

**R18**

Code No: 157EH

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year I Semester Examinations, January/February - 2023

**BASIC MECHANICAL ENGINEERING**

(Common to EEE, CSE, IT)

Time: 3 Hours

Max.Marks:75

Note: i) Question paper consists of Part A, Part B.

ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.

iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

**PART – A**

**(25 Marks)**

- |      |  |     |
|------|--|-----|
| 1.a) | Define black body.   | [2] |
| b)   | Define point and path functions.                                   | [3] |
| c)   | What is degree of saturation?                                      | [2] |
| d)   | Explain the purpose of carburetor in SI engine.                    | [3] |
| e)   | Define interference.   | [2] |
| f)   | What is a differential gear? Where is, it used?                    | [3] |
| g)   | Define mechanical advantage.                                       | [2] |
| h)   | Define the terms prime circle, pitch circle, base circle of a cam. | [3] |
| i)   | Define resonance.  | [2] |
| j)   | List the advantages of multistage compressors.                     | [3] |

**PART – B**

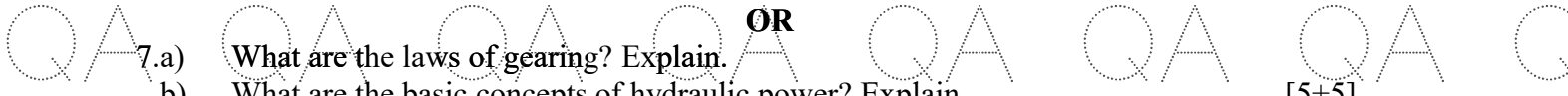
**(50 Marks)**

- |           |  |       |
|-----------|--|-------|
| 2.a)      | How does transient heat transfer differ from steady heat transfer? How does one-dimensional heat transfer differ from two-dimensional heat transfer? |       |
| b)        | No engine can be made to work on Carnot cycle" justify the statement.  | [5+5] |
| <b>OR</b> |  |       |
| 3.a)      | Define thermodynamic equilibrium. Explain different laws of thermodynamic.   |       |
| b)        | Discuss the different modes of heat transfer.  | [5+5] |
| 4.a)      | What are the main components of automobile which contribute for efficient functioning? Explain.  |       |
| b)        | What is the difference between vapour compression cycle and absorption cycle?  | [5+5] |
| <b>OR</b> |  |       |
| 5.a)      | Why compression ratio of petrol engine is low compared to diesel engines?  |       |
| b)        | Explain the vapour compression cycle with a neat sketch.   | [5+5] |



6.a) Derive an expression for minimum number of teeth required on a pinion to avoid interference when it gears with a rack.

b) Why are hydraulic systems preferred for heavy work than the pneumatic systems? [5+5]

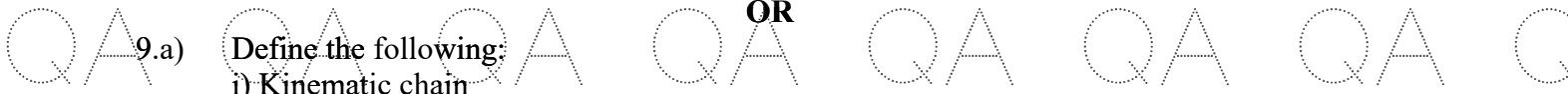


7.a) **OR**  
What are the laws of gearing? Explain.

b) What are the basic concepts of hydraulic power? Explain. [5+5]

8.a) Sketch and define transmission angle of a four-bar mechanism.

b) What is the differences between an element and a kinematic link of a mechanism? How do you classify links of a mechanism? [5+5]



9.a) **OR**  
Define the following:

i) Kinematic chain

ii) Mechanism

iii) Structure.

b) Derive the expression for velocity and acceleration during out-stroke and return stroke of the follower. [5+5]



10.a) Explain the working principle of centrifugal compressor.

b) Differentiate between free vibrations and forced vibrations. [5+5]

**OR**

11.a) With a neat sketch, explain the parts of Reciprocating compressor.

b) Define the following terms:

i) Periodic motion

ii) Fundamental mode of vibration

iii) Degree of freedom

iv) Simple harmonic motion [5+5]



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