# Composite Materials VTU CBCS Question Paper Set 2018

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10AU663

# Sixth Semester B.E. Degree Examination, June/July 2017
## Composite Materials

Time: 3 hrs. Max. Marks:100

**Note:** ***Answer FIVE full questions, selecting at least TWO questions from each part.***



### PART – A

1 a. Define composite material. Give the detailed classification with suitable block diagram and list the characteristics of composite materials. **(10 Marks)**

b. Distinguish between thermoplastic and themoset composites. **(04 Marks)**

c. List the different matrix and reinforcements used in MMC's PMC's and CMC's. **(06 Marks)**

2 a. Sketch and explain the Hand lay-up technique/process to fabricate polymer matrix composites. **(10 Marks)**

b. Explain with neat sketch the vacuum bag moulding process of preparing polymer matrix composites. **(10 Marks)**

3 a. Sketch and explain the filament winding process to fabricate the fiber reinforced polymer composites. **(10 Marks)**

b. With a neat sketch and explain the pultrusion process to fabricate FRP composites. **(10 Marks)**

4 a. Sketch and explain the Laser beam cutting of composites and mention its advantages and disadvantages. **(10 Marks)**

b. Briefly describe the different joining methods of composites. **(10 Marks)**

### PART – B

5 Write explanatory notes on the applications of composites materials in the following fields :

a. Automobile industries

b. Air craft/missile/space industries

c. Electrical and Electronics industries

d. Marine and sporting goods industries. **(20 Marks)**

6 a. Sketch and explain the powder metallurgy process/technique for fabrication of metal matrix composites. **(10 Marks)**

b. With a neat sketch and explain the squeeze casting technique for fabrication of metal matrix composites. **(10 Marks)**

7 a. What are different matrix and reinforcement materials used in MMC production? **(05 Marks)**

b. What are the properties/characteristics of MMCs? **(05 Marks)**

c. Explain briefly the need for developing the metal matrix composites. **(05 Marks)**

d. List the advantages, disadvantages and application of MMCs. **(05 Marks)**

8 a. Explain the influence of shape, size and distribution of reinforcement on the properties of MMC's (metal matrix composites) **(10 Marks)**

b. What are shape memory alloys? What are their applications? Describe mechanisms of their behaviour. **(10 Marks)**

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# Sixth Semester B.E. Degree Examination, Dec.2015/Jan.2016
## Composite Materials

Time: 3 hrs. Max. Marks:100

**Note:** ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***





### PART – A

1 a. Define Composite materials. Explain the classification of composites. **(04 Marks)**
b. List the advantages and disadvantages of composite materials. **(06 Marks)**
c. Distinguish between Thermoplastic and Thermoset polymers. **(10 Marks)**

2 a. With a neat sketch, explain the process of Filament winding. **(07 Marks)**
b. With a neat sketch, explain the process of Pultrusion Technique. **(07 Marks)**
c. With a neat sketch, explain the process of Blow moulding. **(06 Marks)**

3 a. With a neat sketch, explain the process of Water Jet cutting. **(10 Marks)**
b. With a neat sketch, explain the process of Laser Beam cutting. **(10 Marks)**

4 a. Explain the Application of composites in Marine Industry and Recreational and Sport Goods. **(10 Marks)**
b. Explain the current status and future potential for composites. **(10 Marks)**

### PART – B

5 a. List the Important requirements of reinforcement materials, used in Metal Matrix Composites. **(10 Marks)**
b. What is the need for developing Metal Matrix Composites ? **(05 Marks)**
c. Write a note on Selection of base Metal, in Metal Matrix composites. **(05 Marks)**

6 a. With a neat sketch, explain the process of powder Metallurgy Technique. **(10 Marks)**
b. With a neat sketch, explain the process of OSPREY Technique. **(10 Marks)**

7 a. Explain the Mechanical characteristics of Aℓ - SiC composites. **(10 Marks)**
b. Explain the influence of shape, size and distribution of particles of Mechanical properties of MMC's. **(10 Marks)**

8 a. Explain any two Applications of shape memory alloys. **(12 Marks)**
b. Explain Pseudo Elasticity in Shape Memory Alloys. **(08 Marks)**

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# Sixth Semester B.E. Degree Examination, Dec.2016/Jan.2017
## Composite Materials

Time: 3 hrs. Max. Marks:100

**Note:** ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***



### PART – A

1 a. Define Composite Materials and classify them. **(06 Marks)**

b. List out the different types of Reinforcement and mention the properties of reinforcement. **(08 Marks)**

c. Write a short note on laminated composites. **(06 Marks)**

2 a. With a neat sketch, explain Hand Layup technique for composite materials. **(07 Marks)**

b. Explain Filament winding process, with a neat sketch. **(07 Marks)**

c. What is Curing? Differentiate open and closed mold processing of composites. **(06 Marks)**

3 a. Describe briefly with a neat sketch, pultrusion process for production of composite materials. Also mention advantages, disadvantages and applications. **(10 Marks)**

b. Write a short note on :
i) Injection molding ii) Pulforming process. **(10 Marks)**

