Pimpri Chinchwad Education Trust's

Pimpri Chinchwad College of Engineering

An Autonomous Institute

(Affiliated to Savitribai Phule Pune University)

SET –

SEMESTE

End Term Examination

Third ~~Second~~ Year B. Tech. (CS/IT/E&TC/CIVIL)

[Open Elective - IV] Model Based System Engineering (BME6604A

Even Semester (2022-23)

Total No. of Questions-09 ***Total No. of Printed Pa***

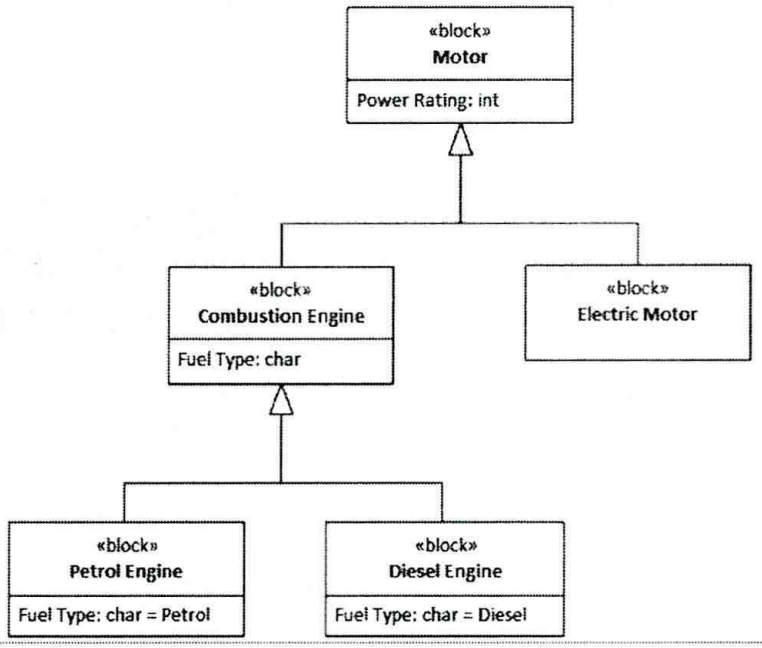
[Time: 2 Hr. 50 min.] ***[Max. Mar***

PRN								

Instructions:

IMP: Verify that you have received a question paper with correct course, code, branch etc.
i. Q.1, Q.2 and Q.3 are compulsory. Attempt Q.4 or Q.5, Q.6 or Q.7 and Q.8 or Q.9
ii. Assume suitable data wherever necessary.
iii. Neat labelled diagrams must be drawn wherever necessary.
iv. Figure to right indicates full marks.
v. Use of a non-programmable calculator is allowed.

		Marks
Q.1	**Attempt any one of the following**	**5**
A	Draw and explain three layers of typical cyber-physical architecture.	5
B	Discuss the challenges of cyber physical system	5
Q.2	**Attempt any one of the following**	**5**
A	Explain the following terms related to system engineering with suitable example i) State ii)Events iii) Process	5
B	Discuss any three applications of cyber physical system	5
Q.3	**Attempt any one of the following**	**5**
A	Explain the framework for defining the approach of model-based system engineering.	5
B	Explain modeling methods used in MBSE and list any two modeling methods	5
Q.4	**Attempt the following**	**20**
A	List the four pieces of information contained in the header of general diagram	4

A	Read the diagram based on SysML ontology and write the same as the part of your answer 	4
B	Draw parametric diagram with suitable example	8
C	Draw use case diagram with suitable example and state the importance of include and extend use case	8
Q.6	**Attempt the following**	**20**
A	Explain process context with car maintenance as the context.	4
B	Explain different process types using SysML ontology	8
C	Explain viewpoint context view, viewpoint definition view and ruleset definition view with the help of neat SysML diagram	8
	OR	
Q.7	**Attempt the following**	**20**
A	Discuss what is process group as per ISO 15288.	4
B	Discuss how process artifacts associated with each process are captured with suitable example	8
C	Draw SysML diagram to explain viewpoint relationship from the process perspective. Also explain the seven-view approach to process modeling	8
Q.8	**Attempt the following**	**25**
A	Explain the different types of constraints associated with the system with the help of suitable example	5
B	Discuss how context can be modeled using use case diagram. What are the two major problems associated with SysML use case diagram	10
C	Discuss how parametric diagram can be used to visualize scenarios. Explain all the elements used in parametric diagram	10
	OR	
Q.9	**Attempt the following**	**25**
A	List down the major pitfalls for describing needs using need description and	5

