Subject Code: G0406/R13

M. Tech –I Semester Regular/ Supply Examinations, February, 2016
MECHATRONICS
(Common to AM&MSD, CAD/CAM and AMS)

Time: 3 Hours   **Max Marks: 60**

Answer any FIVE questions
All questions carry EQUAL marks
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1. a) What do you mean by Mechatronics? What are the components of Mechatronic system? Explain their role.
    b) What are the advantages and disadvantages of mechatronic systems?

2. a) What is a Measurement System? Explain the Principle and operation of Optical Encoders.
    b) Explain the working of any one temperature measuring sensor that is used in a mechatronic system.

3. a) Differentiate among Hydraulic Pneumatic and Electrical actuation systems.
    b) Explain the working of an Electro -Hydraulic actuation system with a neat sketch.

4. a) What is an Op-amp? State the applications of Op-amp.
    b) Explain briefly the Summing and difference amplifiers.

5. a) What is the basic structure of PLC? Explain.
    b) Draw the generalized block diagram of a Microcontroller and explain function of each component .

6. What do you understand by the terms System and Interfacing and data acquisition? Explain with suitable example.

7. With the help of neat sketches Explain BJT, FET and TRIAC.

8. Write Brief note on:
      a)   Stepper Motors.
      b)   Analog to Digital Conversion

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Subject Code: G0505/R13

M. Tech –I Semester Regular/ Supply Examinations, February, 2016
SOFTWARE ENGINEERING
(Computer Science & Engineering)

Time: 3 Hours   Max Marks: 60

Answer any FIVE questions
All questions carry EQUAL marks
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1. a) Explain about the software evolution.
    b) Software is developed or engineered; it is not manufactured in the classical sense. Justify the statement.

2. a) Discuss about the relational unified process.
    b) What is prototyping? Discuss about prototyping model.

3. a) Differentiate between known risks and predictable risks.
    b) Write short notes on risk management.

4. a) What is the importance of software architecture? Discuss.
    b) Discuss about the evaluation of architecture.

5. Explain different design concepts in software engineering.

6. a) Explain the terms code inspection and unit testing.
    b) How coding is developed? Explain.

7. Explain about different testings in software engineering.

8. Explain about the following terms
    a) Software problems
    b) Project monitoring plan
    c) Effort estimation

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Subject Code: G0509/R13

M. Tech –I Semester Regular/ Supply Examinations, February, 2016
DATA COMMUNICATIONS AND COMPUTER NETWORKS
(Computer Science)

Time: 3 Hours   Max Marks: 60

Answer any FIVE questions
All questions carry EQUAL marks
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1	a	Explain about Broad band ISDN	6
	b	Explain the protocol using GO Back N.	6
2	a	Explain the Error Correcting Codes	6
	b	Explain the ATM Reference Model	6
3	a	Explain the wave length Division Access Protocol	6
	b	Explain the Carrier Sense Multiple Access Protocol.	6
4	a	Explain the Congestion Prevention Policies	6
	b	Explain about Load Shedding	6
5	a	Explain about the Exterior Gateway Protocol (BGP)	6
	b	Explain about Mobile IP.	6
6	a	Explain about the Transport layer Connection Release Protocol	6
	b	Explain the Crash Recovery	6
7	a	Explain RPC in DCE	6
	b	Explain the RSA Cryptographic algorithm	6
8		Explain the following	4
		a. Domain Name Service	4
		b. MIME	4
		c. HTTP	

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Subject Code: G1509/R13

M. Tech –I Semester Regular/ Supply Examinations, February, 2016
NON DESTRUCTIVE EVALUATION
(Common to MD and MED)

Time: 3 Hours   Max Marks: 60

Answer any FIVE questions
All questions carry EQUAL marks
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1. a. Describe various visual Inspection methods and tools used for non destructive testing.
   b. What are the magnetization techniques used in MPI?

2. a. Explain the steps involved in eddy current measurement with the aids of conceptual sketch. Mention its application.
   b. List any four applications of thermography.

3. a. What are the different sources of radiation used in radiographic inspection method?
   b. Write short notes on Radiation Hazards and safety measures?

