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B. Tech. (Mechanical Engineering) 8th Semester  
(G Scheme) Examination, July-2022

**OPERATION RESEARCH**

**Paper-OEC-ME-402-G**

*Time allowed : 3 hours]*

*[Maximum marks : 75*

*Note : The students have to attempt five questions in total, first being compulsory and selecting one from each unit. All questions carry equal marks.*

- (a) Write down the standard form of an LPP.
- (b) State Weak Duality Theorem in LPP.
- (c) Define Mean and Variance in Probability theory.
- (d) Explain the queue parameters.
- (e) Explain Deterministic model.
- (f) Explain the North-West corner rule for finding Initial solution for a transportation Problem. 6×2.5=15

**Unit-I**

2. Discuss the Role of operation research in decision making and also discuss the application of Operation Research in Industry. 15

3710-P-4-Q-9 (22)

[P. T. O.]

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9. (a) What are the different environments in which decisions are made ?
- (b) What is the significance of utility as a basis of decision making ?

7.5

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B.Tech. (Mechanical Engineering) 8th Semester

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**INDUSTRIAL AUTOMATION**

**Paper- PCC-ME-402-G**

*Time allowed : 3 hours]*

*[Maximum marks : 75*

*Note : Attempt any five question in all, selecting one question from each unit. Question No. 1 is compulsory. All Questions carry equal marks.*

1. Write a short note on: 2.5×6=15
- (a) Simulation
  - (b) Strategies of automation
  - (c) Centrifugal feeder
  - (d) Cellular manufacturing
  - (e) Sensors Vs Amplifiers
  - (f) Artificial intelligence

**Unit-I**

2. (a) Discuss principles and strategies of automation in production systems. 10
- (b) Discuss the levels and types of automations. 5
3. (a) Discuss principal of material handling system and equipment used for it. 7.5
- (b) Discuss material transport system used in an industry 7.5

[P. T. O.]

**Unit-II**

4. (a) Discuss conveyor systems with type and application. 7.5
- (b) Discuss the strategies, equipment and methods used in storage system. 7.5
5. (a) Discuss part families, parts classification and coding used in group technology. 7.5
- (b) Discuss planning and implementation issues in FMS. 7.5

**Unit-III**

6. (a) Discuss environmental factor, Economic factor and sensor characteristic for choosing a sensor. 10
- (b) Discuss the need of sensors? 5
7. (a) Discuss the definition, operations and theorems of Boolean algebra. 7.5
- (b) Discuss the factors involvement of design of manufacturing. 7.5

**Unit-IV**

8. What is system modelling? Discuss the requirement before building models. 15
9. Discuss Fuzzy logics with application. 15

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**B.Tech. (Mechanical Engineering) 8th Semester  
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PLANT MAINTENANCE ENGINEERING  
Paper- PEC-ME-404-G**

*Time allowed : 3 hours* *[Maximum marks : 75]*

*Note : Attempt any five question in all, selecting one question from each section. Question No.1 is compulsory. All Questions carry equal marks.*

1. Explain the following  
(a) Preventive Function 5  
(b) Predictive Maintenance 5  
(c) Levels of standardization 5

**Section-A**

2. What do you understand by the term 'Maintenance Planning'? What are different phases involved in Maintenance Planning? 15
3. Discuss the advantages and disadvantages of decentralization with reference to plant engineering department. 15

**Section-B**

4. When does an organization opt for contractual maintenance? Explain with examples. What are its merits and demerits? 15

5. What do you understand by the term RCM? Explain how Predictive Maintenance can help in implementing RCM?

**Section-C**

6. What are the major criteria taken into consideration for placing a manufacturing firm making lighter items?
7. What are the principal factors affecting the location choice? What are different types of facility location problem?

**Section-D**

8. Discuss the part codification and classification system with examples. Distinguish between the hierarchical and chain type coding structures with examples.
9. (a) What is inter-changeability? How it relevant for standardization of spare parts?
- (b) What is A-B-C Analysis? Explain the step-by-step method to conduct the A-B-C analysis.

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**B. Tech. (Mechanical Engineering) 8th Semester  
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**POWER PLANT ENGINEERING**

**Paper-PEC-ME-412-G**

*Time allowed : 3 hours]*

*[Maximum marks : 75*

*Q.1 : Question no.1 is compulsory and attempt questions  
by selecting one from each unit.*

- (a) Discuss on types of power plant.  $6 \times 2.5 = 15$
- (b) Rainfall
- (c) Coal handling system
- (d) Rankine cycle
- (e) Explain nuclear fission and fusion
- (f) Enlist Non-conventional Power Function System.

**Unit-I**

Plot various curve for estimating steam flow and size of reservoir for hydroelectric power plant. Also compare hydroelectric power plants with others.

15

I-P-3-Q-9 (22)

[P. T. O.]

3. Discuss the energy resources and their availability in India. Also discuss on selection of site for hydroelectric power plant.

### Unit-II

4. Write short note on :
- Feeding and burning of Pulverized Fuel
  - Ash handling system
5. Write working principle of gas turbine power plant. Find maximum work output and efficiency of the cycle. And discuss the parameter which affects the thermodynamic efficiency.

### Unit-III

6. Write principle of nuclear energy with nuclear reactions. Also discuss the India's nuclear power program. What are the advantages and limitations of nuclear power plant?
7. Discuss performance and operating characteristics of power plants. Also discuss on economic aspects of power sharing.

### Unit-IV

8. Discuss and derive maximum efficiency peak curve for thermionic power generation. 15
9. Explain solar energy and discuss in details methods of solar energy utilization. 15

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**B.Tech. (Mechanical Engineering) 8th Semester**

**(G-Scheme) Examination, July-2022**

**Automobile Engineering**

**Paper- PEC-ME-420-G**

*Time allowed : 3 hours]*

*[Maximum marks : 75*

*Note : Question No.1 is compulsory. Attempt total five questions selecting one question from each unit. All Questions carry equal marks.*

1. Compulsory question 6 parts. 2.5×6
- (a) Discuss different auto electric system and their function
  - (b) Classify the different types of brakes
  - (c) What are the different types of steering system
  - (d) What is the function of Clutch?
  - (e) What is the need of governor
  - (f) What is the need of method of synchronizing

**Unit-I**

2. Explain the following terms: 15
- (a) Chassis and chassis overhang
  - (b) Long wheel base and short wheel base chassis
  - (c) Full forward and semi forward chassis
  - (d) Wheel Base and wheel track

3805-P-2-Q-9 (22)

[P. T. O.]

3. Explain the working of Centrifugal Clutch with neat sketch 15

### Unit-II

4. Explain Construction and working of constant mesh gear box with neat sketch 15
5. What is the need of differential assembly? Discuss different types of differential and explain the construction and working of differential with neat sketch 15

### Unit-III

6. What do you mean by power steering systems? Explain the principles of power steering and draw its construction layout 15
7. Explain Ackermann's steering mechanism and explain wheel lock and steering lock angles? 15

### Unit-IV

8. Sketch and explain the construction and working of disc brake. 15
9. Draw the layout of an electrical system for any four wheeler involving as many details as possible. 15