

**FACULTY OF ENGINEERING**

B.E. 4/4 (Civil) I-Semester (Main &amp; Backlog) Examination, Nov./Dec. 2016

Subject: Pre-Stressed Concrete (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 the basic concept of pre-stressed concrete? 2
- 2 What is the need for estimating losses of pre-stress? 3
- 3 What is eccentric tendon? Explain. 3
- 4 Explain concept of load balancing. 2
- 5 Give the IS-specifications for the design of shear reinforcements in PSC members. 3
- 6 Explain how do you consider shear and principal stress to torsion in PSC members. 3
- 7 Define Mohr's theorems. 3
- 8 How do you identify short term deflection and long term deflection? 2
- 9 Define end block. 2
- 10 Give any two advantages of continuous beams. 2

**PART – B (50 Marks)**

- 11 Discuss in detail methods of pretensioning and post tensioning with suitable sketches. 10
- 12 A pre-stressed concrete beam supports a live load of 4 kN/m over a simply supported span of 8m. The beam has an I-section with an overall depth of 400 mm. The thickness of the flange and web are 60 and 80 mm respectively. The width of flange is 200 mm. The beam is to be pre-stressed by an effective pre-stressing force of 235 kN at a suitable eccentricity such that the resultant stress at the soffit of the beam at centre of the span is zero.
  - i) Find the eccentricity required for the force
  - ii) If the tendon is concentric, what would be the magnitude of the pre-stressing force for the resultant to be zero at the bottom fibre of the central span section. 10
- 13 A double T-section having a flange 1200 mm wide and 150mm thick is pre-stressed by 4700 mm<sup>2</sup> of a high tensile steel located at an effective depth of 1600 mm. The ribs have a thickness of 150 mm each. If the cube strength of concrete is 40 N/mm<sup>2</sup> and tensile strength of steel is 1600 N/mm<sup>2</sup>, determine flexural strength of the double T-girder using IS : 1343 provisions. 10
- 14 A concrete beam of rectangular section, 200 mm wide and 600 mm deep, is pre-stressed by a parabolic cable located at an eccentricity of 100 mm at mid span and zero at the supports. If the beam has a span of 10 m and carries a uniformly distributed live load of 4 kN/m, find the effective force necessary in the cable for zero shear stress at the support section. For this condition calculate, the principal stresses. The density of concrete is 24 kN/m<sup>3</sup>. 10

- 15 A pre-stressed beam of rectangular section, 100 mm wide and 200 mm deep, has a straight duct 25 mm by 40 mm with its centre located at 50 mm from the soffit of the beam which is pre-stressed by 12 wires of 7mm diameter stressed at  $600 \text{ N/mm}^2$ . The beam supports an imposed load of 4 kN/m over a span of 6m. The modulus of elasticity of concrete is  $38 \text{ kN/mm}^2$ . Estimate the central deflection of the beam under the action of pre-stress, self weight and live load.
- i) based on net section (beam ungranted) ; and
  - ii) based on transformed section (beam granted).
- 10
- 16 Write the stepwise procedure for the design of end block by Guyon's method. 10
- 17 A continuous concrete beam ABC (ABC = BC = 10m) has a uniform rectangular cross-section, 100 mm wide and 300 mm deep. A cable carrying an effective pre-stressing force of 360 kN varies linearly with an eccentricity of 50 mm towards the soffit at the end supports to 50 mm towards the top of beam at mid support B.
- i) Determine the resultant moment at 'B' due to pre-stressing only.
  - ii) If the eccentricity of the cable at 'B' is +25mm, show that the cable is concordant.
- 10

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**FACULTY OF ENGINEERING****B.E. 4/4 (Civil) I – Semester (Main) Examination, November / December 2016****Subject: Geographical Information Systems  
(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 a map? Explain the various components of a map.   | 3 |
| 2  | Briefly describe the features preserved in different types of projections and mention the area and / or country best represented by it. | 3 |
| 3  | Briefly describe the use of GIS in soil and water resources.  | 2 |
| 4  | How is existing digital data incorporated into GIS?   | 2 |
| 5  | How is data organized for analysis in GIS?  | 3 |
| 6  | What is a data structure and how is it implemented in a GIS?  | 2 |
| 7  | What are the sources of existing digital data?  | 2 |
| 8  | What are connectivity functions and what are their applications in GIS?   | 3 |
| 9  | Describe the various types of output from GIS software.   | 3 |
| 10 | Describe the characteristics of electromagnetic radiation.  | 2 |

**PART – B (5x10 = 50 Marks)**

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|----|--|---|
| 11 | a) Describe the applications of GIS in agriculture.  | 5 |
|    | b) What is a map projection? Explain the basic families of map projections with the help of a diagram.               | 5 |
| 12 | a) Describe the process of manual digitization using a digitizing tablet.  | 5 |
|    | b) Describe the different types of scanners used to scan maps.   | 5 |
| 13 | a) What is the role of remotely sensed data in GIS.  | 5 |
|    | b) Explain why is modeling done in GIS rather than an experimental study.  | 5 |
| 14 | a) What is record overlay? Explain with the help of an example.  | 5 |
|    | b) Explain cost and path analysis in GIS with the help of an example.  | 5 |
| 15 | a) Briefly describe the editing and query functions in GIS.  | 5 |
|    | b) Describe in detail about knowledge based systems.   | 5 |
| 16 | a) What are connectivity functions and what are their applications in GIS.   | 5 |
|    | b) Define error and describe the various types of errors in GIS along with recommendations to overcome these errors. | 5 |
| 17 | a) Describe the application of GIS in environmental modeling.  | 5 |
|    | b) What are the various types of sensors used in remote sensing?   | 5 |

