



B.E DEGREE EXAMINATIONS: APRIL 2018

(Regulation 2014)

Eighth Semester

AERONAUTICAL ENGINEERING

U14AEE807: Aircraft Production Techniques

COURSE OUTCOMES

- CO1:** Recommend appropriate part manufacturing processes when provided a set of functional requirements and product development constraints.
- CO2:** Recommend cost-effective material options based upon net part shape, expected loading, operating environment, cost constraints, and life expectancy.
- CO3:** Fabricate basic parts and assemblies using powered and non-powered machine shop equipment in conjunction with mechanical documentation.
- CO4:** Ascertain product and process quality levels through the use of precision measurement tools and statistical quality control charts.
- CO5:** Mitigate production problems using risk management and root cause analysis tools.

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 [K₂]

List I		List II	
A. Molten metal		i. Rolling	
B. Dissimilar metals		ii. Casting	
C. Plastic		iii. Welding	
D. Hot deformation		iv. Injection molding	

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

2. _____ is casting-cum-welding process CO2 [K₃]
- a) Slush casting b) Thermit welding
 c) Resistance seam welding d) Thermoforming
3. Which of the following statements are correct? CO2 [K₂]
- (1) Soldering is commonly used for electrical joints.
 (2) Drilling operation cannot be performed in a lathe.
 (3) Resistance welding is a process of joining two metal pieces based on heat and pressure.
 (4) Plastics melt at temperature > 700 C.
- a) 1,3 b) 1,4
 c) 1,2 d) 2,3
4. _____ is used in molding and casting process to produce internal cavities or to make hollow parts. CO1 [K₂]
- a) Flux b) Sprue
 c) Core d) Lubricant oil
5. Assertion (A): Electrical Discharge Machining (EDM) process only works with materials which are electrically conductive. CO2 [K₂]
 Reason (R): In EDM process, metal is removed by applying a series of rapid and repetitive electrical discharges, wherein the electrode and work piece act as conducting path for the electrical discharges.
- 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
6. _____ is a sealing process through which multiple pieces of plastic material are bonded using a strong solvent. COL [K_L]
- a) Induction bonding b) Solvent bonding
 c) Electro slag welding d) Electrochemical machining
7. Consider the following steps in a drop forging process. CO2 [K₂]
1. This gives a high blow and completes the workpiece in a single operation.
 2. The top part of the die is raised, by mechanical links to a certain height.
 3. The heated metal is placed accurately in the bottom part of the die.
 4. The top of the die is then allowed to fall suddenly.
- The correct sequence is:
- a) 2-3-4-1 b) 1-3-2-4
 c) 3-4-2-1 d) 4-1-3-2

Answer any FIVE Questions:-
PART C (5 x 14 = 70 Marks)
(Answer not more than 300 words)

Q.No. 21 is Compulsory

- | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-------------------|
| 21. With the use of suitable diagrams, explain the working principle, process set-up, advantages, disadvantages and applications of abrasive jet machining process. | CO4 | [K ₂] |
| 22. Explain with neat diagrams the principle, characteristics and applications of:
(i) Centrifugal casting process and (ii) Lost wax process. | COL | [K _L] |
| 23. Explain the principle and methodology of friction any two Résistance process with schematic diagram. How is it different from arc welding process? | CO1 | [K ₂] |
| 24. i) Draw a neat schematic diagram of a lathe machine and explain the functioning of
(i) spindle, (ii) carriage, (iii) gearbox, (iv) bed and (v) headstock.
ii) Explain the function of the following terms that are used in molding in metal casting process: (i) pouring cup (ii) sprue (iii) runner and (iv) riser. | (8) CO3 | [K ₂] |
| 25. Using schematic diagrams, explain the working principle, process methodology, and advantages of (i) Submerged arc welding and (ii) Electron beam welding method. | CO1 | [K ₂] |
| 26. i) Explain how resin transfer moulding (RTM) process can be used to make polymer matrix composites. Use schematic diagrams.
ii) Explain the steps in thermoforming process and mention the advantages, disadvantages and applications of the process. | (8) CO3 | [K ₂] |
| 27. i) Explain the principle of metal extrusion process. With neat diagrams explain (a) direct extrusion and (b) impact extrusion process.
ii) Explain the 4 steps involved in powder metallurgy process, using suitable diagrams. Compare the differences between powder metallurgy and casting processes. | (6) CO2 | [K ₂] |
