Name of the Examinations: B.E. METALLURGICAL ENGINEERING THIRD YEAR
SECOND SEMESTER – 2024 **Ref. No.: Ex/Met/PC/B/T/321/2024**

Subject: FOUNDRY METALLURGY **Time: Full Marks: 100**

Group / Part I (50)

Instructions: Use Separate Answer scripts for each Group / (Attending all the CO is mandatory from part I)

CO I (Answer any 3 questions from CO I)

1. Explain the basic steps of the sand casting process. What are the limitations of the green sand molding process? 5+5=10
2. Explain the hot chamber die casting and cold chamber die casting. Why collapsibility and refractoriness of the molding sand is important in the sand casting process? 5+5=10

3. How can you perform the permeability test of molding sand by permeability meter? Explain the different steps in the precision casting process. 5+5=10

4. (a) What types of molds are only suitable for the Titanium alloys? Explain. 1+4=5
   (b) What is the importance of using clay in molding sand? Give three examples of clay used in molding sand. 2+3=5

CO II (Answer any 2 questions from CO II)

5. (a) Explain the bottom gate with a suitable example. Explain the different types of materials used in the design of a gating system. 3+2=5
   (b) A 200 mm long down sprue has cross sectional area of 650 mm^2 where the pouring basin meets the down sprue, A constant molten metal is maintained by the pouring basin. The molten metal flow rate= 6.5 x 10^5 $\frac{mm^3}{s}$. Considering the end of down sprue is open to atmosphere and an acceleration due to gravity =$\frac{10^4}{s^2}$. Calculate the area of down sprue at the end to avoid aspiration effect. 5

6. (a) Mold has down sprue length 20cm. Cross sectional area is $1cm^2$. Down sprue feeds a horizontal runner leading into a mold cavity of volume $1000cm^3$. How much time is required to filled mold cavity? 5
   (b) How the riser shape is important in the casting process? 5

7. (a) What are the different types of chills used in the casting process? Explain any one of them. 1+4=5
   (b) Explain match-plate pattern with suitable figure. 5