

WEEK 5 – NON-METALS
MCQs with Correct Answers

1. An electrical company needs a material for insulating electric wires. Which material is most suitable?

- A) PE
- B) Copper
- C) Cast iron
- D) Steel

Answer: A) PE

2. A plastic component needs to be heated and reshaped several times during manufacturing. Which material should be selected?

- A) Bakelite
- B) Thermoplastic
- C) Ceramic
- D) Epoxy

Answer: B) Thermoplastic

3. A manufacturer wants a polymer that can be easily moulded or extruded because it softens when heated. Which type is appropriate?

- A) Thermosetting polymer
- B) Thermoplastic
- C) Ceramic
- D) Composite

Answer: B) Thermoplastic

4. A manufacturer wants to produce bottles, buckets, films and sheets. Which material is suitable?

- A) Polyethylene
- B) Bakelite
- C) Carbide ceramic
- D) Epoxy

Answer: A) Polyethylene

5. A material is required to have good electrical insulation and chemical resistance. Which category is suitable?

- A) Thermoplastic
- B) Copper
- C) Aluminium
- D) Steel

Answer: A) Thermoplastic

6. A component must retain its shape after heating and should not soften repeatedly. Which is more suitable?

- A) PE
- B) PVC
- C) Thermosetting polymer
- D) PLA

Answer: C) Thermosetting polymer

7. A manufacturer wants an environmentally friendly polymer product. Which material is the logical choice?

- A) PLA
- B) PVC
- C) PE
- D) Bakelite

Answer: A) PLA

8. A furnace component must withstand very high temperatures. Which material category would be most suitable?

- A) Ceramics
- B) PE
- C) PVC
- D) Nylon

Answer: A) Ceramics

9. A cutting tool requires very high hardness and wear resistance. Which material would you choose?

- A) Carbide ceramic
- B) PE
- C) PLA
- D) PVC

Answer: A) Carbide ceramic

10. Silicon carbide is selected for a grinding application. Which property mainly supports this choice?

- A) High hardness
- B) Low melting point
- C) High ductility
- D) High plasticity

Answer: A) High hardness

11. A ceramic component is exposed to sudden temperature changes. Which property is particularly important?

- A) Thermal shock resistance
- B) Ductility
- C) Plastic deformation
- D) Low hardness

Answer: A) Thermal shock resistance

12. An electronic device requires an insulating material that can withstand high temperature. Which material category is suitable?

- A) Oxide ceramics
- B) PE
- C) Copper
- D) Aluminium

Answer: A) Oxide ceramics

13. A dental implant requires a suitable biomedical material. Which category from Week 5 is appropriate?

- A) Oxide ceramics
- B) PE
- C) PVC
- D) Nylon

Answer: A) Oxide ceramics

14. An aircraft manufacturer wants a material with a high strength-to-weight ratio and high stiffness-to-weight ratio. Which should be selected?

- A) Composite
- B) Plain steel
- C) Cast iron
- D) Lead

Answer: A) Composite

15. Why are composites useful in aerospace applications?

- A) They are always cheaper than metals
- B) They provide lightweight, stiffness and fatigue resistance
- C) They have very low strength
- D) They melt easily

Answer: B) They provide lightweight, stiffness and fatigue resistance

16. A sports equipment company wants lightweight components with good mechanical performance. Which material category would be a good choice?

- A) Composite
- B) Cast iron
- C) Lead
- D) Mild steel

Answer: A) Composite

17. A component requires high-temperature performance and good corrosion resistance. Which Week 5 material could be considered?

- A) Composite
- B) PE only
- C) PLA only
- D) PVC only

Answer: A) Composite

18. A manufacturer needs a material for an application involving abrasion and high temperature. Which would be the best choice?

- A) Carbide ceramic
- B) PE
- C) PLA
- D) Nylon

Answer: A) Carbide ceramic

19. An automotive structural component requires low weight and good stiffness. Which would you recommend?

- A) Composite
- B) Lead
- C) PVC only
- D) Bakelite only

Answer: A) Composite

20. A material is made by combining two or more materials to obtain properties superior to those of the individual constituents. What is it called?

