Reg. No.																

Question Paper Code	14576

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2026

Sixth Semester

Electrical and Electronics Engineering

20EEEL607 - ELECTRONIC PRODUCT DESIGN

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART – A (i) (MCQ)
(16 × 1 = 16 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	Find the design approach that improves interaction between users and electronic products. a) Thermal management b) User centred design c) PCB routing d) Signal conditioning	1	K1	CO1
2.	Select the technique used to minimize electromagnetic interference using conductive enclosures. a) Grounding b) Shielding c) Packaging d) Decoupling	1	K1	CO1
3.	Show the design practice that simplifies assembly and maintenance of products. a) Routing topology b) Functional testing c) Design for manufacture d) Image plane assignment	1	K2	CO1
4.	Choose the stage that converts user needs into technical specifications. a) Layer assignment b) Requirements identification c) Prototype testing d) Signal routing	1	K1	CO2
5.	Classify the testing approach that validates software functionality without examining internal logic. a) White box testing b) Grey box testing c) Black box testing d) Unit testing	1	K2	CO2
6.	Apply the concept of functional partitioning to improve modularity in a system. a) Increase PCB thickness b) Reduce vibration c) Improve modularity d) Eliminate shielding	1	K3	CO2
7.	Find the software development model based on sequential execution of phases. a) Spiral model b) Agile model c) Waterfall model d) Prototype model	1	K1	CO3
8.	Relate good programming practice with its major benefit in embedded systems. a) Increased routing layers b) Reduced software bugs c) Higher packaging cost d) Reduced grounding	1	K2	CO3
9.	Identify the important characteristic of a real-time embedded system. a) Timing constraints b) Manufacturing limits c) Wiring sequence d) Packaging dimensions	1	K3	CO3
10.	Show the concept used to represent conductive reference layers in multilayer PCB design. a) Routing grid b) Image plane c) Thermal pad d) Guard band	1	K1	CO4

11.	Interpret the purpose of bypass capacitors in multilayer PCB design. a) Increase routing density b) Reduce voltage fluctuations c) Improve packaging d) Increase thermal resistance	*1*	*K2*	*CO4*
12.	Apply the suitable technique to protect PCB circuits from electrostatic discharge. a) Aesthetic enhancement b) Assembly optimization c) ESD protection d) Layer expansion	*1*	*K3*	*CO4*
13.	Select the instrument suitable for observing analog and digital signal variations during debugging. a) Ammeter b) Oscilloscope c) Venire caliper d) Tachometer	*1*	*K3*	*CO5*
14.	Interpret the objective of characterization testing of electronic components. a) Increase mounting area b) Measure performance behaviour c) Reduce packaging size d) Improve wiring colour	*1*	*K2*	*CO5*
15.	Experiment with integration testing with its expected outcome in product development. a) Verification of module interaction b) Reduction of PCB layers c) Improvement of packaging design d) Increase of routing density	*1*	*K3*	*CO6*
16.	Choose the activity commonly carried out after individual module testing. a) Requirement analysis b) Integration testing c) Industrial design d) Functional partitioning	*1*	*K3*	*CO6*

PART – A (ii) (Short Answer Questions)
(6 × 3 = 18 Marks)
Answer ALL Questions

17.	Apply suitable packaging and thermal management techniques to enhance reliability in electronic product design.	*3*	*K3*	*CO1*
18.	Compare functional models and architectural models used in hardware design.	*3*	*K4*	*CO2*
19.	Identify how software testing helps in risk abatement for embedded systems.	*3*	*K3*	*CO3*
20.	Analyze the role of decoupling techniques in multilayer PCB design.	*3*	*K4*	*CO4*
21.	Utilize suitable troubleshooting techniques for identifying faults in operational amplifier circuits.	*3*	*K3*	*CO5*
22.	Inspect the significance of validation and verification during electronic product development.	*3*	*K4*	*CO6*

PART - B (Descriptive Answer Questions)
(6 × 11 = 66 Marks)
Answer ALL Questions

23.	a) (i)	Apply industrial design considerations including form factor, material selection and environmental constraints in developing a portable electronic device.	*6*	*K3*	*CO1*
	(ii)	Construct suitable methods to improve reliability against vibration, shock and temperature variations in electronic products.	*5*	*K3*	*CO1*
		OR			
	b) (i)	Apply ergonomics and cognition principles in designing an effective man–machine dialogue system.	*6*	*K3*	*CO1*
	(ii)	Develop design for manufacture and assembly principles to improve product reliability and cost effectiveness in electronic systems.	*5*	*K3*	*CO1*
24.	a)	Construct a systematic hardware design procedure from requirement identification to performance evaluation for an electronic control system.	*11*	*K3*	*CO2*
		OR			

	b)	Build design reviews, test procedures and module debugging techniques during hardware testing of an electronic system.	*11*	*K3*	*CO2*
25.	a)	Model software development life cycle concepts in designing an embedded real-time monitoring system.	*11*	*K3*	*CO3*
		OR			
	b)	Apply software metrics and failure prevention methods in embedded software applications.	*11*	*K3*	*CO3*
26.	a)	Inspect a PCB layout with suitable routing topology and grounding methods to minimize noise effects.	*11*	*K4*	*CO4*
		OR			
	b)	Examine the importance of layer stack-up assignment, guard band implementation and ESD protection in PCB design.	*11*	*K4*	*CO4*
27.	a)	Analyze debugging procedures and component inspection techniques for testing analog and digital electronic modules.	*11*	*K4*	*CO5*
		OR			
	b)	Examine the role of simulation, prototyping and EMI/EMC considerations in product debugging and testing.	*11*	*K4*	*CO5*
28.	a)	Apply validation and verification procedures during electronic product development with a suitable example.	*11*	*K3*	*CO6*
		OR			
	b)	Develop a reliable embedded electronic product for industrial applications using appropriate design procedures.	*11*	*K3*	*CO6*