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**FACULTY OF ENGINEERING****B.E. 4/4 (Civil) I-Semester (Main & Backlog) Examination, Nov./ Dec 2016****Subject : Entrepreneurship (Common to All Except ECE/AE/CSE) (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 Entrepreneurship.                     | 2 |
| 2 Define sole proprietorship form of business. | 3 |
| 3 Define Personality.                          | 2 |
| 4 Define Entrepreneurial motivation.           | 2 |
| 5 What are the sources of ideas?               | 3 |
| 6 Define network analysis.                     | 2 |
| 7 Define time estimates of network.            | 3 |
| 8 What is magic approach in Time Management?   | 3 |
| 9 Define SSIS.                                 | 2 |
| 10 Define joint stock company.                 | 3 |

**PART – B (50 Marks)**

- |  |    |
|--|----|
| 11 a) What are the characteristics of an entrepreneur?                                 | 5  |
| b) What are the objectives of SSIS?  | 5  |
| 12 a) Define project formulation and explain different stages.                         | 5  |
| b) Explain profitability analysis in project formulation.                              | 5  |
| 13 a) How do you identify the Market Demand for project formulation?                   | 5  |
| b) List out the differences between CPM and PERT.                                      | 5  |
| 14 a) Explain motivational theories of Maslow's and Mclelland.                         | 5  |
| b) Explain briefly the sources of project financing in India.                          | 5  |
| 15 Enumerate the behavioural aspects of entrepreneurs. What is time management matrix? | 10 |
| 16 Draw Network diagram. Determine critical path calculate Es, Ef, Ls, Lf and float.   | 10 |

Event	1-2	2-3	3-4	1-3	2-4
Duration	4	0	7	3	6

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|--|----|
| 17 Write short notes on any three of the following : | 10 |
| a) Tax Holiday                                       |    |
| b) Women Entrepreneurship                            |    |
| c) Leadership concepts                               |    |
| d) Choice of Technology                              |    |
| e) Project characteristics                           |    |

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**FACULTY OF ENGINEERING****B.E. 4/4 (EEE) I - Semester (Main) Examination, November / December 2016****Subject : HVDC Transmission (Elective-I)****Time : 3 Hours****Max. Marks: 75****Note: Answer all questions from Part-A and answer any five questions from Part-B.****PART – A (25 Marks)**

- 1 What are the main applications of HVDC transmission? (2)
- 2 What are different kinds of HVDC links? (2)
- 3 Draw the equivalent circuit of an inverter in HVDC. (2)
- 4 What is a GREATZ circuit and what are the factors that favour it? (3)
- 5 What controls are provided at the rectifier and inverter stations ? (2)
- 6 Why do you need to maintain minimum ignition angle and minimum extinction angle in the rectifier and inverter respectively? (3)
- 7 What are the functions of a smoothing reactor? (3)
- 8 What are different converter harmonics? (3)
- 9 What are the applications of MTDC systems? (2)
- 10 Draw a neat diagram of a series bipolar MTDC and explain how power is controlled. (3)

**PART – B (50 Marks)**

- 11 (a) Discuss the different factors that favour DC transmission. (5)  
(b) Draw the homopolar HVDC link and mention its advantages and disadvantages over other types of links. (5)
- 12 (a) Sketch the output voltage of a three-phase bridge converter with overlap. Assume 3/2 thyristor conduction mode. (5)  
(b) Derive expressions for output voltage and output current for overlap angle less than  $60^\circ$ . (5)
- 13 (a) Explain with necessary sketches how power is controlled in an HVDC line. (5)  
(b) Explain with  $V_d$  versus  $I_d$  characteristics how power is reversed in a HVDC line. (5)
- 14 (a) Draw the circuits of single and double tuned harmonic filters and show their characteristics. (5)  
(b) Explain the causes of over voltages on the DC line. (5)
- 15 (a) What are the comparative merits of series and parallel MTDC systems? (5)  
(b) Explain with a neat diagram the working of parallel MTDC systems. Also, explain how control is achieved. (5)
- 16 (a) Explain with a block diagram how a DC pole is protected against short circuit currents. (5)  
(b) What are normal and abnormal modes of a three-phase thyristor bridge converter? Sketch output voltage versus output current in all the modes? (5)
- 17 Write short notes on the following: (5)  
(a) DC Circuit breaker (5)  
(b) AC versus DC intertie (5)

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B.E. 4/4 (EEE) I - Semester (Main) Examination, November / December 2016

**Subject : Power Quality (Elective – I)****Time : 3 Hours****Max. Marks: 75****Note: Answer all questions from Part-A and answer any five questions from Part-B.****PART – A (25 Marks)**

- 1 What is the importance of Power Quality? (3)
- 2 What is the purpose of power quality database and how to process PQ data? (3)
- 3 What are the guidelines for harmonic voltage and current limitations? (2)
- 4 What is the purpose of site surveys? (3)
- 5 What are the effects of momentary voltage dips on induction motors? (3)
- 6 Why harmonic filtration is required to improve PQ? (3)
- 7 What is the effect of pre-fault voltage on voltage sag? (2)
- 8 What is the effect of harmonics of ASDs? (2)
- 9 What are the causes of voltage sags? (2)
- 10 What do you mean by voltage flicker? (2)

