Register Number:……..

KUMARAGURU
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B.E DEGREE EXAMINATIONS: MAY 2017

(Regulation 2014)

Sixth Semester

MECHANICAL ENGINEERING

U14METE69**:** Composite Materials

COURSE OUTCOMES

CO1: Explain the various types of composites and its fabrication techniques

CO2: Discuss the applications of metal matrix composites.

CO3: Explain the production and applications of ceramic matrix composites.

CO4: Know different types of fibres and fibre composites

CO5: Discuss about advanced composite fabrication techniques

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Matching type item with multiple choice code CO1 [K_1]

List I	List II
A. Powder metallurgy	i. Ceramic matrix composites
B. Hot pressing	ii. Metal matrix composites
C. Compression moulding	iii. Carbon composites
D. Chemical vapour deposition	iv. Polymer composites

	A	B	C	D
a)	ii	i	iv	iii
b)	iii	iv	ii	i
c)	ii	iv	iii	i
d)	iii	i	ii	iv

2. Usually stronger constituent of a composite is CO1 [K_1]

a) Matrix b) Reinforcement

c) Both are of equal strength d) Can’t define

3. The following material can be used for filling in sandwich structures CO5 [K_1]

1. Polymers 2. Cement 3. Wood 4.Binder

a) 1& 2 b) 2 &3

c) 3 &4 d) 1 &2&3

4. Al-alloys for engine/automobile parts are reinforced to increase their CO2 [K_1]

a) Strength b) Wear resistance

c) Elastic modulus d) Density

5. Assertion (A): The matrix binds the fibres together, holding them aligned in the important stressed directions. CO3 [K_1]

Reason (R): The matrix should protect the reinforcing filaments from mechanical damage and from environmental attack

a) A is True b) R is false

c) Both A and R is True d) Both A and R is False

6. Longitudinal strength of fiber reinforced composite is mainly influenced by CO4 [K_1]

a) Fiber strength b) Fiber orientation

c) Fiber volume fraction d) Fiber length

7. Rule-of-mixture provides _____ bounds for mechanical properties of particulate composites. CO2 [K_2]

a) Lower b) Upper

c) Lower & upper d) Same

8. Size range of dispersoids used in dispersion strengthened composites CO1 [K_1]

a) 0.01-0.1 μm b) 0.01-0.1 nm

c) 0.01-0.1 mm d) All

9. Assertion (A): Stir casting method is mostly used to manufacture composite materials CO2 [K_1]

Reason (R): Stir casting method is economical and easily available.

a) Both A and R are Individually true and R is the correct explanation of A

b) Both A and R are Individually true but R is not the correct explanation of A

c) A is true but R is false

d) A is false but R is true

10. SAP is a typical example of CO5 [K_1]

a) Dispersion strengthened composite b) Particle strengthened composite

c) Fiber strengthened composite d) Laminate composite

PART B (10 x 2 = 20 Marks)

(Answer not more than 40 words)

11.	Classify composite materials.	CO1	[K_2]
12.	Explain particulate reinforced composites.	CO1	[K_2]
13.	State rule of mixtures applicable to composite materials.	CO2	[K_2]
14.	List the characteristics of metal matrix composites.	CO2	[K_2]
15.	What is the need for ceramic matrix composite materials?	CO3	[K_2]
16.	Give the matrices used for making CMCs.	CO3	[K_2]
17.	Name any to methods for producing polymer matrix composites.	CO4	[K_2]
18.	What is meant by fibre reinforced plastics?	CO4	[K_2]
19.	Give the advantages of carbon matrices.	CO5	[K_2]
20.	What are the applications of carbon-carbon composites?	CO5	[K_2]

Answer any FIVE Questions:-

PART C (5 x 14 = 70 Marks)

(Answer not more than 300 words)

Q.No. 21 is Compulsory

21.	Explain in detail about fiber strengthened composites.	CO1	[K_3]
22.	Draw and explain the squeeze casting and powder metallurgy process with neat sketch.	CO2	[K_2]
23.	Explain diffusion bonding and stir casting method for producing metal matrix composites with neat sketch.	CO2	[K_2]
24.	Explain the various steps involved in processing of ceramics.	CO3	[K_3]
25.	With a neat sketch explain the cold isostatic and hot isostatic process for producing ceramic matrix composites.	CO3	[K_3]
26.	Draw and explain the pultrusion and injection molding process with neat sketch.	CO4	[K_2]
27.	Explain the chemical vapour deposition process with neat sketch.	CO5	[K_2]

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