4. Compare and contrast:
   a. Normal and angle beam pulse echo testing
   b. A-Scan and C-Scan diasplays.

5. Explain inspection procedure adopted for inspecting a drive shaft using ultrasonic transducer. Also discuss the interpretation of data obtained during the inspection.

6. What are the different types of sources used in RT method and what are the safety precautions required in RT?

7. a. Explain the principle and procedure followed in In-situ metallography.
   b. Explain about visual inspection method and optical holographic method.

8. Select a suitable Non contact – Non Destructive testing method for the inspection of Space Shuttle leading edge and explain about that method.

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Subject Code: G2109/R13

M. Tech –I Semester Regular/ Supply Examinations, February, 2016
ADVANCED I.C.ENGINES
(Thermal Engineering)

Time: 3 Hours   Max Marks: 60

Answer any FIVE questions
All questions carry EQUAL marks
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1. A single cylinder vertical atmospheric engine with a 1.2 m bore and a piston of 2700kg mass is used to lift a weight. Pressure in the cylinder after combustion and cooling is 22 kPa, while ambient pressure is 98 kPa. Assume piston motion id friction less.Calculate: a) Mass which can be lifted if the vacuum is at the top of the cylinder and the piston moves up (kg).b) Mass which can be lifted if the vacuum is at the bottom of the cylinder and the piston moves down (kg).

2. An in-line, straight 8, four-stroke cycle SI engine has throttle body fuel injection using two injectors. Each injector supplies fuel for four of the cylinders. The firing order of the engine is 1-3-7-5-8-6-2-4. Design an intake manifold for this engine with consideration to maintaining consistent AF to each cylinder and overall engine cycle smoothness.

3 a) Small high-swirl direct-injection CI engines have fuel conversion efficiencies which are about 10 percent higher than values typical of equivalent indirect-injection engines. What combustion-system related differences contribute to this higher efficiency?
  b) Discuss the importance of supercharging and turbocharging with P-v and T-s diagrams?

4. a) List five reasons why there are HC emissions in the exhaust of an automobile?
   b) Why is it good to place a catalytic converter as close to the engine as possible? Why is this bad?

5. a) Explain how you would estimate the thermal boundary-layer thickness on the combustion chamber wall of an internal combustion engine.?
   b) Discuss the various parameters which affect the engine heat transfer?

6. Explain why the brake mean effective pressure of a naturally aspirated diesel engine is lower than that of a naturally aspirated spark-ignition engine. Explain why the bmep is lower at the maximum rated power for a given engine than the bmep at the maximum torque.

7. Four-stroke cycle engines, the inlet and exhaust valve opening and closing crank angles are typically: IVO 15^0 BTC; IVC 50^0 ABC; EVO 55^0 BBC; EVC 10^0 ATC. Explain why these valve timings improve engine breathing relative to valve opening and closing at the beginnings and ends of the intake and exhaust strokes. Are there additional design issues that are important?

Subject Code: G2109/R13

8. Design a fuel delivery system for a flexible-fuel automobile engine. The engine should be able to use any mixture combination of gasoline, ethanol, and/or methanol. Tell how engine variables will change for various fuel combinations (e.g., ignition timing, fuel, injection, etc). State all assumptions you make?

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Subject Code: G2207/R13

M. Tech –I Semester Regular/ Supply Examinations, February, 2016
GIS FOR TRANSPORTATION
(Transportation Engineering)

Time: 3 Hours   Max Marks: 60

Answer any FIVE questions
All questions carry EQUAL marks
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1. (a) Write the basic components of GIS with subsystems
   (b) State how GIS is useful in decision making?

2. (a) What are the various forms of remotely collected data? Briefly describe data acquisition and its interpretation.
   (b) Define the terms: Pattern Recognition, Range Resolution, Relief and Re-sampling.

3. (a) Write an overview on Spatial data manipulation and its analysis on GIS platform?
   (b) Explain the visual analysis methods of GIS

4. (a) Explain the details of vector data storage and attribute data storage systems
   (b) Explain the computational analysis methods of GIS

5. (a) Write an overview non-spatial attribute data and its integration output formatting.
   (b) Explain how system justification and development of an implantation plan is carried out by using GIS tool?

