Code No. 6442 / N / S

FACULTY OF ENGINEERING

B.E. 4/4 (M/P / AE) I – Semester (New) (Suppl.) Examination, July 2014

Subject: Design for Manufacture (Elective – I)

Time: 3 Hours **Max.Marks: 75**

Note: Answer all questions from Part A. Answer any five questions from Part B.

PART – A (25 Marks)

1	What is 'strength' in relation to mechanical properties?	2
2	What are the applications of plastics?	2
3	What is a section bend – sketch it.	2
4	What is the basic principle in ECM – sketch and explain.	3
5	Differentiate between Brazing and soldering.	2
6	What is automation?	2
7	What are composites? What are their advantages?	3
8	Discuss about group technology in industry.	3
9	What is importance of tolerances? Explain by means of examples.	3
10	Explain the differences between stamping, blanking and piercing.	3

PART – B (50 Marks)

11	a)	What are the advantages in applying DFM during product design.	5
	b)	What are the general requirements considered for selection of proper material and process?	5
12	a)	Explain applications of HOT rolled steel, brass, aluminium, rubber and composites.	5
	b)	What is electro forming – Explain.	5
13	a)	List out design modifications for rolled parts and formed parts.	5
	b)	What are various operations that can be performed on a milling machine? Explain.	5
14	a)	Explain about centerless grinding and internal grinding and parts produced by the same operations.	5
	b)	What are the design considerations for investment cast parts?	5
15	a)	What is powder metallurgy? Explain how parts are made using powder metallurgy.	5
	b)	Explain about assembly methods and how DFM can be used to get faster assemblies and better assemblies.	5
16	a)	What is CAM? Explain about CNC programming methods (Conventional and Computer Assisted).	5
	b)	What is group technology? Explain its salient features, applications and advantages.	5

17 Write short notes on:

a) Geometric tolarencing b) Forming processes

c) Ceramic and their applications

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Code No. 6213 / O / S

FACULTY OF ENGINEERING

B.E. 4/4 (M/P/AE) I – Semester (Old) Examination, July 2014

Subject : Computational Fluid Flows (Elective - I)

Time : 3 hours **Max. Marks : 75**

Note:Answer all questions from Part - A. Answer any FIVE questions from Part - B. Missing data, if any, may suitably be assumed.

PART – A (25 Marks)

1 Differentiate steady and unsteady flows. (2)
2 Write the differential equation for heat conduction. (2)
3 What is turbulent flow? List any two turbulence models. (3)
4 Define boundary conditions and initial conditions. (3)
5 Write the Taylor series expansion for u_{i+1} and u_{i+2}. (2)
6 Define the terms stability and consistency and convergence. (3)
7 Differentiate structured and unstructured grids. (3)
8 Differentiate Jacobi and Gauss Seidel methods. (2)
9 Write the merits of finite volume method. (2)
10 Explain staggered grid with neat sketch. (3)

PART – B (50 Marks)

11 Derive continuity equation for 3-Dimensional, unsteady, compressible flows.

12 Write the characteristics of elliptic and parabolic partial differential equations.

13 Derive the condition of stability for Euler's implicit equation using Von-Neumann stability analysis.

$$u_i^{n+1} - u_i^n = \frac{\alpha \Delta t}{\Delta x^2}\left[u_{i+1}^{n+1} - 2u_i^{n+1} + u_{i-1}^{n+1}\right]$$

