VASAVI COLLEGE OF ENGINEERING (*Autonomous*), HYDERABAD
B.E. (ECE) III Year I-Semester Main & Backlog Examinations, December-2017
Analog Communication

Time: **3** hours

Max. Marks: **70**

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

1. Inspect whether coherent detector be used for AM signal detection? Present time domain analysis.
2. Compare linear modulation schemes based on transmission power requirement.
3. Justify that FM is a non-linear modulation technique.
4. An angle modulated wave is given by $S(t) = 10 \sin(2\pi10^8t + 5 \sin 2\pi10^4t)$. Calculate Maximum Frequency deviation & power dissipated in a 10Ω resistor.
5. When a super heterodyne AM receiver is tuned to 1000 kHz. What is the image frequency? The antenna of this receiver is connected to the mixer via a tuned circuit whose loaded q is 60. Find Image Frequency Rejection Ratio (IFRR)?
6. Emphasize on the need for amplitude limiter in FM receivers?
7. Classify the sources of noise.
8. Define and relate Noise figure and Noise Equivalent temperature.
9. Draw the frequency spectrum for under sampling, critical sampling and over sampling of message signal.
10. Illustrate the generation of PPM signals with neat sketch.

Part-B (5 × 10 = 50 Marks)

11. a) Summarize the analysis on how a Square law device can be used for AM signal generation and detection with necessary time and frequency domain analysis, diagrams and and waveforms. [8]

    b) What are the advantages of SSB-SC over other linear modulation techniques? [2]

12. a) Discuss generation of Narrow Band FM signal. Bring out the similarities and differences between NBFM and AM. [5]

    b) How Balanced frequency discriminator performs demodulation of FM signal. Explain. [5]

13. a) Explain the working of Low level AM transmitter with the help of a neat block diagram. What is the frequency range used for AM broadcasting? [5]

    b) What are the drawbacks of TRF receiver and explain how these are overcome using super heterodyne receiver. [5]

14. a) Analyze the noise performance of FM system and derive the expression for Figure of Merit. [8]

    b) Calculate Figure of Merit of AM system if a single tone message signal is modulated to depth of 60%. [2]

15. a) Explain the generation and detection of PPM signal. [5]

    b) State and prove the sampling theorem for low pass signals. [5]

16. a) Demonstrate single tone SSB-SC modulation and demodulation assuming Upper Side Band transmission. [5]

    b) Emphasize on the need for Pre & De-emphasis circuits in FM systems. [5]

17. Answer any *two* of the following:
    a) FM transmitter [5]
    b) Noise performance of AM system [5]
    c) Natural and Flat –top sampling. [5]

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VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD
B.E. (I.T.) IV Year I-Semester Main Examinations, December-2017
Information Security

Time: **3** hours   Max. Marks: **70**

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

1. List out the various threats in information security.
2. Sketch the CIA triangle
3. Differentiate between a policy and a law
4. Define Standard of due care and due diligence
5. Distinguish various authentication factors
6. List out the various stages in BIA that were conducted by contingency planning team
7. Consider the below scenario and Assume you are the Bob.

    Alice generates two keys. One for her, the other for Bob.
    Assume Alice will have Bob's key only when needed.
    Alice encrypts a Blob using her own and Bob's key.
    Bob's key alone cannot decrypt Alice Blob.
    Alice's key alone cannot decrypt her own blob.
    Eve has access to Alice's key and Blob. Even cannot decrypt Alice's blob.

    Which Cryptosystem, if any does this scenario portray or does such a system exist or can you recommend a best practice for this scenario.
8. State the factors that are to be considered while measuring the effectiveness of IDPS system
9. What is separation of duties? How can it be used to improve an organization's information security practices?
10. What are the key qualifications and requirements for the CISA position?

Part-B (5 × 10 = 50 Marks)

11. a) Discuss in detail about the different characteristics of information.   [5]
    b) Describe the four important information security functions that were performed for an organization.   [5]

12. a) What is the another name for the Kennedy-Kassebaum Act(1996) and why is it important to organizations that are not in the health care industry?   [5]
    b) Describe why periodic review must be a part of the process in risk management strategies [5]

13. a) How is an application layer firewall different from a packet-filtering firewall? Why is an application layer firewall sometimes called a proxy server.   [7]
    b) Describe the importance of security education.   [3]

14. a) Consider a plain text "Can you see me tomorrow at 10PM to talk about PKI", where Alex at XYZ Corporation wants to send an message to Rachel at ABC Corporation.