6. (a) Write the GIS applications in environment impact assessment.
   (b) Explain how the GIS used as tool for Highway alignment.

7. (a) Describe how road network planning in a region is carried out by using GIS.
   (b) Describe how GIS can be used as a tool for accident investigation in an urban area.

8. (a) Describe how topography mapping is carried out with vectorised drainage features?
   (b) Write short note on types of sensors used for the remote sensing data acquisition?

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Subject Code: G2208/R13

M. Tech –I Semester Regular/ Supply Examinations, February, 2016
PAVEMENT MANAGEMENT SYSTEMS
(Transportation Engineering)

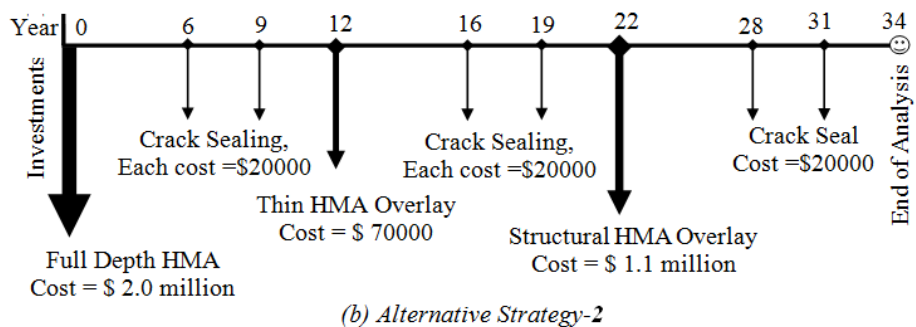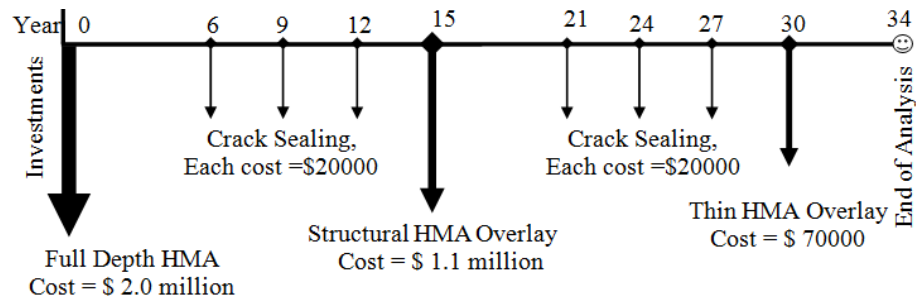Time: 3 Hours   Max Marks: 60

Answer any FIVE questions
All questions carry EQUAL marks
***

1. (a) State the purpose of pavement evaluation surveys. Describe the significance of pavement evaluation for better maintenance of highway facilities?
   (b) State the significance of sampling interval and frequency of sampling adopted for measuring various parameters of pavement used for functional evaluation of pavements? Write a few widely adopted guidelines of each?

2. (a) Describe guidelines on present serviceability ratings with reference to typical description of pavement surface characteristics/distress?
   (b) State different types of functional evaluations and explain them briefly?

3. (a) Show, with the help of a classification diagram, how roughness measuring equipment can be categorized under contact type or non-contact type.
   (b) Draw a sketch showing quarter car model and state what the golden car parameters are.

4. (a) State the categories of object functions with their criterion used for determination of optimal strategy of Maintenance &Rehabilitation (M & R) of PMS? Also state the general constraints and different types of optimization algorithms used for determination of optimal M & R strategy, at network level?
   (b) Classify the factors considered for priority ranking of maintenance of pavement projects based on structural, functional and safety aspects?

5. (a) Explain various expert systems used for pavement evaluation and rehabilitation?
   (b) State the importance of Analysis of Data by different methods? How the methods of analysis of data should be interpreted with different practices of PMS?