**PART – B (50 Marks)**

- 11 Discuss in detail the power quality data collection, analysis of data, database structure and processing of data of PQ problems. (10)
- 12 Explain the sources and causes of voltage sags. Draw the flow chart for analysis of voltage sags. (10)
- 13 Give a detailed analysis of sag magnitude in radial system with the without transformers. (10)
- 14 (a) Explain the phase sequence of different harmonics with phasor diagrams. (5)  
(b) Derive the unbalanced voltage sags for different faults. (5)
- 15 How is power quality monitored and explain the equipment selection and testing in a distribution system? (10)
- 16 Discuss the design procedure of filters to reduce harmonic distortion. (10)
- 17 Write short notes on the following:  
(a) Impact of distribution system capacitor Banks on PQ (5)  
(b) Load influence on voltage sags (5)

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**FACULTY OF ENGINEERING****B.E. 4/4 (EEE/Inst.) I - Semester (Main) Examination, November / December 2016****Subject : Embedded Systems (Elective-I)****Time : 3 Hours****Max. Marks: 75****Note: Answer all questions from Part-A and answer any five questions from Part-B.****PART – A (25 Marks)**

- 1 What is the function of Watchdog timer Reset? (2)
- 2 Mention the various forms of system memory. (3)
- 3 Draw the basic embedded processor. (3)
- 4 Mention the interrupts in 8051. (2)
- 5 Mention the embedded control application. (2)
- 6 What are the advantages of High level Programming? (3)
- 7 What is RTOs? (2)
- 8 What is Kernel? (3)
- 9 Mention the basic function boundary scan. (3)
- 10 What are the Simulators and Emulators? (2)

**PART – B (50 Marks)**

- 11 Explain in detail the processor embedded into the system. Give the details of any two with suitable examples. (10)
- 12 Explain the PIC micro controller with neat diagram. Describe briefly each institution set. (10)
- 13 Explain in detail Network based embedded applications with neat diagram. What are the parallel bus protocols. (10)
- 14 (a) What are OS-II & Vx Works? Give them in detail. (5)  
(b) What is the CPU performance issue in embedded system. (5)
- 15 (a) Explain briefly embedded product development life cycle. (5)  
(b) Explain with neat diagram different phases and approaches of EDLC. (5)
- 16 (a) Write short notes on ISR concepts. (5)  
(b) What is programming modeling concept in detail. (5)
- 17 Write short notes on the following: (10)
  - (a) Trends in embedded industry
  - (b) Timer functions
  - (c) DFG models

**FACULTY OF ENGINEERING****B.E. 4/4 (EEE) I - Semester (Main) Examination, December 2016****Subject : High Voltage Engineering (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 Briefly explain the difference between photo-ionization and photo electric emission. 3
- 2 Mention the application of oil in power apparatus. 2
- 3 Draw the connection diagram for cascade connection of three transformers. 2
- 4 Define : Impulse voltage and impulse flash over voltage. 2
- 5 Mention the disadvantages of sphere gap. 2
- 6 What are the tests which are to be performed on the power capacitors? 2
- 7 Explain the performance of half wave rectifier circuit. 3
- 8 Draw the exact equivalent circuit of an impulse generator and indicate the significance of each parameters. 3
- 9 An electrostatic voltmeter has two parallel plates. The movable plate is 10 cm in diameter. With 10 kV between the plates the pull is  $5 \times 10^{-3}$  N. Determine the change in capacitance for a movement of 1mm of movable plate. 3
- 10 Draw the schematic arrangement for impulse testing of transformer. 3

**PART – B (50 Marks)**

- 11 Explain streamers theory of breakdown in gases. 10
- 12 Explain the working of a Cockroft-Walton voltage multiplier circuit. Derive an examples for ripple voltage. 10
- 13 a) Explain the analysis of impulse generator circuit of series RLC type. 5  
b) Explain the construction and working of impulse generator in brief. 5
- 14 Draw a neat schematic diagram of a generating voltmeter and explain its principle of operation. Discuss its applications and limitations. 10
- 15 a) Explain the various tests to be performed on power capacitors. 5  
b) Explain the factors which are to be considered while deciding the voltage and power rating of test equipment. 5
- 16 a) Discuss any two methods of measuring high d.c. and a.c. currents. 5  
b) Describe various tests to be carried out on circuit breaker. 5
- 17 Write short notes on the following : 10  
a) Van-de Graff generator  
b) Paschen's law

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B.E. 4/4 (Inst.) I - Semester (Main) Examination, November / December 2016

**Subject : Automation in Process Control (Elective-I)****Time : 3 Hours****Max. Marks: 75****Note: Answer all questions from Part-A and answer any five questions from Part-B.****PART – A (25 Marks)**

1. How do we interface input analog signals to a PC. (2)
2. What are the guidelines to be followed in selecting an add-on- card. (3)
3. Mention the two mode of working of RTU. (2)
4. Draw distributed SCADA structure. (3)
5. Draw the block diagram of distributed computer control. (3)
6. What are different layers of computer network. (2)
7. Explain computer control of liquid level system. (2)
8. Give the flow sheet of Plastic injection moulding process. (3)
9. What are smart sensors. Give the advantages of using it. (3)
10. Draw the diagram of smart control valve positioner. (2)

