BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: BE **SEMESTER : VII**
BRANCH: CHEM. ENGG. / CEP&P **SESSION : MO/18**

SUBJECT: PC7009 POLYMER COMPOSITE

TIME: 3:00 HRS. **FULL MARKS: 60**

INSTRUCTIONS:
1. The question paper contains 7 questions each of 12 marks and total 84 marks.
2. Candidates may attempt any 5 questions maximum of 60 marks.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a)	Distinguish between laminates and hybrid composite.	[2]
Q.1(b)	What do you mean by composite? What is the role of interface in composite?	[4]
Q.1(c)	What are the different compounding ingredients used in short fibre reinforced polymer composite. Give example of each. What is the function of low profile additives?	[6]
Q.2(a)	What are the various ways to join the composite?	[2]
Q.2(b)	Derive expressions for average fiber stress for fibers of different lengths.	[4]
Q.2(c)	Explain with diagram of filament winding process. Give the advantages of filament winding over Hand lay up process.	[6]
Q.3(a)	Why oxidation is essential steps in c-fiber making process from PAN precursor?	[2]
Q.3(b)	What function offers by initiating and participating comonomer. Give example of Initiating and participating comonomer. How it affect the processing of carbon fibre?	[4]
Q.3(c)	Distinguish between continuous and marble process for glass fibre preparation	[6]
Q.4(a)	What do you mean by nanocomposte?	[2]
Q.4(b)	How surface area affect the overall change of modulus of a nanocomposite.	[4]
Q.4(c)	What are the various ways of surface modification of nano filler?	[6]
Q.5(a)	What is Reaction injection moulding?.	[2]
Q.5(b)	Distinguish between SMC & DMC. Gives example of SMC & DMC compound.	[4]
Q.5(c)	Briefly describe pultrusion process with diagram. What type of mold gives better inner surface finish & why?	[6]
Q.6(a)	Distinguish between prepreg & perform.	[2]
Q.6(b)	Why hand lay up techniques is useful for making large article?	[4]
Q.6(c)	What is spray up techniques? What are the advantages of spray up techniques over hand lay up techniques?	[6]
Q.7(a)	Derive the equation of modulus of elasticity of a unidirectional composite in longitudinal direction (direction of alignment).	[4]
Q.7(b)	A continuous and aligned glass fiber-reinforced composite consists of 40 vol% of glass fibers having a modulus of elasticity of 47 GPa and 60 vol% of a polyester resin that, when hardened, displays a modulus of 2.9 GPa. (a) Compute the modulus of elasticity of this composite in the longitudinal direction. (b) If the cross-sectional area is 215 mm2 and a stress of 40 MPa is applied in this longitudinal direction, compute the magnitude of the load carried by each of the fiber and matrix phases.	[8]

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