ROLL NO													

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

Test 1

Winter Semester: 2021-22
Course Code: MEC 3070
Course Name: Electronic Waste Management
Program & Sem: B.Tech & IV Sem

Date: 27th April 2022
Time: 03:00 PM to 04:00 PM
Max Marks: 30
Weightage: 15%

Instructions:

(i) Read the question carefully and answer all the questions

Part A [Memory Recall Questions]

Answer the following Questions. Each Question carries 4 marks. (3Qx4M= 12M)

1. A significantly large number of elements is used in the manufacturing of any Electronic product. Some of the elements present are very toxic in nature and have significant effect on the human health. List any two toxic elements present in the E-Waste, and mention the electronic components in which they are used. (C.O.NO 2) [Knowledge]

2. What are the benefits of recycling the e-Waste? (C.O.NO 1) [Knowledge]

3. Define E-Waste and mention the types of E-waste produced. (C.O.NO 1) [Knowledge]

Part B [Thought Provoking Questions]

Answer the following Questions. Each Question carries 5 marks. (2Qx5M=10M)

4. Quantifying or estimating the e-waste to be recycled in future is a difficult task. Can you suggest any method with which quantification of e-waste can be executed? Name those methods with brief description in 1 or 2 sentences. (C.O.NO 2) [Comprehension]

5. The conventional disposal techniques are not effective if improperly executed. Describe in brief the various techniques of e-Waste disposal and the associated challenges. (C.O.NO 2) [Comprehension]

Part C [Problem Solving Questions]

Answer the following Question. The Question carries 8 marks. (1Qx8M= 8M)

7. A young entrepreneur installed a small capacity E-Waste recycling plant as a part time business in his town to recycle the E-waste generated in his town. The number of different E-waste collected by him annually is shown in the table below.

Electronic Equipment	**Number of Units**
Mobile phones	100000
Head phones	40000
Refrigerator	2000
Laptop	20000

Since his plant is of low budget so he can only take out gold, Silver and Aluminum from the different E-waste. The amount of above element present in a single unit of different E-waste is given in table below.

Electronic Equipment	**Gold in (gram)**	**Silver in (gram)**	**Aluminum in (gram)**
Mobile phones	0.01	10	10
Head phones	0	5	10
Refrigerator	1	50	500
Laptop	0.1	20	50
Cost of Elements	***INR5000.00***	***INR 75.00***	***INR 0.25***

Calculate the total worth generated by the entrepreneur annually by recycling all the 4 electronic equipments listed above. (note: cost of the 3 elements per gram is given in the last row of the 2nd table)

C.O.NO 2 [Application]

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Test 2

Winter Semester: 2021-22
Course Code : MEC 3070
Course Name: Electronic Waste Management
Program & Sem: B.Tech All Branches & IV Sem

Date: 2nd June 2022
Time: 3.00 PM to 4.00 PM
Max Marks: 30M
Weightage: 15%

Instructions:

(i) ***Read the question carefully and answer all the questions***

Part A [Memory Recall Questions]

Answer the following Questions. Each Question carries FOUR marks (3Qx4M= 12M)

1. Describe the impact of Mercury (Hg) on human health.

C.O.NO 3 [Knowledge]

2. What are Flame Retardants? Describe them in brief, also give examples.

C.O.NO 3 [Knowledge]

3. What is CERCLA priority list? Mention any 4 substances listed in it.

C.O.NO 3 [Knowledge]

Part B [Thought Provoking Questions]

Answer the following Questions. Each Question carries 5 marks (2Qx5M= 10M)

4. On outbreak of a disease, health department collects sufficient information to assess the situation and allocate resources to tackle it. How do you think such a situation is approached? What is risk Assessment? Describe all its sub-processes with suitable example.

C.O.NO 3 [Comprehension]

5. There are several elements in E-waste that cause health hazards. Among them, Lead (Pb) has been a matter of debates for several decades. According to your study, is Lead beneficial or harmful for human health? Describe its effect in detail with suitable examples.

C.O.NO 3 [Comprehension]

Part C [Problem Solving Questions]

Answer the following Question. The Question carries 8 marks (1Qx 8M= 8M)

6. An evaluation of personal records of employees of a plant that manufactures white-phosphorus revealed that out of 210 workers who were exposed directly to white-phosphorus, 21 were detected to have respiratory tract irritation. The plant also engaged another group of 300 workers who were not exposed to the gas, of which 33 workers were diagnosed with similar respiratory issue. Determine the attributable risk, odds ratio and relative risk of developing respiratory tract irritation due to direct exposure to white-phosphorus.

