UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, June/July 2020

Course: Metal forming principle and design   Semester: VIII
Program: B.Tech ADE   Time 03 hrs.
Course Code: ADEG 435   Max. Marks: 100

Instructions:

SECTION A

S. No.		Marks	CO

Q 1	Statement
	   A) Strain hardening affects the plastic deformation of the material.
	   R) Strain hardening makes the materinal more ductile which increase the plastic deformation
	
	Options:
	   a) A and R are correct and R is a correct explanation of A
	   b) A and R are correct but R is not a correct explanation of A
	   c) A is correct but R is incorrect
	   d) A is incorrect but R is correct.
		5	CO1

Q 2	Statement
	   A) Sticking friction will leads to subsurface deformation.
	   R) Sticking friction is more prominent in the center region of the die in forging.
	
	Options:
	   a) A and R are correct and R is a correct explanation of A
	   b) A and R are correct but R is not a correct explanation of A
	   c) A is correct but R is incorrect
	   d) A is incorrect but R is correct.
		5	CO1

Q 3	A cup of base diameter 50 mm and height 100mm has to be drawn from the carbon steel sheet of thickness 0.8mm. enter the value of diameter of blank required…………mm.	5	CO2
Q 4	A brass billet has to extrude from initial diameter of 100mm to a final diameter 50mm. Material follow the power law as $= 300e^{0.3}$. Value of extrusion force required for extrusion is…..............MN.	5	CO2

Q 5	Which of the following metal forming process is suitable for dome shaped large radar dishes.
	   a) Electromagnetic forming
	   b) Explosive forming
	   c) Electrohydraulic forming
	   d) Radar forming.
		5	CO3

Q 6	"Electric arc is created inside the fluid which results in pressure pulse that is able to deform the material". The above statement is related to.	5	CO3

	a) Weld forming b) Hydraulic forming c) Electrohydraulic forming d) Explosive forming.		
SECTION B			
Q 7	a) Differentiate between true stress strain and engineering stress strain. b) "True stress and strain is used in metal forming operations". The given statement is true or not. Give your reasons for the same.	**10**	**CO1**

Q 8	A steel is rolled by 40 % from the initial thickness of 50mm using 900 mm diameter rolls. The slab width is 800mm. material is having yield strength of 350 MPa. Assume coefficient of friction acting at the contact surface is 0.25. Use Von misses plain strain strength as a deformation criteria . Rolls are rotating with the 250 rpm. finds
	    a) Rolling load per roll (neglecting sticking friction) (4)
	    b) Maximum draft (2)
	    c) Total torque and power required (4)
	
	OR
	
	Estimate punch and dies size and blanking force to cut a rectangular blank 25mm wide and 30 mm long from a 1.5mm thick metal strip. If the ultimate shear, strength of the material is 450 MPa. also find out the work done if the percentage penetration is 25% of metal thickness
		10	**CO2**

Q 9	a) Enlist various elements/ phenomenon, which is not considered in theory of plasticity and explain any one of them. b) Explain sliding and sticking friction in context of forging operation.	**10**	**CO1**
Q 10	A wire drawing operation is performed using conical die having a die angle of 16^0. Input rod is having the diameter of 14mm and reduction of 25% is observed after drawing process. Unidirectional yield flow strength of the material is 600 MPa. Coefficient of friction is 0.15 and output wire sped is 7 m/s. find the value of drawing stress and power required in the process.	**10**	**CO2**

Q 11	Explain about the following defects related to metal forming , also mention causes and remedies of given defects
	    i. Zipper crack
	    ii. Cold shut /fold
	    iii. Center bust
	    iv. Oxides ring formation.
		10	**CO3**

SECTION-C			
Q 12	a) Compare forward, backward and hydrostatic extrusion process b) Describe electromagnetic forming process. Enlist its advantages, disadvantages and applications **OR** a) Compare various types of rolling mills in rolling operation. b) Describe various methods of Extrusion of pipe and tubing.	**20**	**CO3**