14 Write vorticity transport equations and boundary conditions for the nodes of LID driven cavity of 4 x 4 grid.

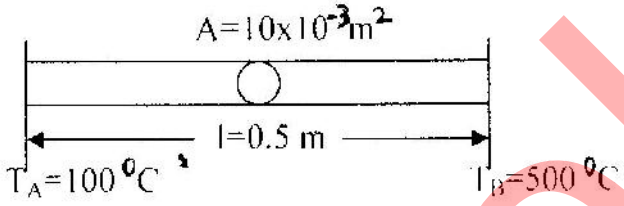
15 Formulate the solution matrix for the one dimensional domain with given boundary condition using finite difference method. The governing equation is

$$k\frac{\partial^2 T}{\partial^2 x} - Q = 0$$

..2

16 Two ends of an insulated rod are maintained at constant temperatures of 100^0C and 500^0C. Calculate steady state temperature distribution in the rod using FVM. Take five control volumes of δx = 0.1m. Thermal conductivity k = 1000 W/m/K. Area of cross section of rod is $10x10^{-3}m^2$. Use Gauss elimination method for solving the matrix. The governing equation is (10)

$$\frac{d}{dx}\left[k\frac{dT}{dx}\right]=0$$



17 Derive second order accurate, forward difference expression for second derivative of a function using Taylor's series method. (10)

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Code No. 6444 / N / S

FACULTY OF ENGINEERING

B.E. 4/4 (M/P / AE) I – Semester (New) (Suppl.) Examination, July 2014

Subject: Computational Fluid Flows (Elective – I)

Time: 3 Hours **Max.Marks: 75**

Note:
i) **Answer all questions from Part A. Answer any five questions from Part B.**
ii) **Answer to the questions of Part-A must be at one place and in the same order as they occur in the question.**
iii) **Missing data, if any, may suitably be assumed.**

PART – A (25 Marks)

1	List the basic equations satisfied by laminar fluid flow.	2
2	Write the Fourier equation for heat conduction.	2
3	Define laminar and turbulent flows.	2
4	Write the characteristics of elliptical partial differential equation.	3
5	Differentiate structured and unstructured grid.	2
6	Write Taylor series expansion for u_{i+1}, u_{i-1}, u_{i+2}.	3
7	Differentiate point Jacobi and Gauss Seidel numerical methods.	2
8	List the advantages of Finite Volume Method.	3
9	Explain staggered grid with neat sketch.	3
10	Differentiate implicit and explicit methods.	3

PART – B (50 Marks)

11 Considering a 2-D element, derive strain rate matrix $\in_{ij}$ in terms of velocity components u, v and w.

12 Derive the condition of stability for the following equation using Von-Neumann stability analysis

$$u_i^{n+1} - u_i^n = \frac{\alpha \Delta t}{\Delta x^2}\left[u_{i+1}^{n+1} - u_i^{n+1} + u_{i-1}^{n+1}\right]$$

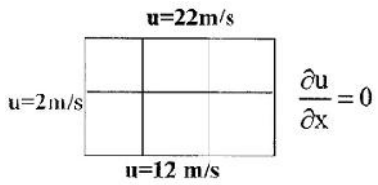
13 a) Explain the mapping layout of O-type grid and C-type grid.
b) Explain mesh smoothing and adaptive mesh generation in unstructured grid generation.

14 Using finite volume method, write the flux balance form of the following 1-D equation and explain how to apply Dirichlet and Newman boundary conditions.

$$kA\frac{d^2T}{dx^2} - hP(T - T_f) = 0$$

15 Find the velocity at all the nodes of the following rectangular domain ($\Delta x = \Delta y$) with given boundary conditions using finite difference method.

The governing equation is $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$.



16 Derive vorticity transport equation from 2-D Navier Stokes equations.

17 Write short notes on Parabolic and hyperbolic partial differential equations.

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Code No. 6212 / O / S

FACULTY OF ENGINEERING

B.E. 4/4 (M/P/AE) I – Semester (Old) (Suppl.) Examination, July 2014

Subject: Composite Materials (Elective – I)

Time: 3 Hours **Max.Marks: 75**

Note: Answer all questions from Part A. Answer any five questions from Part B.