C.O.NO 3 [Application]

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END TERM EXAMINATION

Winter Semester: 2021 - 2022 | **Date**: 1st July 2022

Course Code: MEC 3070 | **Time**: 09:30 AM to 12.30 PM

Course Name: Electronic Waste Management | **Max Marks**: 100

Program & Sem: B.Tech, & IV Sem | **Weightage**: 50%

Instructions:

(i) Read the question properly and answer accordingly.

(ii) Scientific and Non-programmable calculators are permitted.

Part A [Memory Recall Questions]

Answer all the Questions. Each question carries FIVE marks. (6Qx5M=30 M)

1) Many techniques are available for recycling E-Waste. Name some of the existing e-waste recycling techniques. (CO.No.3) [K]

2) E-waste contains hazardous chemical substances and they are harmful to the environment. Explain about the Minamata Incident happened because of Methyl Mercury and write the harmful effects of methyl mercury on human. (CO.No.2) [K]

3) Discuss about the statewise e-waste generation along with pie-chart. (CO.No.1) [K]

4) One organization lists top 20 hazardous element list is prepared in every 2 year by ATSDR. Write the full form of the ATSDR and also name the element which is at the first rank in the latest list. (CO.No.2) [K]

5) Explain the different steps involved in the recycling of E-waste. (CO.No.3) [K]

6) Large number of elements are used in the manufacturing of any Electronic product. Some of the elements present are very toxic in nature and have significant effect on the human health. List any 5 toxic elements present in the E-Waste. (CO.No.2) [K]

Part B [Thought Provoking Questions]

Answer all the Questions. Each question carries EIGHT marks. (5Qx8M=40 M)

7) Huei-Chia Dien Company is into recycling of precious metals out of scrap IC boards from electronics products. Explain the physical separation flow sheet for recycling of scrap IC boards along with neat sketch. (CO.No.3) [C]

8) What is risk assessment? Write the flowchart of risk assessment involved in Electronics Waste Management. Explain in brief about each of steps involved in risk assessment of Electronics Waste Assessment. (CO.No.2) [C]

9) Hydrometallurgical process is used for recovery of precious metal from electronics waste. Explain in detail about Halide Leaching process and it's chemical reactions. Also explain the limitations of Halide leaching process. (CO.No.3) [C]

10) Electronics waste contains number of precious metals which can be recovered. The recovery of precious metals is going to be great economical benefit for individual and enterprises. Write few precious metals that are present in e-waste. Also explain the procedure we follow for economical assessment of e-waste step by step. (CO.No.1) [C]

11) Thiosulfate leaching process is used for recovery of metals from e-waste. Discuss the advantages and disadvantages involved in Thiosulfate leaching. (CO.No.3) [C]

Part C [Problem Solving Questions]

Answer both the Questions. Each question carries FIFTEEN marks.(2Qx15M=30M)

12) In an IT Company, 10,09,870 CRT Monitors are to be replaced this month and old CRT monitors to be discarded. As the CRT monitors contain various precious metals. By considering the right composition of these metals in the CRT monitors as per the table of composition, estimate what is the total value of metals that can be recovered in that IT Company after extraction from the e-waste. Assume 1 Euro = Rs.88.

The composition (g/unit) & rates (euro/kg) are respectively, Aluminum 242 & 1.5, Barium 1 & 550, Copper 952 & 5.2, Ferrite 483 & 0.12, Glass 6845 & 0.05, Gold 0.31 & 34070, Lead 464 & 1.7, Nickel 199 & 14, Plastics 2481 & 1.2, Silver 1.25 & 514, Steel/Iron 3322 & 0.12, Tin 20 & 17, Vanadium 1 & 20, Yttrium 1 & 47. (CO.No.1) [A]

13) Deepak Nitrate company Manufactures Caustic Soda and it is located in Gujarat. While it is manufacturing Caustic Soda, the employees were found to have direct exposure to Methyl Mercury. When an investigation was carried out that off 1200 employees, 45 developed memory loss. A bunch of organized employees within the company who are

having smoking history similar to exposed employees and not likely to encounter Methyl Mercury had 35 with memory loss and 851 who did not develop memory loss. Find the relative risk, attributable risk and odds ratio for those data.

(CO.No.2) [A]