6. (a) Write the typical classification of decision trees based on category of distress? Draw a typical sketch showing feasible treatment options based on Pavement Condition Index (PCI) rating?
   (b) Calculate the value of residual service life for the following conditions:
   Cost of structural HMA overlay laid (as the last activity) on the existing PCC pavement = Rs.50 million Expected Service Life of the Structural Hot Mix Asphalt overlay = 7 years
   Number of years served since this last activity of maintenance = 5 years

Subject Code: G2208/R13

7. (a) What are the applications and used of pavement performance models used in PMS? Classify the deterioration models based on their approach of modeling?

(b) Draw a typical process of flow chart describing decision tree of PMS which are used for determination of cost and cost-effectiveness of candidate treatments?

8. Following is sample of a proposed plan with two alternative treatments spread over an analysis period of 34 years. Details of proposed best suitable treatments with their costs of construction and their time of activities are shown for the each Alternative, below. Take the value of discount rate as 5.0 % and consider inflation rate as 1.0 % per year, on all the costs of maintenance. Determine the best alternative strategy by conducting Life Cycle Cost Analysis based on Net Present Value?

(a) Alternative Strategy-1

(b) Alternative Strategy-2

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Subject Code: G4305/R13

M. Tech –I Semester Regular/ Supply Examinations, February, 2016
POWER QUALITY
(Common to PE, P&ID, PE&ED, PE&D, EM&D and PE&PS)

Time: 3 Hours   Max Marks: 60

Answer any FIVE questions
All questions carry EQUAL marks
****

1. (a) Explain characteristics of power quality events in short and long duration voltage variations.
   (b) Discuss in detail about transients with respect to power quality.

2. Explain the following:
   a)   Voltage Unbalance
   b)   Waveform Distortion
   c)   Voltage fluctuation
   d)   Power Frequency Variations

3. (a) What are the main sources of transient over voltages. Explain the capacitor switching transient over voltages in detail.
   (b) Discuss the principles of over voltage protection of load equipment.

4. Explain various devices used for the protection of equipment from the over voltages due to transients.

5. (a) Explain the following harmonic indices in detail:
   (i)   Total Harmonic Distortion
   (ii)   Total Demand Distortion
   (b) Write a short note on power system quantities under non-sinusoidal conditions.

6. (a) What is the need of locating harmonic sources? Explain the power system response characteristics under the presence of harmonics.
   (b) Discuss the impact of harmonic distortion on transformers and capacitors.

7. (a) Explain how the utility voltage is regulated with distributed resources.
   (b) Discuss about various devices used for voltage regulation in long duration voltage variation.

8. (a) What are the problems that are noticed when the DG is interfaced to the utility system. Discuss the impact of DG interface to utility system.
   (b) Explain the power quality issues when the DG is integrated to utility system.

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Subject Code: G5503/R13

M. Tech –I Semester Regular/ Supply Examinations, February, 2016
EMBEDDED COMPUTING
(Embedded Systems)

Time: 3 Hours   **Max Marks: 60**

Answer any FIVE questions
All questions carry EQUAL marks
****

1. a) Define Scheduling and explain different Scheduling algorithms in detail   [6+6]
    b) List out the different File system used in Linux and explain the Root file system in detail

2. a) Explain the concepts of Semaphore and Message Queue with examples   [6+6]
    b) Draw the processes state diagram and explain the operation of it

3. a) what are the different software development tools used in a Linux and explain any one tool in detail   [6+6]
    b) Define compiler and explain the compiler options in detail

4. Draw the interfacing diagram GPS and GSM module and explain the operation of data processing in detail   [12]

5. a) Explain the operation of Audio signal processing along with circuit diagram   [6+6]
    b) Write short notes on Open CV machine vision concept in detail

6. a) Draw the TCP/IP reference model block diagram and explain its operation in detail
    b) Writs sort notes on UDP protocol in detail   [6+6]

7. a) Define Interrupt? Explain how to interrupt handle in Intel architecture (IA-32) [6+6]
    b) Define Assembler directive and explain different Assembler directives used in IA32

8. Writs short notes on following terms in detail   [4X3=12]
    a) Debugging tools
    b)   Bluetooth
    c)   Interrupt Latency

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Subject Code: G5613/R13

M. Tech –I Semester Regular/ Supply Examinations, February, 2016
PROGRAMMABLE LOGIC CONTROLLERS AND APPLICATIONS
(Common to PS, PSC&A, EPE, EPS, and APS)

Time: 3 Hours   Max Marks: 60

Answer any FIVE questions
All questions carry EQUAL marks
****

1. (a) Describe the significance of CPU processor.
    (b) Explain briefly about I/O modules.