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[Time: 2 Hr. 30 min.]

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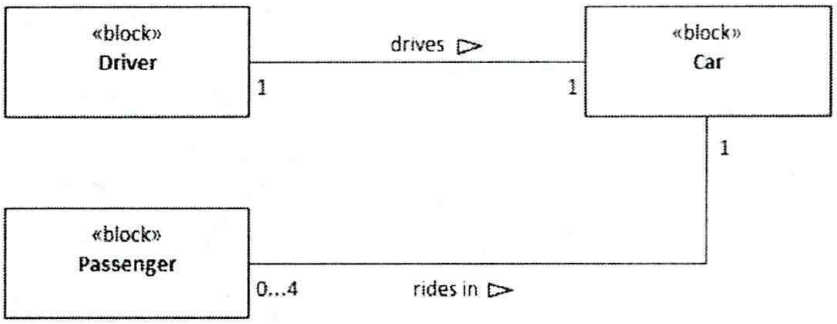
iv. Figure to right indicates full marks.
v. Use of a non-programmable calculator is allowed.

		Marks
Q.1	**Attempt any one of the following**	**5**
A	List down the three evils of system engineering and explain any one.	5
B	Explain different types of systems with appropriate examples.	5
Q.2	**Attempt any one of the following**	**5**
A	Define Modal based system engineering and discuss the benefits of MBSE.	5
B	Define system as per INCOSE and state the mission of the system.	5
Q.3	**Attempt any one of the following**	**5**
A	Discuss the use of modeling language in system engineering and list the different modeling languages used.	5
B	Explain notations with suitable example and list the different types of notations used in systems engineering	5
Q.4	**Attempt the following**	**20**
A	Classify SysML diagram and draw the general diagram concept	4
B	Explain block definition diagram using blocks and relationships with suitable example	8

A	Read the diagram based on SysML ontology and write the same as the part of your answer 	4
B	Draw sequence diagram with suitable example.	8
C	Draw activity diagram with suitable example. Discuss the importance of fork node, join node and merge node	8
Q.6	**Attempt the following**	**20**
A	What is process in model-based system engineering? Discuss the desirable process properties associated with processes	4
B	Discuss with the help of neat diagram how the following ontology elements are related to process i) Process execution group ii) Service iii) Resource	8
C	Explain with the help of SysML diagram how activity diagram and sequence diagram can be used to define the process behaviour and sequence of processes	8
	OR	
Q.7	**Attempt the following**	**20**
A	Discuss the common problems associated with processes	4
B	Discuss process concept based SysML ontology using activities, artifacts, and stakeholders with suitable example	8
C	Discuss the list of questions to ask, to decide whether viewpoints in the framework are defined thoroughly and correctly	8
Q.8	**Attempt the following**	**25**
A	Discuss the types of needs associated with system using suitable ontology view	5
B	Discuss how source elements can be visualized using SysML diagram. Also explain legal and forbidden source element	10
C	Explain how context is essential to gain an understanding of the needs in need modeling. Draw the context definition view based on stakeholder and system structure	10
	OR	
Q.9	**Attempt the following**	**25**
A	Explain how needs and constraints are described. Discuss need description, source element and rule associated with the need	5
B	Discuss how sequence diagram can be used to visualize scenarios. Explain	10

