Exam Date & Time: 12-Dec-2023 (09:30 AM - 12:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

THIRD SEMESTER B.TECH END SEMESTER EXAMINATIONS, DEC 2023

MANUFACTURING PROCESSES-I [MIE 2122]

Marks: 50 **Duration: 180 mins.**

A

Answer all the questions.

Instructions to Candidates:
Answer ALL questions.
Missing data may be suitably assumed

1) Discuss the salient features of green sand moulding with a visual setup. Comment on its advantages and limitations. (3)

A)

B) Maintaining the right moisture content plays an important role in sand moulding, you are the supervisor of sand moulding unit, to coach the new batch of technicians, develop a visual arrangement, how to test the moisture content of the supplied sand and discuss its salient aspects. (3)

C) Deliberate the notching and bulging processes with a visual support. (4)

2) Automobile components made of aluminum, magnesium, copper base alloys are to be casted wherein the pressure on the casting metal may vary from 21 to 210 MPa and in some cases may reach upto 700 MPa. Ilustrate the casting technique with pictorial mapping. (3)

A)

B) Metal slabs are to be produced on a continuous basis from the molten metal unit, the slabs will be processed further for foundation of pelton turbine units. Deliberate on the casting process with a graphical setup. (3)

C) Tungsten is used as a electrode material for welding aluminium, magnesium and stainless steel plates, you being the welding section incharge, develop a graphical content for the same to demonstarate it working for new batch recruits. (4)

3) A popular welding company has got orders for welding pipes, cables, conductors, shafts, and broken machinery frames, rails and repair of large gear tooth. You being the manager of the welding expertise unit, suggest a welding technique that needs to be adopted, and develop a visual content to brief the clients of the project. (3)

A)

B) Discuss the salient features of chip formation while machining cast iron and copper with pictographs. (3)

C) Batch of 600 jobs of diameter 50 mm and length 90 mm is to be turned at 200 rpm and feed 0.15 mm/rev. Applying Taylor's equation $VT^{0.25}=160$, determine the tool life in (4)

minutes. In addition find the number of components that can be produced per tool life.

4) Comment on the explosive forming technique used in ship building industry with a graphical outlook. Discourse its advantages and limitations. (3)

A)

B) Discourse the ethical, societal and environmental aspects in material selection and processing of metals. (3)

C) Long and slender components are supported in lathe machine tool by work holding devices such as steady and follower rests, compare these devices with a visual setup. (4)

5) Estimate the machining time in minutes required in rough turning a 1.5m long annealed aluminium alloy round bar 75mm in diameter, using a HSS tool. Given that feed = 02 mm/rev and maximum cutting speed = 04 m/s. (3)

A)

B) A customer is in need of a grinding wheel for the following specification W-A-36-L-5-V-23, you being the incharge of the grinding workshop, help him to purchase the wheel by letting him know the designation details. (3)

C) Use pictographs to discuss the significance of straddle milling and slot milling processes used for milling aluminium piston heads. (4)

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