

Exam Date & Time: 17-Jan-2024 (09:30 AM - 12:30 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

THIRD SEMESTER B.TECH END SEMESTER EXAMINATIONS, JAN 2024

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) Gypsum slurry is utilised from making precision castings of aluminium, zinc, and copper based alloys. Discuss the salient features of moulding process with a visual setup. Comment on its advantages and limitations. (3)
 - A)
 - B) Evaluating the mechanical properties of the moulding sand plays an important role in finalising the sand contents, you are the supervisor of sand moulding unit, to coach the new batch of technicians, develop a visual arrangement, how to test the tensile strength of the supplied sand and discuss its salient aspects. (3)
 - C) Deliberate the trimming and curling processes with a visual support. (4)
- 2) Casting of the zinc, tin lead and other low melting alloys used for automobile components are to be casted wherein the pressure on the casting metal may vary from 7 to 14 MPa and compressed air pressure from 2.5 to 5 MPa. Illustrate the casting technique with pictorial mapping. (3)
 - A)
 - B) Hollow pipes, tubes and hollow bushes which are axisymmetric with a concentric hole are to be produced without the use of cores, the pipes, tubes will be processed further for laying crude pumping pipe lines. Deliberate on the casting process with a graphical setup. (3)
 - C) Copper dam plates are used for retaining the weld slags, weld plates thus obtained are used for fabricating high pressure vessels, rolling mill frames, ship hulls, and locomotive frames, you being the welding section incharge, develop a graphical content for the same to demonstrate it working for new batch recruits. (4)
- 3) A popular welding company has got orders for welding automobile parts, refrigerators components, metallic toys, racks, frames, boxes and radio chassis. 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 crater and flank wear formation while machining mild steel with pictographs. (3)
 - C) A cylinder of 25mm diameter and 100 mm length is turned with a tool, for which the relation $VT^{0.25} = 55$ is applicable. The cutting velocity is 22 m/min. What will be the (4)

number of tool regrinds required to produce 425 cylinders for a tool feed of 0.046 mm/rev.

- 4) Comment on the electromagnetic forming technique used in crimping of coils, tubes, wires and bulging of thin tubes with a graphical outlook. Discourse its advantages and limitations. (3)
- A)
- B) Discourse the environmental aspects in metal waste disposal. (3)
- C) Discuss the v-groove and round groove process used in lathe machine tool with a visual setup. (4)
- 5) Calculate the time required for drilling a hole of 18 mm diameter through a work-piece of 60 mm thickness. Assume the cutting speed as 12 m/min and feed as 0.18 mm/rev. (3)
- A)
- B) A customer is in need of a grinding wheel for the following specification BT-C-45-O-13-R-27, 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 form milling and gang milling processes used for milling I C engine cylinder heads. (4)

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