    Describe the process of Encryption and Decryption of message using the technique of Transposition Cipher (Bit Level and Byte Level) by considering Key pattern as

    1->4, 2->8, 3->1, 4->5, 5->7, 6->2, 7->6, 8->3.   [5]
    b) Demonstrate about any two protocols for secure communications.   [5]

15. a) List and describe the three major steps in executing the project plan. [6]
   b) What is job rotation, and what benefits does it offer an organization? [4]

16. a) Explain the security problems faced during software development. [5]
   b) Illustrate the risk control cycle. [5]

17. Answer any *two* of the following:
   a) Explain MAC layer firewall. [5]
   b) Compare the IDPS detection methods. [5]
   c) Discuss certification vs Accreditation. [5]

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Hall Ticket Number:

Code No. : 41113

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD
B.E. (C.S.E.) IV Year I-Semester Main Examinations, December-2017

Principles and Applications of Embedded Systems

Time: **3** hours

Max. Marks: **70**

*Note: Answer **ALL** questions in **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

1. List two ARM Instructions that utilizes barrel shifter.

2. Illustrate the process of embedded system design.

3. How will you interface a LED with Arduino Uno in Sinking and Sourcing modes? Justify.

4. How Co-processors provide flexibility in system design? Justify.

5. Demonstrate the use of semaphore with an example.

6. List various key features of uC/OS – II.

7. Classify types of multiprocessor systems.

8. Determine the utilization of CPU for the tasks P1, P2, P3 that have 15, 12, 10 as periods and 2, 3, 2 as execution times respectively.

9. List the features of a simulator for embedded system design.

10. Draw the block diagram of Host and Target system in embedded system development and explain in brief.

Part-B (5 × 10 = 50 Marks)

11. a) Design and realize automatic ticket vending machine. [6]

    b) Explain load and store architecture with ARM instructions. [4]

12. a) How will you interface stepper motor with Arduino? Draw and explain with appropriate circuit diagram. [5]

    b) Justify how the performance of the system is enhanced using Pipelining in ARM processor. [5]

13. a) What is priority inversion? Why it is important? Explain. [4]

    b) Explain the following uC/OS – II functions: [6]

       i) OSSemCreate (semVal)

       ii) OSSemPend(*eventPointer eventPointer, *timeOut timeOut, *SemErrPointer SemErrPointer)

14. a) Why automobile systems require Multi-rate control? Justify with proper analysis. [5]

    b) Determine the utilization of CPU and schedule the tasks using RMS. [5]

15. a) Explain embedded system development processes using ICE. [5]

    b) Explain how linker and locator is used in embedded software development. [5]

16. a) List the steps for formalisms in system design. [4]

b) How light intensity is controlled using PWM with Arduino, explain with suitable circuit diagram. [6]

Tasks	Execution time	Period/Deadline
P1	2	30
P2	4	40
P3	7	120
P4	5	60
P5	1	15

17. Answer any *two* of the following:

a) Explain the working of mailboxes. [5]

b) Describe how memory is shared in multiprocessor system. [5]

c) Explain how embedded software is loaded in to target System. [5]

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VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD
B.E. (I.T.) III Year I-Semester Main & Backlog Examinations, December-2017
Digital Signal Processing

Time: 3 hours
Max. Marks: 70

Note: Answer ALL questions in Part-A and any FIVE questions from Part-B

Part-A (10 × 2=20 Marks)

1. List any four advantages of DSP.
2. Test whether the following system $y(n) = n.x(n)$ is linear time invariant or not.
3. Specify the conditions for a FIR system to have linear phase.
4. State the properties of Bartlett window.
5. Apply impulse invariance transform to analog filter transfer function $H(s) = \frac{1}{s^2+3s+2}$ to obtain digital filter transfer function H(z).
6. Define warping. How it can be avoided in digital filters?
7. Define the different stages in pipelining?
8. Give the functions of data read address bus?
9. Explain function of various blocks in DSP-based biometry receiver system.
10. Differentiate between DSP and other microprocessors architectures.

Part-B (5 × 10 = 50 Marks)

11. a) A System is described by the difference equation [5]
    y(n) = 3y(n-1) + 2y (n-2) + x(n).
    i) Find the impulse response of the system *(ii)* Is it stable?

    b) Compute 8 point DFT of x(n) = {4, 3, 2, 1}using DIF FFT algorithm. [5]

12. a) Discuss the various characteristic features of windows used in FIR filter design. [5]

    b) Design an ideal band pass filter with a frequency response [5]
    $H_d(e^{jw}) = 1$ for $\frac{\pi}{4} \le w \le \frac{3\pi}{4}$ and $H_d(e^{jw}) = 0$ otherwise. Using Triangular window for N=11.

13. a) Design an analog Butterworth filter that has the following specification, pass-band [5]
    attenuation $\alpha_p = 3$dB at frequency $f_p = 10$kHz and stop-band attenuation $\alpha_s = 18$dB at frequency $f_s = 25$kHz.

    b) Realize the second order system described by a difference equation [5]
    $y(n) = 2r.\cos(\omega).y(n-1) - r^2.y(n-2) + x(n) - r.\cos(\omega).x(n-1)$
    using direct form I and direct form II realization.