**Part B ( 5x10=50 Marks)**

11. (a) Explain the concept involved in data acquisition system using PC add-on card. (5)
- (b) Write the guidelines in selecting the appropriate DA and Control boards. Using standard Add-on-Cards. (5)
12. (a) Draw the block diagram of SCADA and explain the basic function carried out by the SCADA system. (5)
- (b) Compare SCADA PLC DCS and smart instruments. Also write the applications of SCADA system in process control. (5)
13. (a) Explain three kinds of communication network protocol in DCS. (5)
- (b) Write short notes on DCS integration with PLC. (5)
14. (a) Explain On-line optimizing control of a Distillation Column. (5)
- (b) Explain with suitable diagram computer control heat exchanger. (5)
15. Explain main features of field buses FIP and PROFIBUS in detail. (10)
16. (a) Discuss briefly IEEE-GPIB. (5)
- (b) Explain peer-to-peer based network. (5)
17. (a) Write short notes on smart sensors. (5)
- (b) Write short notes on Main frame DDC. (5)

**FACULTY OF ENGINEERING**  
**B.E. 4/4 (ECE) I - Semester (Main) Examination, December 2016**

**Subject : Optical Fiber Communication (Elective – I)**

**Time : 3 Hours**

**Max. Marks: 75**

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

**PART – A (25 Marks)**

1. Explain polarization of optical wave.
2. Compare single mode and multimode step-index and graded index optical fibres.
3. Explain the significance of numerical aperture.
4. Obtain the expression for normalized frequency  $V$ .
5. What are the requirements of optical fibre materials?
6. Explain scattering losses, bending losses and cladding losses.
7. With a neat diagram explain LED structure.
8. Explain temperature effects of laser diodes.
9. Describe laser diode to fibre coupling.
10. Explain with diagram fibre splicing.

**Part B (50 Marks)**

11. (a) With a diagram explain principle of photodiode.  
(b) Explain the working of avalanche photo diode.
12. (a) What are factors which effect detector response time?  
(b) with a neat diagram explain InGaAs avalanche photo diode.
13. (a) With a schematic explain optical receiver.  
(b) Explain with a diagram pre-amplifier used in optical receiver.
14. (a) Describe link power budget for point to point communication.  
(b) Explain operational principle of WDM in optical communication.
15. (a) Describe various couplers used in optical systems.  
(b) Explain single mode laser with basic architecture.
16. (a) Describe Inline amplifier, pre-amplifier, power amplifier applications with suitable diagrams.  
(b) Compare pin diodes and avalanche photodiodes.
17. Writes short notes on
  - (a) Absorption and scattering losses.
  - (b) Examples of direct and indirect band gap materials with energy diagram.
  - (c) Avalanche multiplication noise.

**FACULTY OF ENGINEERING**

B.E. 4/4 (ECE) I - Semester (Main) Examination, November / December 2016

**Subject : Digital Image Processing (Elective-I)****Time : 3 Hours****Max. Marks: 75****Note: Answer all questions from Part-A and answer any five questions from Part-B.****PART – A (25 Marks)**

- 1 What is the storage of 1024x1024,32 level gray level image. (2)
- 2 Define 4-Connectivity and 8-Connectivity of a pixel. (2)
- 3 Write the 2D Hadamard transform [Forward and Inverse]. (3)
- 4 Write any three properties of 2D Fourier Transform. (3)
- 5 Write the differences between spatial domain and frequency domain methods of image enhancement. (3)
- 6 What is the use of repeated application of LPF or HPF to an image? (2)
- 7 Mention the drawbacks of inverse filtering. (2)
- 8 List out the typical degradation sources. (3)
- 9 Mention the limitation of Huffman coding. (3)
- 10 State the need for data compression. (2)

**PART – B (50 Marks)**

- 11 (a) Describe in detail about the basic elements of Digital image processing. (5)  
(b) Explain the concept of sampling and quantization of an image. How image are digitally represented. (5)
- 12 (a) State and derive the properties of 2D Fourier Transform. (5)  
(b) Obtain the Haar Transform matrix for  $N = 3$ . (5)
- 13 What is histogram equalization? Discuss in detail about the procedure involved in histogram matching. (10)
- 14 (a) What is meant by image restoration? Explain the model of image degradation. (4)  
(b) Describe constrained least square filtering for image restoration and derive its transfer function. (6)
- 15 Determine the Huffman code for the following data: (10)

Symbol	Probability
a1	0.1
a2	0.4
a3	0.06
a4	0.1
a5	0.04
a6	0.3

Compute the average length of the code and entropy of the source.

- 16 (a) A source emits 3 symbols ABC with probability {0.5, 0.25, 0.25} respectively. construct an arithmetic code to encode the word 'CAB'. (6)  
(b) Explain how smoothing is achieved in the frequency domain. (4)
- 17 Write short notes on :  
(a) Hotelling Transformation  
(b) Speckle noise

**FACULTY OF ENGINEERING**

B.E. 4/4 (ECE) I - Semester (Main) Examination, November / December 2016

**Subject : Embedded Systems (Elective-I)****Time : 3 Hours****Max. Marks: 75****Note: Answer all questions from Part-A and answer any five questions from Part-B.****PART – A (25 Marks)**

- 1 Differentiate between a general purpose system and Embedded System.
- 2 Draw the CPSR register and show its contents.
- 3 What is a THUMB instruction?
- 4 Enlist two advantages of serial communication over parallel communication.
- 5 Describe the TCP/IP Protocol.
- 6 With reference to the design life cycle, what are
  - (i) Product life time
  - (ii) Design time
  - (iii) Cost of re-engineering
- 7 What is a ROM emulator?
- 8 What is an IDE?
- 9 For a digital clock, what are the interrupts?
- 10 Describe two branch instructions in ARM.