- A) Polymer
- B) Composite
- C) Thermoplastic
- D) Ceramic

Answer: B) Composite

21. A medical manufacturer needs a biodegradable material for making sutures and implants. Which material is suitable?

- A) PVC
- B) PLA
- C) Bakelite
- D) PE

Answer: B) PLA

22. A company wants to manufacture a component using 3D printing with a biodegradable polymer. Which should it choose?

- A) PLA
- B) PVC
- C) Nylon
- D) Bakelite

Answer: A) PLA

23. A manufacturer needs a polymer for wire insulation that has good electrical insulation and chemical resistance. Which is suitable?

- A) PE
- B) Ceramic
- C) CFRP
- D) GFRP

Answer: A) PE

24. A packaging company wants a low-cost, flexible material with good weather resistance. Which polymer is most appropriate?

- A) PE
- B) Ceramic
- C) CFRP
- D) Bakelite

Answer: A) PE

25. A manufacturer needs plastic for pipes and window frames. Which material should be selected?

- A) PLA
- B) PVC
- C) PE
- D) CFRP

Answer: B) PVC

26. A hospital needs a material for a device that must have good wear and tear resistance and chemical resistance. Which polymer is appropriate?

- A) PVC
- B) PLA
- C) PE
- D) Nylon

Answer: A) PVC

27. An engineer needs a material that can be moulded, extruded and formed into different shapes. Which polymer best fits this requirement?

- A) PVC
- B) CFRP
- C) Ceramic
- D) GFRP

Answer: A) PVC

28. A manufacturer of electronic devices requires a material for insulators, substrates and packaging. Which material is suitable?

- A) Oxide ceramic
- B) PE
- C) PLA
- D) GFRP

Answer: A) Oxide ceramic

29. An aerospace component must operate at high temperature and resist chemical attack. Which material would be appropriate?

- A) Oxide ceramic
- B) PE
- C) PLA
- D) PVC

Answer: A) Oxide ceramic

30. A dental implant requires a material with good biocompatibility, hardness and chemical stability. Which is suitable?

- A) Oxide ceramic
- B) PE
- C) PVC
- D) PLA

Answer: A) Oxide ceramic

31. A chemical plant needs pump parts that can resist acid attack. Which material would be suitable?

- A) Oxide ceramic
- B) PE
- C) CFRP
- D) PLA

Answer: A) Oxide ceramic

32. A grinding-wheel manufacturer needs a material with high hardness and wear resistance. Which should be selected?

- A) Silicon carbide
- B) PLA
- C) PE
- D) PVC

Answer: A) Silicon carbide

33. A furnace lining must withstand high temperature and thermal shock. Which material is appropriate?

- A) Silicon carbide
- B) PE
- C) PVC
- D) PLA

Answer: A) Silicon carbide

34. A manufacturer needs a material for bullet-proof protection where low density and very high hardness are important. Which should be selected?

- A) Boron carbide
- B) PE
- C) PVC
- D) PLA

Answer: A) Boron carbide

35. A cutting-tool manufacturer requires a ceramic with excellent hardness and high-temperature resistance. Which material is suitable?

- A) Tungsten carbide
- B) PLA
- C) PE
- D) PVC

Answer: A) Tungsten carbide

36. A civil engineer wants to replace traditional steel reinforcement bars with a corrosion-resistant material. Which composite is suitable?

- A) GFRP
- B) CFRP
- C) PLA
- D) PVC

Answer: A) GFRP

37. A vehicle manufacturer needs a lightweight material for body panels and engine components.

Which composite can be used?

- A) GFRP
- B) PLA
- C) PVC
- D) Ceramic

Answer: A) GFRP

38. An aircraft manufacturer wants a material with a high strength-to-weight ratio and high fatigue resistance. Which should be selected?