PART – A (25 Marks)

1	Why fibers of thin diameter are preferred in composites.	3
2	Define and classify glass fibers.	2
3	Define a prepreg.	3
4	List various fabrication processes of composites.	2
5	Differentiate anisotropic, orthotropic and transversely isotropic material based on elastic constants.	3
6	Define minimum fiber volume fraction and critical fiber volume fraction.	2
7	Derive stress transformation matrix from local to global coordinates about an axis.	3
8	What do you mean by reduced stiffness?	2
9	Define fracture modes in composites.	3
10	Give an expression for Tsai-Wu failure criterion.	2

PART – B (50 Marks)

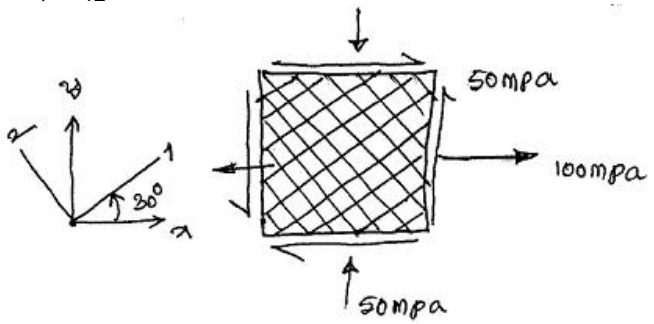
11 a) Differentiate between thermoset and thermo-plastic matrices. State advantages and disadvantages. 5

b) Discuss the method of production of glass-fibers. 5

12 Discuss Resin-transfer moulding with a neat sketch. 10

13 Derive an expression for major Poisson's ratio, ν_{12} of a UD lamina from mom approach. 10

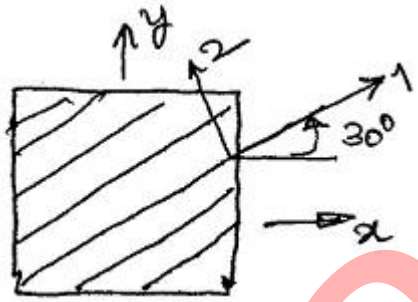
14 An element of a balanced orthotropic lamina is under the state of stress as shown the properties of the lamina are $E_1 = E_2 = 70$ GPa; $F_{1t} = F_{1c} = F_{2t} = F_{2c} = 560$ MPa; $\nu_{12} = \nu_{21} = 0.25$; $F_{12} = 25$ MPa, $G_{12} = 5$ GPa.



Using the max. strain criterion, determine whether or not the failure will occur. 10

…2.

15 Determine the transformed reduced stiffness and compliance matrices for a graphite epoxy lamina that has E_1 = 148 GPa; E_2 = 10.5 GPa; G_{12} = 5.61 GPa; ν_{12} = 0.3; θ = 30°. 10



16 Derive an expression for minimum fibre volume fraction and critical fiber volume fraction. 10

17 Discuss the following: 10

a) Inter-laminar shear stress

b) Truncated maximum strain criterion.

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Code No. 6443 / N / S

FACULTY OF ENGINEERING

B.E. 4/4 (M/P / AE) I – Semester (New) (Suppl.) Examination, July 2014

Subject: Composite Materials (Elective – I)

Time: 3 Hours **Max.Marks: 75**

Note: Answer all questions from Part A. Answer any five questions from Part B.

PART – A (25 Marks)

1 How composite materials are classified. 3

2 Differentiate between thermoset and thermo plastic matrices. 2

3 Differentiate between fibers and whiskers. 2

4 What is prepreg? 3

5 Determine the transverse modulus E_2 of a UD carbon/epoxy composite with the properties E_{2f} = 14.8 GPa; E_m = 3.45 GPa; v_m = 0.36, V_f = 0.65 using mom approach and Halpin-Tsai relationship with ξ=1. 3

6 Define micro-mechanics. 2

7 Calculate the Q bar matrix at 30^o and 45^o for a lamina whose Q matrix is given by

$$[Q] = \begin{bmatrix} 20 & 0.7 & 0 \\ 0.7 & 2 & 0 \\ 0 & 0 & 0.7 \end{bmatrix}$$ 3

8 Differentiate between balanced and cross ply laminates. 2

9 Discuss the fracture modes in composites. 3

10 Explain Tsai-Hill criterion. 2

PART – B (50 Marks)