2. Explain the programming examples in PLC programming using contacts and coils?

3. What are the input instructions in PLC programming and also explain the outputs in PLC programming?

4. Explain the following
    (a) Digital logic gates
    (b) Module addressing

5. (a) Discuss about the Timerfunctions and Industrial applications in PLC.
    (b) Explain the arithmetic functions with examples.

6. Explain about counters and counter functions industrial applications?

7. (a) Explain the different data handling functions and their applications?
    (b) Mention the applications of Matrix functions and sequence functions?

8. (a) Give the comparison Analog signalprocessing and multi bit data processing?
    (b) Explain the importance of PID tuning?

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Subject Code: G8707/R13

M. Tech –I Semester Regular/ Supply Examinations, February, 2016
REPAIR AND REHABILITATION OF STRUCTURES
(Common to SE and SD)

Time: 3 Hours   Max Marks: 60

Answer any FIVE questions
All questions carry EQUAL marks
****

1. a) Describe in detail about the repair aspect of maintenance?
    b) Explain the different materials used for repair and rehabilitation of a damaged structure?

2. a) Explain about stress reduction techniques?
    b) Explain about Column strengthening with example?

3. a) Explain about flexural strengthening with example?
    b) Explain about Shear Transfer strengthening?

4. a) Explain about Bonded installation techniques?
    b) Write in detail about externally bonded FRP?

5. a) Explain the applications of Fibre reinforced concrete?
    b) Explain the merits and demerits of Fibre reinforced concrete?

6. a) Explain the Properties of fly ash concrete in fresh state and hardened state?
    b) Write the properties and reaction mechanism of fly ash?

7. a) Explain about High performance concretes
    b) Explain the Development of high performance concretes in India?

8. Explain about strengthening of floor of structures in detail with some examples?

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Subject Code: G8709/R13

M. Tech –I Semester Regular/ Supply Examinations, February, 2016
PLASTIC ANALYSIS AND DESIGN
(Common to SE and SD)

Time: 3 Hours   **Max Marks: 60**

Answer any FIVE questions
All questions carry EQUAL marks
****

1. (a) Find the shape factor for a thin ring.
    (b) Determine the maximum plastic moment and shape factor for an equilateral triangle of side 20 cm. f_y=2500 kg/cm^2.

2. A simply supported beam of span l overhangs by a distance a. It is subjected to a *udl* of w per unit run. Find the critical value of a so that collapse occurs simultaneously in the cantilever portion and in the interior span. Compute the value of the load in terms of M_p and l.

3. A beam of length l has a moment capacity of M_P and is restrained at the ends by moments of M_P and m M_P at the left and right end respectively. The beam carries a *u.d.l.* of w per metre run. Compute the collapse load w_u for different values of m and tabulate the results.

4. A uniform continuous beam, of full plastic moment M_P rests on five simple supports A,B,C,D and E. Now AB = 6l, BC = CD = 8l, DE = 10l. Each span carries a concentrated load at its mid point, these loads being P on AB, P on BC, 1.4P on CD and 0.5 P on DE. Find the value of P which will just cause collapse.

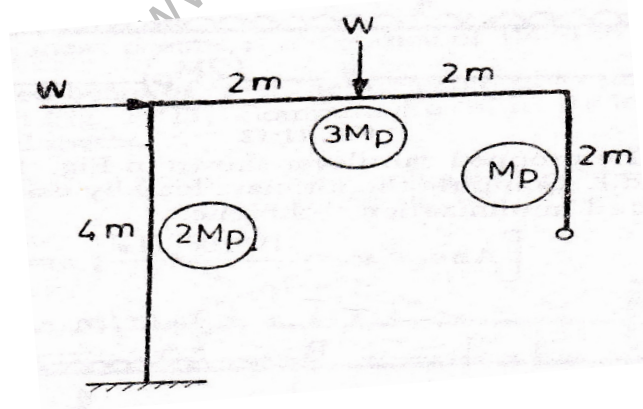5. Find the ultimate load of the structure shown in Fig.1. Draw BMD at collapse.