- A) CFRP
- B) PE
- C) PVC
- D) PLA

Answer: A) CFRP

39. A sports company is manufacturing bicycles, golf clubs and tennis rackets. Which material is suitable?

- A) CFRP
- B) PVC
- C) PE
- D) Oxide ceramic

Answer: A) CFRP

40. A company needs a material for aircraft fuselages, wings and rotor blades. Which should it choose?

- A) CFRP
- B) GFRP
- C) PLA
- D) PVC

Answer: A) CFRP

41. A manufacturer needs a polymer that can be reheated and reshaped during production. Which should be selected?

- A) Thermosetting polymer
- B) Thermoplastic
- C) Ceramic
- D) CFRP

Answer: B) Thermoplastic

42. A component must maintain its shape permanently after the moulding process. Which material is more appropriate?

- A) Thermoplastic
- B) Thermosetting polymer
- C) PE
- D) PLA

Answer: B) Thermosetting polymer

43. A manufacturer wants to use a polymer for food packaging. Which material is suitable?

- A) PE
- B) CFRP
- C) Silicon carbide
- D) Boron carbide

Answer: A) PE

44. A company needs a polymer for cables and electrical insulation. Which property is most important?

- A) Electrical insulation
- B) High density
- C) High electrical conductivity
- D) Magnetic behaviour

Answer: A) Electrical insulation

45. A product must be biodegradable after disposal. Which material is the best choice?

- A) PLA
- B) PVC
- C) PE
- D) Bakelite

Answer: A) PLA

46. A manufacturer needs a material that is chemically resistant and suitable for pipes. Which polymer should be considered?

- A) PVC
- B) PLA
- C) CFRP
- D) Boron carbide

Answer: A) PVC

47. A ceramic component is needed for an application where electrical insulation and high-temperature stability are required. Which category is suitable?

- A) Oxide ceramics
- B) Thermoplastics
- C) PE
- D) PLA

Answer: A) Oxide ceramics

48. A ceramic material is required to resist wear in a high-temperature application. Which property should the engineer prioritize?

- A) Hardness and wear resistance
- B) High ductility
- C) Low melting point
- D) High flexibility

Answer: A) Hardness and wear resistance

49. A grinding application requires a ceramic material capable of resisting severe abrasion. Which is most suitable?

- A) Silicon carbide
- B) PLA
- C) PE
- D) PVC

Answer: A) Silicon carbide

50. A protective component requires an extremely hard ceramic with low density. Which material would be appropriate?

- A) Boron carbide
- B) PE
- C) PVC
- D) PLA

Answer: A) Boron carbide

51. A high-temperature cutting application requires a carbide ceramic. Which material is appropriate?

- A) Tungsten carbide
- B) PLA
- C) PE
- D) PVC

Answer: A) Tungsten carbide

52. A component is exposed to sudden changes in temperature. Which ceramic property is especially important?

- A) Thermal shock resistance
- B) High ductility
- C) High plasticity
- D) Low hardness

Answer: A) Thermal shock resistance

53. A medical engineer needs a ceramic for a dental application. Which property is particularly important?

- A) Biocompatibility
- B) High electrical conductivity
- C) High ductility
- D) Low hardness

Answer: A) Biocompatibility

54. A chemical-processing plant requires a material that resists corrosion and chemical attack. Which material category from Week 5 is appropriate?

- A) Ceramics
- B) PE only
- C) PLA only
- D) Thermoplastics only

Answer: A) Ceramics

55. An aircraft manufacturer wants to reduce component weight without sacrificing stiffness. Which material category should be considered?

- A) Composite
- B) Lead
- C) Cast iron
- D) PVC

Answer: A) Composite

56. A structural component needs a high strength-to-weight ratio. Which material is the best candidate?

- A) CFRP
- B) PE
- C) PLA
- D) PVC

Answer: A) CFRP

57. A bridge engineer wants a reinforcement material with good corrosion resistance. Which composite is appropriate?

- A) GFRP
- B) CFRP
- C) PE
- D) PVC

Answer: A) GFRP

58. A manufacturer is making automotive body panels and wants a lightweight composite material. Which would be appropriate?

- A) GFRP
- B) PLA
- C) PVC
- D) Silicon carbide

Answer: A) GFRP

59. An aircraft wing requires a material with high stiffness-to-weight ratio and fatigue resistance. Which is most suitable?

- A) CFRP
- B) PE
- C) PVC
- D) PLA

Answer: A) CFRP

60. A material must combine the useful properties of different constituent materials to achieve improved performance. What should the engineer select?