11 Discuss the pultrusion technique in detail. 10

12 Write short notes on the following: 10

a) Aramid fibers
b) Silicon carbide fibers
c) Alumina based fibers

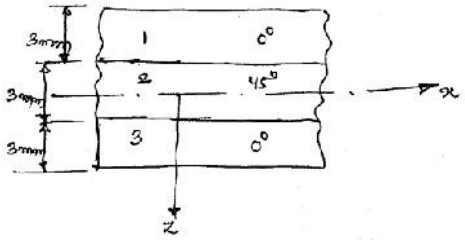
13 a) Derive an expression for in-plane shear modulus, G_{12} using mom approach. 7

b) Find G_{12} of a glass/epoxy with G_{fr} = 28.3 GPa; G_m = 1270 MPa; V_f = 0.55. 3

14 a) What is quasi-isotropic laminate. 3

b) For a three-ply laminate as shown in Fig obtain the A, B and D matrices if each lamina has same properties as $[Q] = \begin{bmatrix} 20 & 0.7 & 0 \\ 0.7 & 2.0 & 0 \\ 0 & 0 & 0.7 \end{bmatrix}$ GPa. 7

…2.



15 Longitudinal axis of an orthotropic lamina makes an angle of 45° with the x-axis it is subjected to the following stresses. σ_x = 20 MPa; σ_y = 0; τ_{xy} = 20 MPa using maximum work theory, predict the failure of the lamina with F_{1t} = 500 MPa; F_{2t} = 10 MPa; F_{2c} = 75 MPa; F_{1c} = 350 MPa; F_{12} = 35 MPa. 10

16 Write short notes on the following: 10
a) Requisites of matrix
b) Requisites of reinforcements
c) Functions of reinforcements.

17 Briefly describe the following: 10
a) UD fiber composites
b) Isotropic composites
c) Particulate composites.

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Code No. 6445 / N / S

FACULTY OF ENGINEERING

B.E. 4/4 (M/P / AE) I – Semester (New) (Suppl.) Examination, July 2014

Subject: Disaster Mitigation and Management (Elective – I)

Time: 3 Hours **Max.Marks: 75**

Note: Answer all questions from Part A. Answer any five questions from Part B.

PART – A (25 Marks)

1 What are the elements of risk in earthquake?
2 What are the causes for the Tsunami 2004 which inflicted heavy loss of life and property along the coast of Tamil Nadu?
3 Briefly discuss the disaster management cycle with suitable examples.
4 Explain how public awareness is helpful in risk reduction.
5 What are the goals and objectives of international strategy for disaster risk reduction?
6 What are the forecasting tools available for prediction of disasters?
7 What are the losses caused by major power breakdown?
8 What is the difference between occurrence of landslides and avalanches?
9 What is the role of disaster management network?
10 What are the landslide remediation practices?

PART – B (50 Marks)

11 a) Discuss the various types of natural and human made disasters. Highlight the specific efforts to mitigate disasters in India.
b) Write about IDNDR and explain the role of international agencies in post disaster reconstruction.

12 a) Explain the structural and non-structural measures in flood management.
b) Develop a framework for making infrastructure flood resilient with specific examples.

13 a) Present the guidelines for the seismic evaluation and strengthening of buildings.
b) What are the types, causes and impacts of droughts and desertification?

14 a) What are the different strategies to tackle traffic accidents from the perspective of engineering principles and management.
b) Discuss any two case studies of chemical industrial disasters and its impact on the environment.

15 Explain the capabilities of remote sensing and GIS in disaster mitigation and management with suitable examples and case studies.

16 a) "Risk gets reduced through disaster prevention". Elaborate with reference to major natural disasters.
b) Explain the significance of planning in vulnerability reduction.

17 Write short notes on the following:
a) Early warning system for landslides
b) Regulation and enforcement as a part of disaster management
c) Important aspects of preparedness of meteorological and hydrological disasters.

