Reg. No. \_\_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **18MS3107** | **Duration :** | **3hrs** |
| **Sub. Name :** | **INDUSTRIAL SAFETY** | **Max. Marks :** | **100** |

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| **Q. No.** | **Sub Div.** | | **Questions** | **Course Outcome** | **Marks** |
| **ANSWER ANY FIVE QUESTIONS (5 x 16 = 80 Marks)** | | | | | |
| 1. | a. | | What are the causes of accidents? Give its types, results and the measures of controlling them. | CO1 | 8 |
| b | | Define hazard and its types. Give its preventive measures and an example of hazardeous accident. Elaborate. | CO1 | 8 |
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| 2. | a | | What are primary and secondary functions of the maintainance department? | CO2 | 8 |
| b | | What are the different types of maintainance? How does proper maintainance help in reducing the maintainance and overall cost? Explain. | CO2 | 8 |
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| 3. | a | | Define corrosion. What are the factors affecting corrosion and its types? What are its preventive methods? | CO3 | 8 |
| b | | What are the causes of wear? What are its effects? Mention its types. | CO3 | 8 |
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| 4 | a | | Explain decision tree with the help of a diagram and give its applications. Why is decision tree needed? | CO4 | 8 |
| b | | Differentiate between internal combustion and external combustion engine. | CO4 | 8 |
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| 5 | a | | What is the concept of periodic inspection? Why is it needed? | CO5 | 8 |
| b | | What is preventive maintainance? How does it helpful in an industry? | CO5 | 8 |
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| 6 | a | | What is a lubricant? What are is types? Give its various applications. | CO3 | 8 |
| b | | What are the types of lubrication methods? Explain. | CO3 | 8 |
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| 7 | a | | Write about fire prevention and the various equipments and methods used for fire fighting. | CO1 | 8 |
| b | | Write about the safety color codes and significance of the color codes. Elaborate. | CO1 | 8 |
|  | | | **COMPULSORY QUESTION (1 x 20 = 20 Marks)** |  |  |
| 8 | |  | **Case study:**  A number of workers at the plant have over the last six months been subject to several differenthealth problems. The following information has been received by the head engineer at the plant.  a) In an assembly area that was installed recently, workers have to bend to the groundthroughout the day to attach several small parts onto a large and heavy vehiclecomponent. Some workers have begun to develop lower back pain, likely due to therepetitive bending. The problem has become so severe for one of the workers that he hasbeen told by his doctor to stay off work for two weeks so his back can recover. Themanufacturing engineers who designed the assembly operation had wanted to use anautomated system, but that option was deemed not to be economic. So they used amanual operation, but did not take into account industrial ergonomics, as they had noexpertise in that discipline.  b) An increased incidence of respiratory illnesses has been reported over the last month byworkers operating near the paint-spray booths. Many of the substances used in the booths(paints, solvents, etc.) are known to be causes of the observed respiratory illnesses. Butthe workers are not supposed to come into contact with any of the substances because thepaint-spray booths are designed to ensure that all materials exit the plant through a highcapacity ventilation system and that no materials can leak back into the plant. No tests had been carried out on the ventilation system, or on the air quality around the paintspraybooths, so it is uncertain whether or not there have been any leaks into the plantfrom the paint-spray booths.  c) In an area of the plant where metal cutting occurs and workers use protective eyewear,workers have reported minor eye injuries. The area in question is one where it is commonknowledge that the workers do not routinely use the protective eyewear. It is oftenobserved to be hanging on nearby hooks or to be loosely hanging around the necks ofworkers. Workers complain that they find the protective eyewear uncomfortable and donot think it is needed or important. The plant manager knows of this behaviour butoverlooks it, since enforcing the use of the protective eyewear seems may make theworkers unhappy and, consequently, less productive. That, he feels, could render theplant non-competitive.  **Questions:**  a) How would you go about investigating the causes of the observed  health problems?  b) What are the unsafe conditions and acts in the plant?  c) Which of the unsafe conditions and acts identified in part b are  (1) of a technical nature, or  (2) related to human behaviour or management? | CO6 | 20 |