**PART – B (50 Marks)**

- 11 What a neat sketch, describe the various hardware and software parts of Embedded System?
- 12 (a) What is a Pipeline? What are its hazards?  
(b) Explain the 'ADDNE' instruction of ARM.  
(c) Describe the features of RISC processor.
- 13 (a) What is CAN protocol? Mention its frame, advantages and applications.  
(b) Describe the AMBA with a neat sketch and show the three different buses.
- 14 (a) Draw the diagram of a native tool chain. Mention the requirement of a Goss assemble and Goss complier in the native tool chain when applied to embedded systems.  
(b) What is a PROM programmer?
- 15 (a) Describe an Instruction Set Simulation and mention its advantages and disadvantages.  
(b) What is a logic analyzer?
- 16 Write a case study of an automatic vending machine describing its hardware and software features.
- 17 Write short notes on the following:
  - (a) System on chip
  - (b) I<sup>2</sup>C
  - (c) In circuit Emulator

**FACULTY OF ENGINEERING**

B.E. 4/4 (ECE) I - Semester (Main) Examination, November / December 2016

**Subject : System Automation and Control (Elective - I****Time : 3 Hours****Max. Marks: 75****Note: Answer all questions from Part-A and answer any five questions from Part-B.****PART – A (25 Marks)**

- 1 What are the applications of velocity and motion sensors? (2)
- 2 Write a short notes on proximity sensor? (3)
- 3 What are the criteria to choose a suitable data acquisition equipment? (3)
- 4 What are the various signal conditioning modules? (3)
- 5 Write a short notes on hydraulic – mechanical engineering systems? (3)
- 6 Explain the rotational – translational engineering system. (2)
- 7 What are the important features of closed loop controllers? (2)
- 8 Define the terms, transfer function and frequency response of a system. (2)
- 9 List out the real world applications of motion control system. (2)
- 10 Write a short notes on feedback devices. (2)

**PART – B (50 Marks)**

- 11 (a) Describe briefly about the displacement, position and temperature sensors. (6)  
(b) Write a brief note on the selection of sensors. (4)
- 12 Explain the sampling amplifying, filtering and noise reduction processes in detail. (10)
- 13 Explain the mechanical and electrical system building blocks in detail. (10)
- 14 Explain the programmable Logic Controller in detail. (10)
- 15 What are the components of a motion control system? Explain them in detail. (10)
- 16 Explain the following:  
(a) Use of data acquisition. (5)  
(b) Thermal system building blocks (5)
- 17 Write short notes on the following:  
(a) Hardware Interfacing of a micro controller (5)  
(b) Motion input / output (5)

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**FACULTY OF ENGINEERING**  
**B.E. 4/4 (M/P/AE) I - Semester (Main) Examination, December 2016**

**Subject : Automobile Engineering**  
**(Elective – I)**

Time : 3 Hours

Max. Marks: 75

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

**PART – A (25 Marks)**

- 1 What are the main components of electric and hybrid vehicles ?
- 2 Compare Dry liners and wet liners.
- 3 What are the functions of a spark plug ?
- 4 What are the components of water cooling method ?
- 5 What do you mean by wheel balancing ?
- 6 Explain the Linkage arrangements of a steering system.
- 7 State the functions of differential unit.
- 8 What are the different types of gear boxes ?
- 9 What is the need of pollution control ?
- 10 List out the tools required for repair and over haul.

**PART – B (50 Marks)**

11. a) Explain single row overhead valve mechanism with a neat sketch. (5)  
 b) What is piston stop ? Explain any two methods to overcome piston slop with diagram. (5)
12. a) With a neat sketch, explain the common Rail fuel injection system. (5)  
 b) What is wet Sump lubrication system. Explain with a neat sketch. (5)
13. a) What are the different types of thermostats use in cooling of an I.C. Engines. Explain any one with a neat sketch. (6)  
 b) What are the functions of charging system. (4)
14. a) Sketch and explain Ackermann Steering System. (5)  
 b) Explain the terms : Camber, Castor, toe-in and toe out. (5)
15. a) Describe the constructional features of a tyre with a neat sketch. (5)  
 b) Explain the working principle of a multiplate clutch with the help of a diagram. (5)
16. a) Explain the constructional details of a Master Cylinder used in hydraulic braking system. (5)  
 b) Explain the working principle of a torque converter with a sketch. (5)
17. a) Explain the working principle of a 3-way catalytic converter with a sketch. (5)  
 b) Explain the procedure for overhauling of an engine. (5)

**FACULTY OF ENGINEERING**  
**B.E. 4/4 (Mech.) I - Semester (Main) Examination, December 2016**

**Subject : Non-Conventional Energy Sources**  
**(Elective – I)**

Time : 3 Hours

Max. Marks: 75

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

**PART – A (25 Marks)**

- 1 Define Solar Constant and Zenith Angle.
- 2 What are the sources of non-conventional energy ?
- 3 Name the applications of flat plate collector.
- 4 What the limitations of renewable energy ?
- 5 Classify wind energy conversion systems.
- 6 Define lift and drag.
- 7 What are the merits of geothermal energy ?
- 8 What are the sources of biomass energy ?
- 9 Name different types of bio gas plants.
- 10 Write working principle of wave energy conversion.

**PART – B (5x10=50 Marks)**

11. a) Differentiate conventional and non-conventional energy sources.  
b) What is the potential of non-conventional energy sources in Indian Scenario ?
12. a) With neat sketch explain types of concentrating collectors and their merits.  
b) What is solar chimney working ? Explain with line sketch.
13. a) Explain working of solar pond using pictorial diagram.  
b) Write working principle of p-n junction and mention applications of PV solar cell.
14. a) Explain the working principle of Vertical axis windmill with suitable diagram.  
b) Explain the working of Induction generator ? Write how it differs from synchronous.
15. a) Explain dry steam and wet steam geothermal systems with neat sketches.  
b) Brief about KVIC model biomass plant.
16. a) Differentiate between wave and tidal energy systems.  
b) Classify OTEC energy plants with neat diagrams.
17. a) What are the types of tidal energy plants ? Explain.  
b) What are the adverse effects of OTEC plants.