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Code No. 6452 / S

FACULTY OF ENGINEERING

B.E. 4/4 (AE) I – Semester (Suppl.) Examination, July 2014

Subject: Vibrations and Noise Control (Elective – I)

Time: 3 Hours **Max.Marks: 75**

Note: Answer all questions from Part A. Answer any five questions from Part B.

PART – A (10 x 2.5 = 25 Marks)

1 Explain free vibration and force vibration.
2 Explain the types of damping.
3 List the methods of reducing engine noise (petrol engine).
4 Write short notes on traffic noise.
5 What do you understand by sound intensity?
6 What are the different types of analysis of noise?
7 Explain crank shaft.
8 Define tuned absorber.
9 What are the measurements of exterior vehicle noise?
10 Write short notes on sound transmission through barriers.

PART – B (50 Marks)

11 a) What is torsional vibration? How is it controlled by vibration damper? 5
b) Explain with neat sketch longitudinal vibration and transverse vibration. 5

12 a) Describe a microphone. 4
b) Explain overall noise from noise of different frequency bands. 6

13 Explain the following: 10
a) Engine radiated noise b) Intake and exhaust noise
c) Engine accessory contributed noise.

14 a) Explain vibration isolation and untuned absorbers. 5
b) Describe damping treatments and application dynamic forces generated by IC engines. 5

15 a) Explain with table noise of current diesel engines. 5
b) How to reduce noise of diesel engine and list out the methods of reducing engine noise. 5

16 Explain noise control principles. 10
a) Transmission noise b) Combustion noise c) Mechanical noise

17 a) Explain frequency, tracking and sound quality analysis. 5
b) What is sound meter? How it is measured? 5

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Code No. 6456 / S

FACULTY OF ENGINEERING

B.E. 4/4 (AE) I – Semester (Suppl.) Examination, July 2014

Subject: Control Systems Theory (Elective – I)

Time: 3 Hours **Max.Marks: 75**

Note: Answer all questions from Part A. Answer any five questions from Part B.

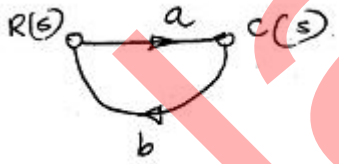
PART – A (25 Marks)

1 Define linear time-invariant control systems. 2

2 What is the effect of feed-back in control systems? 3

3 State the topologies available in block diagrams. 2

4 Obtain the transfer function of the following SFG. 3



5 The characteristic equation of a system is $S^3 + 4S^2 + 3S + 2 = 0$, investigate the stability using Routh-Hurwitz criterion. 3

6 The unit impulse response of a unity feedback system is given by $C(t) = 1 - te^{-t} + 2e^{-2t}$ for $t > 0$. What is the transfer function? 2

7 What is the significance of linearization? 3

8 Define gain and phase margins. 2

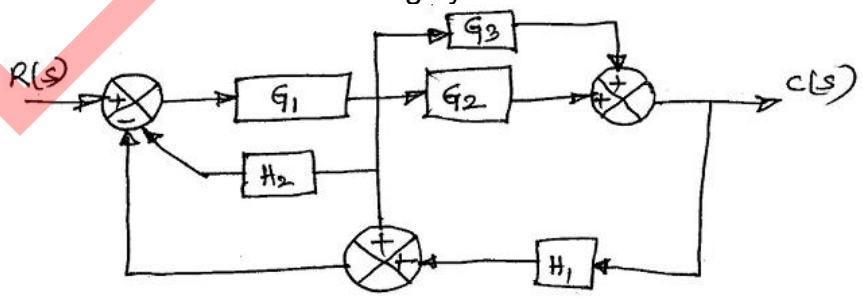
9 State the properties of SJM. 3

10 Define observability and controllability. 2

PART – B (50 Marks)

11 Obtain the state model of a field controlled D.C servomotor. 10

12 Find the transfer function of the following system. 10



13 Sketch the polar plot for $G(S) = \frac{K}{S(S+1)(S+2)}$, and for what value of 'K' it is stable. 10

14 a) Why lag network and lead network are called compensating networks. 5

b) Write the advantages of PID controllers and their applications. 5

…2.