Fig.1

Subject Code: G8709 /R13

6. The two bay rigid frame shown in Fig.2 is fabricated from members of a uniform section having a shape factor of 1.15 and yield stress of 16 t/cm^2. Determine the required section modulus to provide a load factor against collapse of 1.75. Draw the BMD at collapse.
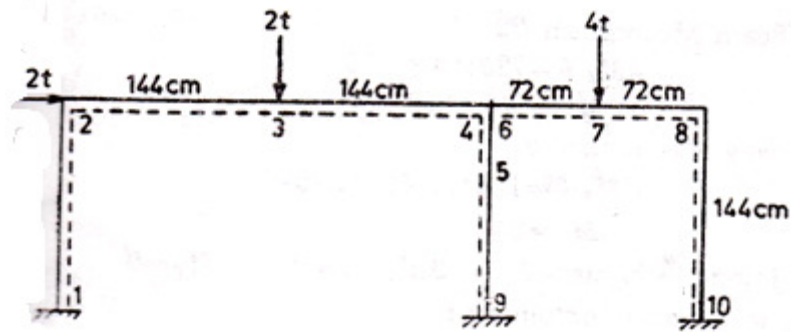

Fig.2

7. Find the deflection at ultimate load assuming the last hinge to form under the load for the structure shown in Fig.3. Use slope deflection and method of vertical work.
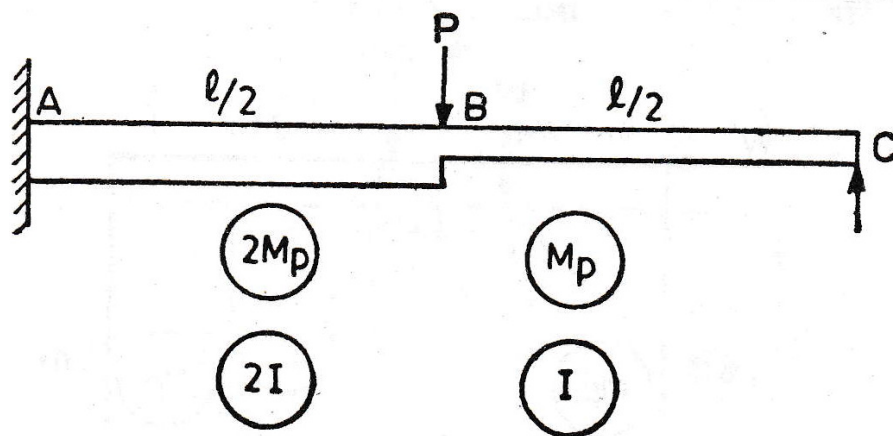

Fig.3

8. Briefly explain the Minimum weight design.

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Subject Code: C5806/R09

M. Tech –I Semester Supply Examinations, February, 2016
OBJECT ORIENTED PROGRAMMING
(Common to CSE, CS and CST)

Time: 3 Hours   Max Marks: 60

Answer any FIVE questions
All questions carry EQUAL marks
***

1. (a) What is object oriented programming? How is it different from Procedure oriented programming?
    (b) Discuss in detail about abstraction mechanisms.

2. Discuss about all scope and lifetime variables, arrays, operators and control statements in java?

3. (a) How do you construct a class from another class? Explain with an example.
    (b) Define polymorphism? What are the differences between method overriding and overloading a method.

4. (a) Write a program to illustrate packages.
    (b) Give an example where interface can be used to support multiple inheritance.

5. (a) Explain with the help of case situation, how to catch and handle different types of exceptions.
    (b) Define synchronization? Write a program to illustrate synchronization.

6. (a) Explain about the components of event delegation model.
    (b) Write a java program for mouse events.

7. (a) Define applet? What are the different types of applets? Explain life cycle of an applet?
    (b) Explain the steps involved in creating jCheckbox, jLable, jButton.

8. What is network socket? Briefly explain the reserved sockets?

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