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## FACULTY OF ENGINEERING

B.E. 4/4 (M/P/AE) I – Semester (Main) Examination, December 2016

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.**

### PART – A (25 Marks)

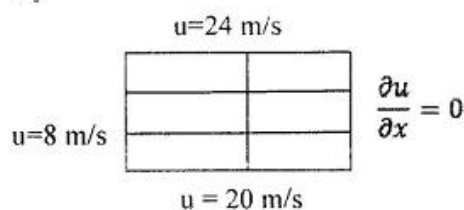
- |  |   |
|--|---|
| 1 State and explain conservative form of continuity equation.  | 3 |
| 2 Write the assumptions made while deriving the N-S equation.  | 2 |
| 3 What do you mean by Turbulence closure? Explain briefly.   | 3 |
| 4 Write down elliptical, parabolic and hyperbolic partial differential equations as applicable to Computational Fluid Flows. | 2 |
| 5 Explain the significance of Crank-Nicolson method in Finite difference solutions?  | 3 |
| 6 Mention different types of errors that crop up in Finite difference methods.   | 2 |
| 7 What is the need of grid generation? Explain.  | 3 |
| 8 How do you check the convergence of Jacobi and Gauss Seidel methods? Explain.  | 2 |
| 9 Write the advantages of Finite Volume Method.  | 2 |
| 10 What is meant by 'SIMPLE algorithm'? Explain briefly.   | 3 |

### PART – B (50 Marks)

- 11 Derive the energy equation for a viscous flow in partial differential non-conservation form.
- 12 Give a classification of partial differential equations and their physical behaviour as applicable to Computational Fluid Flows.
- 13 Formulate the solution matrix for the following rectangular domain  $\Delta x \neq \Delta y$  with given boundary conditions using finite difference method. Take the governing equation as

$$\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$$

$$\tan \beta = \frac{\Delta x}{\Delta y} = 2$$



- 14 When do you apply forward, backward and central difference expressions? Explain with suitable examples.
- 15 Discuss various methods to solve viscous incompressible flow. Explain stream function-vorticity method.
- 16 Describe finite volume formulations for generalized unsteady 2D flow  $\frac{\partial W}{\partial t} + \frac{\partial E}{\partial x} + \frac{\partial F}{\partial y} = 0$ .  
Use cell centered scheme.
- 17 Write short notes on the following:  
 a) Mixing length model  
 b) Convergence criteria.

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**FACULTY OF ENGINEERING**

**B.E. 4/4 (Mech.) I – Semester (Suppl.) Examination, December 2016**

**Subject: Tool Design (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 do you understand coated tools?
- 2 Explain working principle of ECM.
- 3 State design consideration of a single point cutting tool.
- 4 Differentiate between pull and push type broaches.
- 5 List the classification of taps.
- 6 Write about broaching process.
- 7 How to define spinning?
- 8 Explain the principle of location for circular surface.
- 9 What are the applications of plastics as a tooling materials?
- 10 What is importance of twist drill?

**PART – B (5x10 = 50 Marks)**

- 11 a) Explain working principle of EDM.  
b) Briefly explain the classification and coding of carbide tools.
- 12 a) Draw neat sketch of milling cutter and name the features.  
b) How to determine the form tool profile for a given rake angle and tool setting height?
- 13 a) Draw a neat sketch of twist drill and indicate its standard designation.  
b) Explain the manufacturing process of taps.
- 14 a) Make a neat sketch of a die set and describe its various details and accessories.  
b) What important considerations will you make in designing a die?
- 15 a) What are the main advantages of using jigs and fixtures in mass production?  
b) What are the various considerations for designing a jig for turning operation?
- 16 a) What are the criteria generally used for the classification of clamping system used in jigs and fixtures?  
b) Discuss the desirable properties of a tool material.
- 17 Write short notes on the following:
  - a) ISO carbide grades
  - b) Redundant location
  - c) Progressive and compound dies.

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**FACULTY OF ENGINEERING****B.E. 4/4 (AE) I-Semester (Main) Examination, December 2016****Subject : Metal Cutting and Machine Tool Engineering****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 BUE and explain its stability?
- 2 Distinguish between up-milling and down milling.
- 3 Sketch tapping and spot facing.
- 4 Differentiate orthogonal and oblique cutting methods.
- 5 How does a lathe machine tool is specified?
- 6 Distinguish between jigs and fixtures.
- 7 How grinding wheels are selected?
- 8 Distinguish between continuous and discontinuous chips.
- 9 Explain single point cutting tool.
- 10 Distinguish between lapping and honing process.