4 a. What are the basic requirements of tools in fabrication of composites? **(05 Marks)**

b. What are the limitations / drawbacks of the composite tooling materials? **(05 Marks)**

c. Explain why use adhesives? What are major classes of adhesive and also mention advantages and disadvantages of adhesive bonding of composites? **(10 Marks)**

### PART – B

5 a. List out the applications in : i) Automobile Industry ii) Electrical and Electronic iii) Recreational and sports iv) Aircraft. **(10 Marks)**

b. In detail, explain the selection of matrix in Metal matrix composites (MMC). **(10 Marks)**

6 a. List the important requirements of reinforcement materials, in MMC. **(05 Marks)**

b. What is the need for developing MMC? **(05 Marks)**

c. Name the matrix and fiber used in metal matrix composites and its applications. **(05 Marks)**

d. Write about advantages of MMC's. **(05 Marks)**

7 a. Describe Powder Metallurgy techniques with a flow chart for fabrication of metal matrix composites. **(10 Marks)**

b. With a neat sketch, explain the production of Aluminum based composites using particulates by liquid Metallurgy techniques. **(10 Marks)**

8 a. Describe about Mechanical and wear properties of MMC's. **(05 Marks)**

b. Describe the effects of size, shape and distribution of particulars on properties of MMC's. **(10 Marks)**

c. Write a short note on Shape Memory Alloys. **(05 Marks)**

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# Sixth Semester B.E. Degree Examination, June/July 2015
## Composite Materials

Time: 3 hrs. Max. Marks:100

**Note:** ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***



### PART – A

1 a. Define composite material. Explain the need of composite material. **(05 Marks)**
b. Differentiate between thermo – plastics and thermo sets. **(05 Marks)**
c. What are the advantages and disadvantages of composite materials? **(10 Marks)**

2 With a neat sketch, explain the following processes :
a. Injection modeling **(07 Marks)**
b. Filament winding process **(07 Marks)**
c. Pultrusion. **(06 Marks)**

3 a. With a neat sketch, explain water jet cutting of composites. **(10 Marks)**
b. Explain the different types of joining of polymer matrix composites. **(10 Marks)**

4 Explain the applications of composites in the following fields :
a. Automobile industry
b. Marine industry
c. Electrical and electronics industry
d. Recreational and sports equipments. **(20 Marks)**

### PART – B

5 a. Explain boron fibers and alumina fibers which is used as a reinforcement materials in metal matrix composites. **(10 Marks)**
b. What are the advantages, limitations and applications of MMC's? **(10 Marks)**

6 a. With a neat sketch, explain the poser metallurgy technique. **(10 Marks)**
b. With a neat sketch, explain the squeeze casting of metal matrix composites. **(10 Marks)**

7 a. Discuss the physical and mechanical properties of metal matrix composites. **(12 Marks)**
b. List the various advantages of MMC's over other types of composite materials. **(08 Marks)**

8 a. Explain pseudo elasticity in shape memory alloys. **(05 Marks)**
b. With a neat labeled diagram, discuss any two applications of shape memory alloys. **(10 Marks)**
c. Discuss the future potential of composites. **(05 Marks)**

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# Sixth Semester B.E. Degree Examination, June/July 2016
## Composite Materials

Time: 3 hrs. Max. Marks:100

**Note:** ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***





### PART – A

1 a. Define Composite Materials and give the broad classification of it. **(08 Marks)**

b. List and explain different types matrix materials used in polymer matrix composites. **(08 Marks)**

c. What are the advantages and limitations of composites? **(04 Marks)**

2 a. List different methods used in production of FRP's. Briefly explain general steps involved in the production of FRP's. **(10 Marks)**

b. With a neat sketch, explain hand layup technique and sprayup technique. **(10 Marks)**

3 a. With a neat sketch, explain the following process :
i) Pultrusion ii) Blow Molding. **(10 Marks)**

b. With a neat sketch, explain pulforming. **(10 Marks)**

4 a. Explain the different methods used for composite cutting. **(10 Marks)**

b. List the different types of composites joining process and explain any one process. **(10 Marks)**

### PART – B

5 a. Briefly explain the applications of composites. **(10 Marks)**

b. Explain with a neat sketch, any one of the solid state processing of composites. **(10 Marks)**

6 a. Briefly explain different types of reinforcement materials used in MMC's. **(10 Marks)**

b. With a neat sketch, explain vacuum bag molding process highlighting its advantages. **(10 Marks)**

7 a. With a neat sketch, explain the powder metallurgy technique for fabrication of composites. **(10 Marks)**

b. Classify liquid state processing methods and briefly explain squeeze infiltration method. **(10 Marks)**

8 Write short notes on any four of the following :
a. Shape Memory Alloys.
b. Application of MMC's.
c. Filament winding.
d. Particle size and apparent density.
e. Hot Iso static pressing. **(20 Marks)**

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