

G. S. Mandal's
 Maharashtra Institute of Technology, Aurangabad
 (An Autonomous Institute)
 MAKE-UP EXAMINATION
First Year B.Tech (All) -April/May 2022

Course Code : HSM101

Course Name : Engineering Exploration

Duration : 2 Hrs

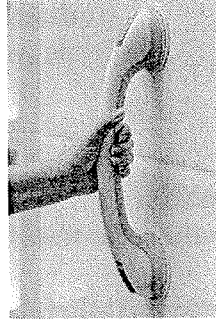
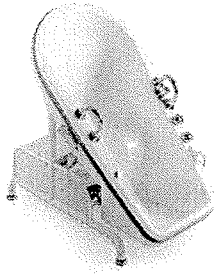
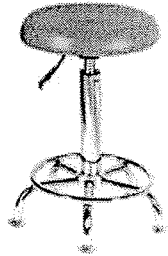
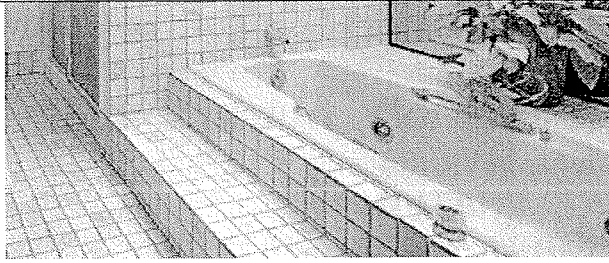
Max. Marks : 30

Date : 05/05/2022

Instructions :

- i) All questions are compulsory
- ii) Assume suitable data wherever necessary and clearly state it
- iii) Figures to the right indicate full marks

Q. No.	Questions	Marks	CO	BL
Q. 1	Solve/Answer Any Five. (Marks : 5)			
a)	Robotics and automation are associated with which industry revolution?	1	CO1	2
b)	List steps in waterfall model.	1	CO2	1
c)	What are the different stakeholders associated with design?	1	CO3	1
d)	State Grashoff's law.	1	CO4	1
e)	What are the types of communication engineer has to deal with?	1	CO6	2
f)	What are different tools for creating documents?	1	CO6	2
Q. 2	Choose an engineering grand challenge and explain role of engineers to address the challenge.	5	CO1	3
Q. 3	A product is to be developed using SCRUM framework. You have a team of 5 people including yourself. Develop SCRUM framework for the same. Assign various roles to the team members also assume suitable timeline.	5	CO2	3
Q.4	Identify the degree of freedom related to following mechanism/ objects. a) Bottle and bottle cap b) Selfie stick extension rod c) Table drawer d) Car steering e) chair f) fan Discuss how degree of freedom affects construction of mechanism and working.	5	CO4	4
Q.5	Many elderly people have difficulty with balancing while showering and while transferring into and out of the tub. Four designs are given. Suggest suitable method to compare the design. Do the comparison and recommend the best design. Objectives with weightages are: Aesthetics= 4 Cost = 2, Ease of Installation = 1, Safety = 9, Ease of Use= 3, Maintenance = 5, Space = 6. The designs are Shower steps, Hydraulic Swivel Chair, shower grips, Pivoting Tub	5	CO3	5



(OR)

Q.5 A vegetable harvesting machine is to be developed. Following morphological chart is given. Find out the number of possible solutions theoretically. Also list 2 valid, 2 invalid designs with explanation.

5

CO3

4

	Option 1	Option 2	Option 3	Option 4
Vegetable picking device		 Triangular plow	 Tubular grabber	 Mechanical picker
Vegetable placing device	 Conveyor belt	 Rake	 Rotating mover	 Force from vegetable accumulation
Dirt sifting device	 Square mesh	 Water from well	 Slits in plow or carrier	
Packaging device				
Method of transportation		 Track system	 Sled	
Power source	Hand pushed	Horse drawn	Wind blown	Pedal driven

Q.6 Write program for obstacle avoider robot using two IR sensor, L298N module.

5

CO5

6

(OR)

Q.6 An IR sensor is attached to pin no 6 of Arduino mega. Write a program such that the led on pin no 13 should turn on when sensor detects the obstacle, otherwise it should turn off. Also draw flow chart.

5

CO5

6