- A) Composite
- B) Thermoplastic
- C) Thermosetting polymer
- D) Pure ceramic

Answer: A) Composite

61. A manufacturer needs a polymer component that may need to be reshaped during several production stages. Which choice is most appropriate?

- A) Thermosetting polymer
- B) Thermoplastic
- C) Ceramic
- D) CFRP

Answer: B) Thermoplastic

62. A component will experience repeated heating during its service life, and dimensional stability after the initial forming process is important. Which material category is preferable?

- A) Thermoplastic
- B) Thermosetting polymer
- C) PLA
- D) PE

Answer: B) Thermosetting polymer

63. Two plastic materials are being considered. Material X can be softened and reshaped repeatedly, while Material Y cannot be repeatedly softened after setting. How should they be classified?

- A) X—thermosetting, Y—thermoplastic
 - B) X—thermoplastic, Y—thermosetting
 - C) Both—thermoplastics
 - D) Both—thermosetting polymers
- Answer: B) X—thermoplastic, Y—thermosetting

64. A packaging company needs a polymer that is lightweight, flexible, weather-resistant and suitable for bottles and films. Which is the strongest choice?

- A) PE
 - B) PVC
 - C) PLA
 - D) Ceramic
- Answer: A) PE

65. A product designer wants a biodegradable polymer, but the product is intended for conventional plastic applications such as packaging. Which Week 5 material should be considered?

- A) PLA
- B) CFRP
- C) Silicon carbide
- D) Bakelite

Answer: A) PLA

66. A medical manufacturer is selecting between PE and PLA for an application where biodegradability is a major requirement. Which should be preferred?

- A) PE
- B) PLA
- C) PVC
- D) GFRP

Answer: B) PLA

67. A pipe manufacturer requires a polymer that combines chemical resistance, electrical insulation and weather resistance. Which material is the better choice?

- A) PVC
- B) PLA
- C) CFRP
- D) Boron carbide

Answer: A) PVC

68. A manufacturer needs plastic that can be processed by moulding, extrusion and forming. Which material from Week 5 best fits this requirement?

- A) PVC
- B) Silicon carbide
- C) CFRP
- D) GFRP

Answer: A) PVC

69. An engineer is choosing between PE and PVC for a component where chemical resistance and weather resistance are particularly important. Which is the more appropriate choice?

- A) PE
- B) PVC
- C) PLA
- D) CFRP

Answer: B) PVC

70. A component must provide electrical insulation rather than electrical conduction. Which category should the engineer consider?

- A) PE
- B) Copper
- C) Aluminium
- D) Steel

Answer: A) PE

71. A furnace component is exposed to extremely high temperatures and sudden temperature changes. Which combination of properties should the engineer prioritize?

- A) High thermal shock resistance and high-temperature capability
- B) High ductility and low hardness
- C) High flexibility and low melting point
- D) High electrical conductivity and ductility

Answer: A) High thermal shock resistance and high-temperature capability

72. A grinding operation produces severe abrasive wear. Which material would be the most logical choice?

- A) Silicon carbide
- B) PE
- C) PLA
- D) PVC

Answer: A) Silicon carbide

73. A component must survive high temperature while maintaining high hardness and wear resistance. Which material is the best candidate?

- A) Carbide ceramic
- B) PE
- C) PLA
- D) PVC

Answer: A) Carbide ceramic

74. A designer chooses silicon carbide instead of a polymer for a severe wear application. What is the main reasoning?

- A) Silicon carbide provides much higher hardness and wear resistance
- B) Silicon carbide is easier to reshape repeatedly
- C) Silicon carbide is more flexible
- D) Silicon carbide has a lower hardness

Answer: A) Silicon carbide provides much higher hardness and wear resistance

75. A protective application requires a ceramic that combines very high hardness with relatively low density. Which material should be selected?

- A) Boron carbide
- B) PE
- C) PVC
- D) PLA

Answer: A) Boron carbide

76. A cutting-tool application requires a material capable of maintaining performance under high-temperature conditions. Which is most suitable?

- A) Tungsten carbide
- B) PE
- C) PLA
- D) PVC

Answer: A) Tungsten carbide

77. A ceramic is being considered for a dental application. Which combination makes ceramics particularly attractive for such an application?

