UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2019

Programme Name: B.Tech ADE Semester   : IV
Course Name   : Metrology and Manufacturing Technology Time   : 03 hrs
Course Code   : MEPD 2001 Max. Marks: 100
Nos. of page(s)   : 2 Instructions:

SECTION A

S. No.		Marks	CO
Q1.	Discuss the working principle of LVDT with proper diagram.	5	CO1
Q2.	Differentiate between hot working and cold working process.	5	CO4
Q3.	Discuss the following machining processes: 1) Boring 2) Reaming 3) Counter sinking 4) Indexing 5) Facing	5	CO3
Q4.	Calculate the indexing required while cutting a gear with 36 teeth? The counts available on the indexing plate are 21, 23, 27, 29, 31, and 33. Use simple indexing.	5	CO3

SECTION B

Q5.	Explain in detail the shell molding process with neat diagram along with its applications. **Or** Explain in detail the hot chamber pressure die casting process with neat diagram along with its applications.	10	CO5
Q6.	Explain the following metal forming principles with neat diagram and their applications: a) Press forging b) Indirect extrusion	10	CO4
Q7.	What do you understand by term Metrology? Define the following terms with respect to a measuring instrument: a) Accuracy b) Precision c) Resolution d) Speed of response	10	CO1
Q8.	Design a GO and NO GO plug gauge for 25 H_8/f_9 fit. The basic size falls in diameter range of 18-30 mm. The fundamental deviation for 'f' shaft is **-5.5 $D^{0.41}$.** The values of standard tolerances for grades of IT 9 and IT 8 are 40i and 25i respectively. Assume suitable wear allowance. Sketch the gauges with values.	10	CO1

	SECTION-C		

Q9.	Derive the expression for force and pressure distribution in rectangular bar forging for following cases with proper assumptions:
	  a) Considering sliding friction all over the surface
	  b) Considering both sticking and sliding friction over the surface.
	Or
	  a) Prove that at point of instability $n = \epsilon$ in metal forming.
	
	  b) A strip of metal with initial dimensions 24 mm x 24 mm x 150 mm is forged between two flat dies to a final size of 6 mm x 96 mm x 150 mm. If the coefficient of friction is 0.05, determine the maximum forging force. Take the average yield strength in tension is 7 N/mm^2.
		20
		
		10
		
		10
			CO4

Q10.	a) In an orthogonal cutting operation, the rake angle is 5°, chip thickness before the cut is 0.2 mm and width of cut is 4.0 mm. The chip ratio is 0.4. Determine
	  (a) The chip thickness after the cut, (b) Shear angle,
	  (c) Friction angle, (d) coefficient of friction,
	  (e) shear strain.
	
	  b) Explain different types of chips and various conditions for their formation in metal cutting.
		10
		
		10
			CO2