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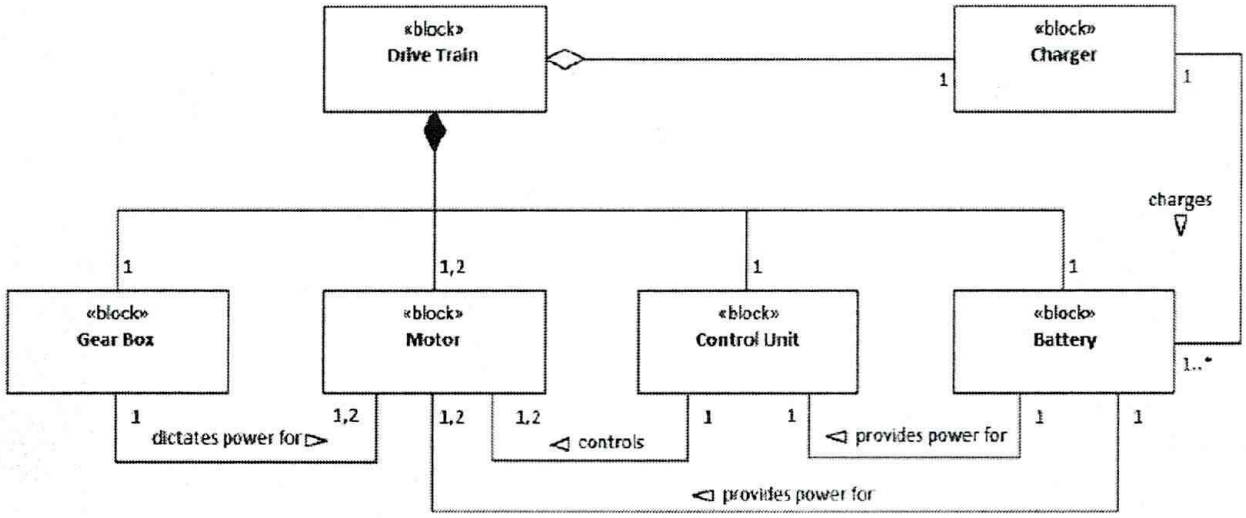
		Marks
Q.1	**Attempt any one of the following**	**5**
A	Discuss the set of common characteristics associated with the systems	5
B	Explain the concept of people, process, and tool for the successful implementation of system engineering	5
Q.2	**Attempt any one of the following**	**5**
A	What are the functional building blocks of context diagram	5
B	Explain the following system properties i) Material and formal properties ii) Disposition, structural and behavioural properties	5
Q.3	**Attempt any one of the following**	**5**
A	Explain the terms model and view in model-based system engineering with the help of suitable example	5
B	Explain modeling tool and list the tools which are compliant with SysML	5
Q.4	**Attempt the following**	**20**

B	Read the diagram based on SysML ontology and write the same as the part of your answer 	8
C	Discuss the importance of package diagram in SysML. Also explain namespace in package diagram using suitable example	8
Q.6	**Attempt the following**	**20**
A	Explain different process types using SysML ontology	4
B	Explain with the help of SysML diagram how activity diagram and sequence diagram can be used to define the process behaviour and sequence of processes	8
C	Explain the process stakeholders for the maintenance process group with the help of SysML block definition diagram	8
	OR	
Q.7	**Attempt the following**	**20**
A	Discuss what is process group as per ISO 15288.	4
B	Discuss the list of questions to ask, to decide whether viewpoints in the framework are defined thoroughly and correctly	8
C	Discuss the process content view to capture processes for car maintenance process group.	8
Q.8	**Attempt the following**	**25**
A	Discuss how source elements can be visualized using SysML digram. Also explain legal and forbidden source element	5
B	Discuss how sequence diagram and parametric diagram can be used to visualize scenarios	10
C	Explain how context is essential to gain an understanding of the needs in need modeling. Draw the context definition view based on stakeholder and system structure	10
	OR	
Q.9	**Attempt the following**	**25**
A	Explain the different types of constraints associated with the system with the help of suitable example	5
B	Draw SysML diagram to explain viewpoint relationship from the need perspective.	10