- A) Biocompatibility, hardness and chemical stability
- B) High flexibility and low hardness
- C) High ductility and easy melting
- D) High electrical conductivity and plasticity

Answer: A) Biocompatibility, hardness and chemical stability

78. An electronic manufacturer requires a material for insulators, substrates and packaging. Which material category is most appropriate?

- A) Oxide ceramics
- B) PE
- C) PLA
- D) GFRP

Answer: A) Oxide ceramics

79. A chemical-processing component is continuously exposed to aggressive chemicals. Which material category offers the most suitable combination of chemical stability and high-temperature capability?

- A) Oxide ceramics
- B) PE only
- C) PLA only
- D) Thermoplastic only

Answer: A) Oxide ceramics

80. A component experiences repeated temperature changes. A ceramic with poor resistance to thermal shock is rejected. Why?

- A) Sudden temperature changes can cause failure in the component
- B) It will become more ductile
- C) It will become biodegradable
- D) It will become electrically conductive

Answer: A) Sudden temperature changes can cause failure in the component

81. An aircraft designer wants to reduce structural weight while maintaining high stiffness. Which material category should be investigated first?

- A) Composite
- B) PE
- C) PVC
- D) PLA

Answer: A) Composite

82. Two candidate materials are available. Material A has high strength but is relatively heavy. Material B provides a high strength-to-weight ratio. Which is preferable for an aerospace component?

- A) Material A
- B) Material B
- C) Both must be rejected
- D) Neither

Answer: B) Material B

83. A composite is selected for an aerospace structure primarily because of its high stiffness-to-weight ratio. What does this allow the designer to achieve?

- A) A lighter structure with required stiffness
- B) A structure with no strength
- C) A structure that melts easily
- D) A structure with high ductility only

Answer: A) A lighter structure with required stiffness

84. An aircraft component requires high strength-to-weight ratio, corrosion resistance and fatigue resistance. Which material is the strongest candidate?

- A) CFRP
- B) PE
- C) PVC
- D) PLA

Answer: A) CFRP

85. A civil engineer wants reinforcement for concrete that offers corrosion resistance and lower weight than conventional steel reinforcement. Which should be considered?

- A) GFRP
- B) PE
- C) PLA
- D) PVC

Answer: A) GFRP

86. An automotive company wants a composite for body panels and engine-related applications. Which is the more appropriate choice from Week 5?

- A) GFRP
- B) PLA
- C) PVC
- D) Silicon carbide

Answer: A) GFRP

87. A sports-equipment company wants a material for bicycle frames, golf clubs and tennis rackets. Which is most appropriate?

- A) CFRP
- B) PVC
- C) PE
- D) Oxide ceramic

Answer: A) CFRP

88. A manufacturer needs a material for aircraft wings and fuselage components. Which should be selected?

- A) CFRP
- B) PE
- C) PVC
- D) PLA

Answer: A) CFRP

89. A component requires low weight, high stiffness and good fatigue performance, but the application does not primarily require repeated reshaping. Which category is most suitable?

- A) Composite
- B) Thermoplastic
- C) PVC
- D) PE

Answer: A) Composite

90. A designer is choosing between GFRP and CFRP for an aerospace component where maximum strength-to-weight performance is a major consideration. Which is the more suitable choice?

- A) CFRP
- B) GFRP
- C) PE
- D) PVC

Answer: A) CFRP

91. A component needs to be lightweight, electrically insulating and chemically resistant. Which material would be a strong candidate?

- A) PE
- B) Copper
- C) Steel
- D) Aluminium

Answer: A) PE

92. A component needs high hardness, wear resistance and high-temperature capability. Which material category should be selected instead of a polymer?

- A) Carbide ceramic
- B) Thermoplastic
- C) PE
- D) PLA

Answer: A) Carbide ceramic

93. A manufacturer needs a material that is biodegradable, while another application needs very high wear resistance. Which pairing is correct?

- A) PLA for the first; silicon carbide for the second
- B) Silicon carbide for the first; PLA for the second
- C) PVC for both
- D) PE for both

Answer: A) PLA for the first; silicon carbide for the second