**PART – B (50 Marks)**

- 11 a) Describe the geometry of single point cutting tool by ASA system.  
b) In orthogonal cutting, feed is 0.18mm/rev. neutral rake is taken on tool, chip thickness obtained is 0.36mm. Find chip reduction coefficient and shear angle.
- 12 Describe a) Design principles for location and clamping  
b) Metal removal rate
- 13 Describe a) Desirable properties of cutting tool materials  
b) Discuss types of chip breakers and their role in metal cutting.
- 14 a) Describe with neat sketches the working mechanism of box jig and indexing jig.  
b) Explain principle of EDM.
- 15 Describe the methods of taper turning on lathe.
- 16 a) Derive Merchant's shear angle solution and indicate the assumptions made.  
b) Explain desirable properties of cutting fluids.
- 17 Write a short note on :  
a) thread rolling                      b) thread milling                      c) EDM

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**FACULTY OF ENGINEERING****B.E. 4/4 (AE) I-Semester (Main) Examination, December 2016****Subject : Production and Operations 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 Define Break Even Analysis (BEA).
- 2 List out steps in work study.
- 3 Classify forecasting methods.
- 4 Define forecast error.
- 5 Define MRP.
- 6 What is ERP-discuss in brief?
- 7 Define various costs in inventory.
- 8 List out assumptions in EOQ.
- 9 What is a bar chart?
- 10 Define critical path and state its significance.

**PART – B (50 Marks)**

- 11 a) Classify layouts.  
b) Discuss in brief factors affecting the selection of a site for a pharma industry.
- 12 Determine trend values by method of least squares. Also determine forecast for the year 2008

Year	2001	2002	2003	2004	2005	2006	2007
Actual demand	18	12	15	17	13	19	11

- 13 Define and discuss in detail MRP system by defining all its input and outputs.
- 14 Demand for an inventory is estimated at 36,000 units per year ordering cost are expected to be Rs.15 per order while carrying cost is estimated to be Rs.5 per unit per year purchase cost of inventory is Rs.50 per unit. The supplier offers a discount scheme as given he offers to give a discount of 5% per unit if '2' orders are placed every year. However he is willing to offer 10% per unit if only one order is placed every year. Determine optimal ordering policy.
- 15 Determine critical path for the project

Activities	1-2	1-3	1-4	2-4	3-4	2-5	4-5	5-7	4-7	4-6	6-7
Time (days)	8	12	6	12	10	14	12	16	10	7	8

- 16 a) Show with a neat sketch break even chart with all its parameters.  
b) Determine breakeven production volume for the following :  
 Total fixed cost = Rs.30,000  
 Variable cost = Rs.20/unit  
 Selling price = Rs.50/unit

17 Write short notes :

- a) Symbols in method study
- b) Difference between a critical activity and non critical activity
- c) Cost slope in crashing

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**FACULTY OF ENGINEERING****B.E. 4/4 (CSE) I-Semester (Main) Examination, December 2016****Subject : Image Processing (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 the following terms : i) Radiance    ii) Luminance    iii) Brightness    | 3 |
| 2  | How much memory is required to store 1000 x 1000 image of 256 intensity levels. | 2 |
| 3  | What is aliasing?   | 2 |
| 4  | What is the relationships between the sampling and the frequency intervals?     | 3 |
| 5  | Differentiate spatial correlation and convolution.                              | 2 |
| 6  | Justify that Laplacian operator does Edge enhancement.                          | 3 |
| 7  | What is the need of “image compression” in image processing?                    | 2 |
| 8  | Describe the image compression models.  | 3 |
| 9  | Draw the model diagram of the image degradation / restoration process.          | 3 |
| 10 | Write the formula for converting an image from CMY model to RGB model.          | 2 |

**PART – B (50 Marks)**

- |    |   |    |
|----|---|----|
| 11 | a) Explain the fundamental steps in digital image processing with a neat diagram.   | 5  |
|    | b) Describe the elements of visual perception.  | 5  |
| 12 | a) Show that Fourier transform of convolution of two functions in the spatial domain is equal to the product in the frequency domain of the Fourier transform of the two functions. | 5  |
|    | b) Write about the fundamental steps in Digital Image Processing.   | 5  |
| 13 | Explain the global thresholding method used for segmentation.   | 10 |
| 14 | a) Calculate the Golomb coding $G_4(9)$ .   | 5  |
|    | b) Explain the LZW coding used in image compression.  | 5  |
| 15 | Explain the different models of noises arise during the image acquisition and transmission.   | 10 |
| 16 | Explain the different linear and nonlinear smoothing spatial filters.   | 10 |
| 17 | Discuss in detail about any two smoothing filters in frequency domain.  | 10 |

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**FACULTY OF ENGINEERING****B.E. 4/4 (CSE) I-Semester (Main) Examination, December 2016****Subject : Mobile Computing (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  | Classify Multiple Access Types.   | 2 |
| 2  | Differentiate direct sequence and frequency Hop Spread spectrum.                | 3 |
| 3  | Write about different types of Handovers scenarios in GSM.                      | 3 |
| 4  | Explain WWW.  | 2 |
| 5  | Differentiate Infrared and Radio transmission.                                  | 3 |
| 6  | List features of Bluetooth.   | 2 |
| 7  | Differentiate Wired and Wireless transmission.                                  | 2 |
| 8  | List the characteristics used to deploy application over 2.5/3G wireless links. | 3 |
| 9  | Write about WAP protocol stack.   | 2 |
| 10 | Write about MIO-NFS.  | 3 |

**PART – B (50 Marks)**

- |       |  |    |
|-------|--|----|
| 11 a) | What is Modulation? Discuss different types of Modulation.                 | 5  |
| b)    | Compare CDMA, TDMA, and FDMA.  | 5  |
| 12 a) | Describe the Protocol Architecture of GSM for signaling.                   | 6  |
| b)    | Write in detail DECT system architecture reference model.                  | 4  |
| 13    | Discuss in detail Bluetooth protocol stack, with a diagram.                | 10 |
| 14 a) | Write about any two classical TCP improvements.                            | 6  |
| b)    | Write short notes on DHCP.   | 4  |
| 15    | Explain about symbian operating system and Java Card support for mobility. | 10 |
| 16 a) | Write the different phases of HIPERLAN.                                    | 5  |
| b)    | What is Adhoc Network? List its Advantages and Disadvantages.              | 5  |
| 17    | Write short notes on :   | 10 |
| a)    | WATM   |    |
| b)    | DAB  |    |
| c)    | Performance enhancing proxies  |    |

