Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Winter Examination-2015

Subject Name: Manufacturing Processes – II

Subject Code: 4TE05MPR1 Branch: B. Tech(Mechanical,Automobile)

Semester: 5 Date: 11/12/2015 Time: 2:30 To 5:30 Marks: 70

Instructions:

(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Q-1 Attempt the following questions: 14

a) Which one of the following are the three basic types of static stresses to which a material can be subjected? (three correct answers):
(i) compression, (ii) hardness, (iii) reduction in area, (iv) shear, (v) tensile, (vi) true stress, and (vii) yield.

b) Which one of the following are mechanical properties of materials? (six correct answers): (i) strength (ii) boiling point (iii) toughness (iv) hardness (v) conductivity (vi) ductility (vii) density (viii) elasticity (ix) fatigue (x) specific heat (xi) melting point.

c) The plastic region of the stress-strain curve for a metal is characterized by a proportional relationship between stress and strain: (i) true or (ii) false.

d) Which one of the following materials has the highest hardness: (i) aluminum, (ii) diamond, (iii) steel, (iv) titanium, or (v) tungsten.

e) Steel is a good material for the wrecking ball used to demolish old buildings because of
Its: (i) high density (ii) low elasticity (iii) high coefficient of linear thermal expansion
(iv) low fatigue (v) poor ductility.

f) Brass is an alloy of copper and zinc: (i) true (ii) false.

g) Which one of the following casting processes is the most widely used: (i) centrifugal
casting (ii) die casting (iii) investment casting (iv) sand casting or (v) shell casting.

h) Compared to others casting processes, investment casting process is the best solution
for manufacturing of (i) engine blocks (ii) gears (iii) jewellery (iv) car wheels (v) pipes.

i) The purpose of a riser is to:
(i) Deliver molten metal into the mould cavity
(ii) Act as a reservoir for the molten metal
(iii)Feed the molten metal to the casting in order to compensate for the

shrinkage
(iv) Deliver the molten metal from pouring basin to gate.

j) The metal is subjected to mechanical working for:
(i) Refining grain size
(ii) Reducing original block into desired shape
(iii) Controlling the direction of flow lines
(iv) All of these.

k) Fin is a casting defect which is due to thin projections of metal not intended as a part
of casting: (i) Correct (ii) Incorrect.

l) A casting defect which occurs due to improper venting of sand is known as: (i) Cold shuts (ii) Blow holes (iii) Shift (iv) Swell.

m) In a ……., the molten metal is poured and allowed to solidify while the mould is revolving.
(i) Die casting method
(ii) Slush casting method
(iii) Permanent mould casting method
(iv) Centrifugal casting method.

n) If the sand is too fine, its permeability will be high: (i) True (ii) False.

Attempt any four questions from Q-2 to Q-8:

Q-2	a)	Write a short note on nanoscale manufacturing with suitable example.	04
	b)	Assume that a plastic shopping bag, made from blown film, has a lateral (width) dimension of 300 mm. (a) What should be the extrusion die diameter? (b) These bags are relatively strong. How is this strength achieved?	04
	c)	Describe with neat sketch i) Sweep pattern ii) Left & right hand pattern	06
Q-3	a)	How is the thermal efficiency of a cupola determined? How a cupola is specified?	04
	b)	Derive an equation to calculate the area of sprue base for cast iron casting weighing up to 5000 kg and placement of pattern is entirely in drag.	04
	c)	Explain with near sketch: i) Centrifugal Casting ii) Continuous casting.	06
Q-4	a)	What are the common allowances provided on pattern and why?	07
	b)	Two steel sheets of 1.5 mm thickness are being spot welded. The process parameters are: current = 5500 A; current flow time = 0.15 s; electrode diameter = 6 mm. Estimate the heat generated in the welding zone and its distribution. Use R = 250 μΩ.	07
Q-5	a)	Explain the term “polarity” in welding. Write its advantages and disadvantages.	07
	b)	A 250 mm wide annealed brass 70-30 strip is rolled from a thickness of 20 mm to 12 mm. For a roll radius of 300 mm and roll rpm of 100, estimate the total power required for this operation.	07

Q-6	a)	Explain the LIGA micro fabrication process.	07
	b)	A 980 kN injection-molding machine is used to make 110 mm diameter spur gears with a thickness of 10 mm. The gears have a fine-tooth profile. How many gears can be injection molded in one set of molds? Does the thickness of the gears influence the answer?	07
Q-7	a)	Write a short note on process selection.	07
	b)	A shielded metal arc welding operation takes place on a steel work piece (with a steel electrode) with a 20V power supply. If a weld with a triangular cross section with a 10 mm leg length is to be produced, estimate the current needed for a welding speed of 10 mm/s. Consider an efficiency of 75%.	07
Q-8	a)	What are the common defects of casting? State their causes and remedies.	07
	b)	Determine the true strain rate in extruding a round billet of radius r_o as a function of distance x from the entry of a conical die.	07