
 - (C) ferromagnetic
 - (D) diamagnetic
56. The interaction that holds the molecules together in a polar molecular solid is
- (A) dipole-dipole interactions
 - (B) metallic bonding
 - (C) hydrogen bonding
 - (D) none of these
57. Which materials possess remenant polarization?
- (A) Ferroelectric
 - (B) Polymer
 - (C) Ferromagnetic
 - (D) None of these
58. With increasing temperature, the electrical conductivity of metals
- (A) increases
 - (B) decreases
 - (C) does not change
 - (D) none of these
59. Which of the following exhibits ferromagnetic property?
- (A) Zinc
 - (B) Aluminium
 - (C) Nickel
 - (D) Rubber

60. The property of a substance to offer no resistance to the flow of electricity at a particular temperature is known as
- (A) magnetism
 - (B) doping
 - (C) superconductivity
 - (D) none of these
61. Which of the following is a network solid?
- (A) H_2O
 - (B) Diamond
 - (C) KF
 - (D) CS_2
62. Which of the following is an example of composite?
- (A) Steel
 - (B) Nylon
 - (C) Mica
 - (D) Wood
63. The most widely used metal in the world is
- (A) gold
 - (B) silver
 - (C) steel
 - (D) aluminium
64. Most commercial glasses consist of
- (A) soda
 - (B) lime
 - (C) silica
 - (D) all of these
65. The word ceramic is meant for
- (A) burnt material
 - (B) wet material
 - (C) dry material
 - (D) none of these

66. Which of the following is the characteristic of ceramics?
- (A) High thermal stability
 - (B) High mechanical strength
 - (C) Low elongation
 - (D) all of these
67. Raman effect is due to the scattering of
- (A) light by molecules of the medium
 - (B) electron by molecules of the medium
 - (C) electron by ions of the medium
 - (D) none of the above
68. The device which converts heat energy into mechanical energy is known as
- (A) motor
 - (B) generator
 - (C) heat engine
 - (D) none of these
69. Visco-elastic behaviour exhibited by plastics correspond to that of a
- (A) solid
 - (B) liquid
 - (C) combination of (A) and (B)
 - (D) none of these
70. Which type of fibre has cellulose as the main constituent?
- (A) acrylic
 - (B) synthetic
 - (C) spandex
 - (D) natural