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**FACULTY OF INFORMATICS**

B.E. 4/4 (IT) I - Semester (Main) Examination, November / December 2016

**Subject : Software Reuse Techniques (Elective – III)****Time : 3 Hours****Max. Marks: 75****Note: Answer all questions from Part-A and answer any five questions from Part-B.****PART – A (25 Marks)**

- 1 What is the incremental model of systematic reuse? (3)
- 2 What are the reasons to reuse use case components? (3)
- 3 What are the different types of variation points? (2)
- 4 What is the intent of singleton pattern? (2)
- 5 Draw the structure of Adapter pattern, mention the participants of the adapter pattern. (3)
- 6 What is the purpose of decorator pattern? (2)
- 7 Differentiate structural and architectural patterns. (3)
- 8 When can you apply a template pattern? (2)
- 9 What are the challenges establishing requirements for a component system? (3)
- 10 List the advantages of pipes and filters pattern. (2)

**PART – B (50 Marks)**

- 11 (a) Describe reusable design and implementation components. (5)  
(b) Explain in detail how facades control access to component system internals. (5)
- 12 (a) How can we use a design pattern? Give a simple approach to applying a design pattern effectively. (5)  
(b) Describe the intent and structure of a abstract factory pattern with the help of an example. (5)
- 13 Discuss about any two structural patterns explaining their motivation, structure and consequences. (10)
- 14 (a) What are the advantages of observer pattern over other behavioural patterns? (5)  
(b) Discuss the pipes and filter architectural design pattern. (5)
- 15 (a) Briefly describe the software engineering process in the reuse business. (5)  
(b) Explain the process of testing reusable components and frameworks. (5)
- 16 Explain Strategy pattern in detail with its implementation and consequences. (10)
- 17 Describe the intent, structure and participants of  
(a) Chain of responsibility pattern (5)  
(b) Flyweight pattern (5)

**FACULTY OF INFORMATICS**

B.E. 4/4 (IT) I - Semester (Main) Examination, November / December 2016

Subject : Grid Computing (Elective – III)

Time : 3 Hours

Max. Marks: 75

**Note: Answer all questions from Part-A and answer any five questions from Part-B.****PART – A (25 Marks)**

- 1 List infrastructural requirements for Grid computing. (2)
- 2 What capabilities does Grid Security Infrastructure provide? (3)
- 3 Give the steps involved in Job submission. (2)
- 4 Explain briefly the SOA interaction pattern. (3)
- 5 List salient features of Grid computing work flow editor. (3)
- 6 List OGSA basic services. (2)
- 7 State goals of Open Grid Services Architecture. (3)
- 8 What is a Resource Broker? (2)
- 9 Define the parameter sweep. (3)
- 10 What is a Virtual organization? (2)

**PART – B (50 Marks)**

- 11 Explain Grid Computing Infrastructure. (10)
- 12 Explain Resource Management on Grid. (10)
- 13 Write about the process of Grid Enabled MPI. (10)
- 14 Explain GSI secure conversation. (10)
- 15 Explain Grid Service Container and Load Balancing features in Globus. (10)
- 16 Describe Open Grid Services Architecture. (10)
- 17 Write short notes on the following:
  - (a) Higher-level Authorization Tools (3)
  - (b) Symmetric and Asymmetric key cryptography (3)
  - (c) Challenges in implementation of Grid Computing (4)

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**FACULTY OF INFORMATICS****B.E. 4/4 (IT) I - Semester (Main) Examination, November / December 2016****Subject : Semantic Web (Elective – III)****Time : 3 Hours****Max. Marks: 75****Note: Answer all questions from Part-A and answer any five questions from Part-B.****PART – A (25 Marks)**

- 1 Discuss the limitations of current web. (3)
- 2 Classify the ontology based on semantic spectrum and generality. (3)
- 3 Compare Logic and Ontology. (3)
- 4 List XML essentials. (2)
- 5 Describe family of attribute languages. (3)
- 6 Write about usage scenario in rule language. (3)
- 7 What is Rule ML? (2)
- 8 Categorize various classes in OWL. (2)
- 9 Outline KR ontology. (2)
- 10 What is the role of software agent in semantic web? (2)

**PART – B (50 Marks)**

- 11 Discuss the iterative approach for building Ontologies according to the process of Noy and McGuinness. (10)
- 12 (a) Explain resource description framework (RDF). (5)  
(b) Identify inference problem and prove the proposition reduction to unsatisfiability. (5)
- 13 (a) Explain the OWL-S service profiles. (4)  
(b) Write about Lexicon based ontology development method. (6)
- 14 How the semantic web services are different from other web services? Explain with an example. (10)
- 15 (a) Explain briefly Uschold and King ontology development method. Why is uschold method criticism? (7)  
(b) Discuss OWL vocabulary for property characteristics. (3)
- 16 (a) What is Metadata? Explain various types of metadata. (4)  
(b) Define Web search agents. Explain various Agent forms. (6)
- 17 Write short notes on the following: (5)  
(a) Inference Engine (5)  
(b) Datalog (5)

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