

Name:

Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2018

Course: Manufacturing Technology I
Program: B.Tech Mechanical/ME with spcl
Course Code: MHEG237

Semester: IV
Time: 03 hrs.
Max. Marks: 100

SECTION A

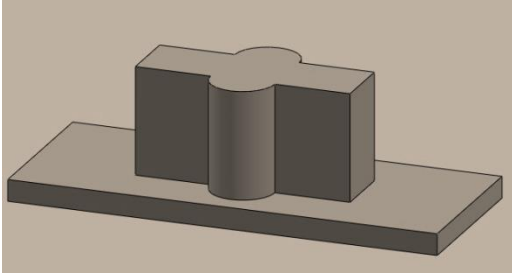
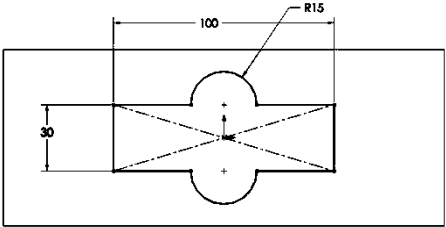
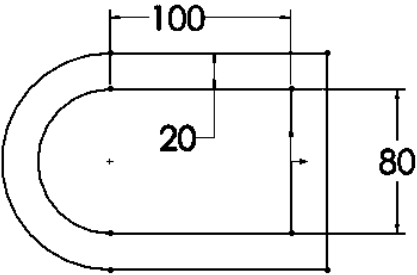
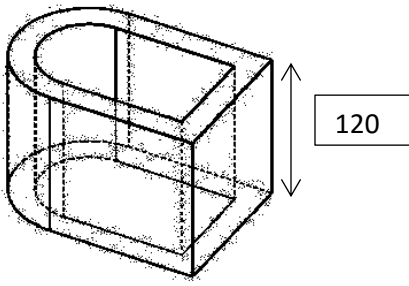
Instructions: All the questions in section A are compulsory

S. No.		Marks	CO									
Q 1	A part can be produced on two machines. <table border="1"><thead><tr><th>Machine Type</th><th>Fixed cost (In rupees)</th><th>Variable cost (Rs./unit)</th></tr></thead><tbody><tr><td>Machine A</td><td>10,00,000</td><td>0.5</td></tr><tr><td>Machine B</td><td>2,00,000</td><td>0.75</td></tr></tbody></table> Calculate the break-even quantity.	Machine Type	Fixed cost (In rupees)	Variable cost (Rs./unit)	Machine A	10,00,000	0.5	Machine B	2,00,000	0.75	4	CO1
Machine Type	Fixed cost (In rupees)	Variable cost (Rs./unit)										
Machine A	10,00,000	0.5										
Machine B	2,00,000	0.75										
Q2	Derive expression for mean flow stress when material follows power law during plastic deformation ($\sigma = K\varepsilon^n$).	4	CO4									
Q3	Differentiate between constant current and constant voltage power source characteristics	4	CO3									
Q4	Differentiate between Infiltration and impregnation techniques used in P/M method.	4	CO6									
Q5	Explain different types of sheet metal bending dies along with forces requirements.	4	CO5									

SECTION B

Instructions: Questions No 5, 6, 7 in section B are compulsory. Question No. 8 has an internal choice

Q6	a) Explain modulus method of riser design. b) Find the dimensions of a cylindrical riser for aluminium cubical casting of side 120mm. volume shrinkage for aluminium is 6.6% by volume.	10	CO2
Q7	a) Explain the concept of using progressive die for washer cutting with neat example. b) Washer with outer diameter=20mm, inner diameter=8mm and 1mm thick is	10	CO5

	cut through progressive die. Calculate the capacity (in tonnage) of hand wheel press required for the operation. Shear strength of material is 70MPa.		
Q8	a) Differentiate between direct and indirect extrusion method. b) Differentiate between hot forging and cold forging.	10	CO4
Q9	<p>Electric arc welding is used to join the column with the base along base perimeter shown in the figure.</p>   <p>Parameters used in welding are as follows. Voltage:- 30 V Efficiency:- 95% Weld cross-section area=10mm² Current:- 120 amps Electrode Diameter=3.15mm Electrode length=300mm Specific energy= 3.6J/mm³</p> <p>Calculate the following</p> <ol style="list-style-type: none"> Welding speed (in mm/s). Welding time Number of electrodes used. <p style="text-align: center;">OR</p> <p>Differentiate between GTAW and GMAW welding processes with neat diagrams.</p>	10	CO3
SECTION-C			
Q9	<p>Design wooden pattern for aluminium casting shown in the figure below</p>   <p>Shrinkage for aluminium is 21mm/m. Draft :-3° for inner details, 2° for outer details Machining allowance:- 3mm on all the surfaces.</p>	20	CO2

Q10	<p>Plastic deformation of a material is occurring according to power law, $\sigma = 400\epsilon^{0.3} \text{MPa}$. Material is compressed from a height of 120mm to 90mm while its width changes from 90mm to 120mm. Length remain unchanged to 100mm. Coefficient of friction is 0.3</p> <ul style="list-style-type: none"> • Calculate the forging load and press capacity • Energy consumed in the operation. • Distance up to which sticking condition will prevail. • Peak pressure in sliding and sticking condition <p style="text-align: center;">Or</p> <p>A sheet of thickness 8mm is rolled through a pair of rolls with diameter 50mm. Coefficient of friction is 0.4. Rolls are rotating at a speed of 100 RPM. Average flow stress of material is 240MPa</p> <p>Calculate</p> <ul style="list-style-type: none"> • The max possible reduction in one pass. • Mini. sheet thickness after rolling. • Roll separating force. • Rolling Torque. • Power consumed in the rolling operation. • Angle of bite. 		CO4
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