Register Number:……..

KUMARAGURU
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B.E DEGREE EXAMINATIONS: MAY 2017

(Regulation 2015)

Fourth Semester

MECHATRONICS ENGINEERING

U15MCT401**:** Manufacturing Technology

COURSE OUTCOMES

CO1: Define and distinguish various manufacturing processes.
CO2: Select and justify appropriate casting methods.
CO3: Anticipate general casting defects and explain their remedies.
CO4: Summarize various bulk deformation processes and explain the working machineries.
CO5: Describe the working principles of machines and various machining processes.
CO6: Choose a suitable metal joining process for a given application.

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Match the appropriate combination between the casting defects (List I) with their meanings (List II): CO3 [K_2]

List I	List II
A. Swell	i. mismatching of top and bottom part of the casting
B. Shift	ii. rough lumps on the surface of castings
C. Hot tear	iii. general enlargement of castings
D. Sand wash	iv. cracks in the casting

	A	B	C	D
a)	ii	i	iii	iv
b)	iii	iv	ii	i
c)	ii	iv	iii	i
d)	iii	i	iv	ii

2. Which one of the following processes produces a casting when pressure forces the molten metal into the mould cavity? CO2 [K_2]

a) Shell moulding b) Investment casting
c) Die casting d) Continuous casting

3. Which of the following are bulk deformation processes: CO4 [K_2]

   1. Deep drawing
   2. Extrusion
   3. Forging
   4. Rolling

   a) 2,3,4 b) 1,2,4

   c) 1,2,3 d) 1,3,4

4. The cutting force in a sheet-metal blanking operation depends on which mechanical property of the metal CO4 [K_2]

   a) Compressive strength b) Modulus of elasticity

   c) Shear strength d) Strain rate

5. Assertion (A): No separate feed motion is required during broaching. CO5 [K_3]

   Reason (R): The broaching machines are generally hydraulically operated.

   a) Both A and R are Individually true and R is the correct explanation of A b) Both A and R are Individually true but R is not the correct explanation of A

   c) A is true but R is false d) A is false but R is true

6. Which one of the four types of chip would be expected in a turning operation conducted at low cutting speed on a brittle work material: CO4 [K_2]

   a) Continuous chip b) Continuous chip with built up edge

   c) Discontinuous chip d) Serrated chip

7. Consider the following operations: CO5 [K_3]

   1. Under cutting
   2. Plain turning
   3. Taper turning
   4. Thread cutting

   The correct sequence of these operations in machining a product is

   a) 2-3-4-1 b) 2-3-1-4

   c) 3-4-2-1 d) 4-1-3-2

8. Gear hobbing is a special form of which one of the following machining operations: CO5 [K_2]

   a) Grinding b) Milling

   c) Planing d) Shaping

9. Assertion (A): Oxidizing flame is used in gas welding to join medium carbon steels having high melting point. CO6 [K_4]

Reason (R): In gas welding, oxidizing flame produces the maximum temperature compared to neutral and reducing flames.

a) Both A and R are Individually true and R is the correct explanation of A
b) Both A and R are Individually true but R is not the correct explanation of A
c) A is true but R is false
d) A is false but R is true

10. The commonly used flux for brazing is CO6 [K_2]

a) Slag
b) Borax
c) Lead
d) Sodium chloride

PART B (10 x 2 = 20 Marks)
(Answer not more than 40 words)

11. How are dissolved gases removed from molten metal? CO1 [K_3]
12. What is the purpose of a riser? CO2 [K_2]
13. Why is flash desirable in impression die forging? CO4 [K_3]
14. Name some products that are manufactured by extrusion. CO4 [K_2]
15. How does a turret lathe differ from engine lathe? CO5 [K_2]
16. What is a blind hole? CO5 [K_2]
17. Give differences between conventional milling and climb milling. CO5 [K_2]
18. What is truing, in reference to grinding wheels? CO5 [K_3]
19. Define braze welding. CO6 [K_2]
20. Why is the heat transfer factor in arc-welding processes that utilize consumable electrodes greater than in those that use non- consumable electrodes? CO6 [K_3]

Answer any FIVE Questions:-
PART C (5 x 14 = 70 Marks)
(Answer not more than 300 words)

Q.No. 21 is Compulsory

21. Draw and give a step-by-step procedure for the following processes:
    (i) Investment casting process (7) CO2 [K_2]
    (ii) Die casting process (7) CO2 [K_2]
22. (i) Explain the working principle of coreless induction furnace with a neat sketch. (9) CO1 [K_2]
    (ii) Write a note on “internal defects in casting”. (5) CO3 [K_2]

23.	Discuss in detail about the sheet metal working process of “manufacturing a cup shaped parts” with a neat sketch.		CO4	[K_3]
24.	Explain the process of “ring rolling” and “thread rolling” with neat sketches.		CO4	[K_2]
25.	Discuss in detail about the various parts and working of a centre lathe with a neat sketch.		CO5	[K_2]
26.	(i) Describe the “continuous broaching” process with a neat sketch.	(5)	CO5	[K_L]
	(ii) Explain the working of universal milling machine with a neat sketch.	(9)	CO5	[K_L]
27.	Explain the various parts and working principle of the following welding processes:			
	(i) Resistance spot welding	(7)	CO6	[K_2]
	(ii) Laser-beam welding	(7)	CO6	[K_2]

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