15 The state space representation of a system is given by $\dot{X} = \begin{bmatrix} -5 & 1 \\ -6 & 0 \end{bmatrix} x$ find the value of $x_1(t)$ at t = 1, if $x_1(0) = 1.0$ and $x_2(0) = 0$.

16 Sketch the negquist plot for the transfer function $G(S)H(S) = \frac{S2}{(S+2)(S^2+2S+5)}$ discuss its stability. 10

17 Define the following: 10
a) Stable system
b) Conditionally stable system
c) Critically stable system

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Code No. 6457 / S

FACULTY OF ENGINEERING

B.E. 4/4 (AE) I-Semester (Suppl.) Examination, July 2014

Subject : Production and Operations Management (Electives - I)

Time : 3 Hours **Max. Marks: 75**

Note: Answer all questions of Part - A and answer any five questions from Part-B.

PART – A (25 Marks)

1 Distinguish between product layout and process layout.
2 Define work study and mention its importance.
3 Explain work sampling.
4 Briefly describe Delphi technique.
5 Compare between single moving average and weighted moving average method.
6 Distinguish between MRP-I and MRP-II.
7 Distinguish between fixed order quantity systems and periodic review system.
8 Define the terms total float and free float.
9 Differentiate between dependent and independent demand.
10 List various wage plans.

PART – B (50 Marks)

11 (a) Explain factors affecting plant location. (5)
(b) Explain the method to find standard time. (5)

12 (a) Derive the EOQ formula. state the assumptions and limitations in this formula. (6)
(b) Explain the MRP system inputs and outputs. (4)

13 (a) What is time series analysis? What are the components of time series? (4)
(b) The demand for the particular product is given for the last 8 periods. Compute the exponentially smoothed forecast for the periods taking h=0.1 and 0.3. Which of these forecast is better. (6)

Period	1	2	3	4	5	6	7	8
Demand	10	18	29	15	30	12	16	8

14 (a) Discuss various types of sales promotion methods. (5)
(b) What are the various elements of cost? Explain how the selling price of a product is established. (5)

15 Draw the network diagram for the following project data. Find out the minimum time required to complete the project. Identify critical path. (10)

Activity	A	B	C	D	E	F	G	H	I	J	K
Precedence activity	-	-	-	B	C	A	D,E	D,E	F,G	H	I,J
Duration (months)	8	5	13	12	6	6	7	9	8	2	6

16 (a) Explain objectives and strategies in aggregate planning. (5)
(b) Explain master production scheduling. (5)

17 Write short notes on the following: (5 + 5)
(a) Simple regression and multiple regression (b) Job, shop, batch production systems

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Code No. 6415 / N / S

FACULTY OF ENGINEERING

B.E. 4/4 (EEE/Inst./AE) I – Semester (New) (Supplementary) Examination, July 2014

Subject : Information Security (Elective – I)

Time : 3 hours **Max. Marks : 75**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1	Differentiate the terms information security.and computer security.	2
2	What is a worm?	3
3	Mention the different types of Laws.	2
4	Define risk appetite.	2
5	Categorize the firewalls by their structure.	3
6	List the components of enterprise ISP.	3
7	Distinguish between symmetric and asymmetric encryption.	2
8	State the purpose of access control devices.	2
9	Justify the need for internal control strategies.	3
10	Write about Bull's-Eye model.	3

PART – B (50 Marks)

11 Describe the process of selecting risk control strategy.

12 a) Discuss about any five critical characteristics of information.
b) Write about Sec SDLC.

13 Explain in detail about the incident response planning.

14 Discuss about digital forensics.

15 a) Write about the importance of VPN.
b) Discuss about the different kinds of attack on crypto systems.

16 a) Write about any five kinds of attacks.
b) List the Ten Commandments of Computer Ethics.

17 a) How do you measure the effectiveness of IDPSs.
b) Discuss different types of IDPS.

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