14. a) Discuss various DSP computational building blocks. [6]

    b) Explain the various addressing modes used in TMS 320C54XX processor. [4]

15. a) Implement speech processing system using TMS 320C54XX processor. [5]

    b) Explain how heart rate obtained from ECG signal using DSP processor. [5]

16. a) Perform linear convolution of a finite duration sequences $h(n) = \{1,1,0,1\}$ and [5]
    x(n)={1,-1,1,2,1,0,1-4,3,2,1,1,0,2} using overlap-add method.

    b) Compare various FIR window techniques. [5]

17. Answer any *two* of the following:
    a) Differentiate between Butterworth and Chebyshev approximation. [5]
    b) Distinguish between Harvard architecture and Von-Neumann architecture for processors. [5]
    c) Explain the JPEG algorithm. [5]

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VASAVI COLLEGE OF ENGINEERING (*Autonomous*), HYDERABAD
B.E.(Civil Engg.) III Year I-Semester Main & Backlog Examinations, December-2017

Theory of Structures-I

Time: **3** hours   Max. Marks: **70**

*Note: Answer **ALL** questions in **Part-A** and any **FIVE** from **Part-B***

Part-A (10 ×2 = 20 Marks)

1. Define static indeterminacy and give an example for static indeterminacy equal to one.
2. Which kinematic indeterminacy is ignored /neglected in moment distribution method.
3. What are the advantages of slope deflection method over moment distribution method?
4. Is slope-deflection method a force or displacement method? Explain.
5. Define rotation and displacement factors.
6. State the advantages of Kani's method over other methods of analysis.
7. List the internal forces at any section of an arch and mark them on a sketch of the arch.
8. When do you use approximate methods of analysis?
9. State Castigliano's theorem-I.
10. What is the effect of temperature rise in a redundant pin jointed structure?

Part-B (5 × 10 =50 Marks)

11. a) Find the static and kinematic indeterminacies of a propped cantilever beam. [3]

    b) Draw bending moment diagrams for the continuous beam ABCD in Fig 1. Use moment-distribution method for analysis. [7]
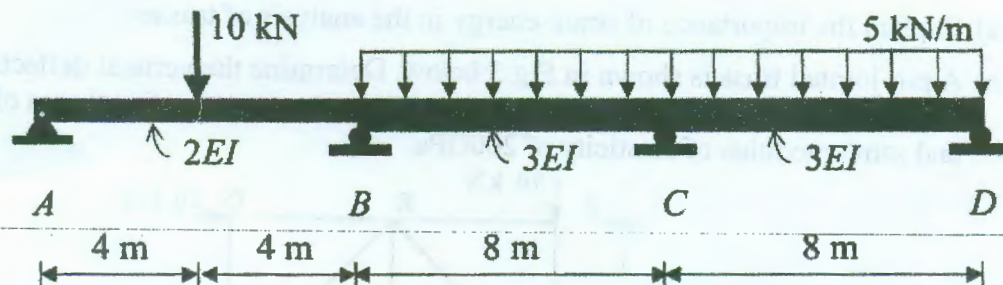
Fig. 1

12. a) What are the causes for side sway in portal frames? [3]

    b) Draw bending moment diagram for the frame in the following Fig:2. use slope-deflection method for analysis. [7]
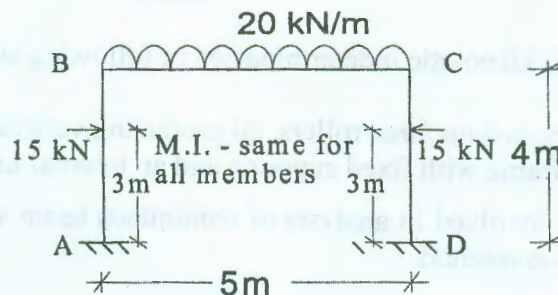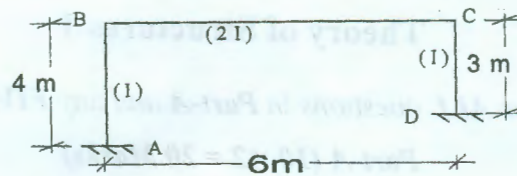

Fig. 2

Contd...2

13. a) Determine displacement factors for the frame in the following Fig:3:   [3]
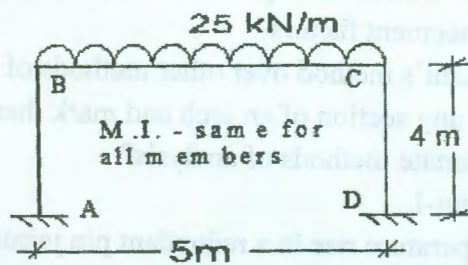

Fig.3

b) Analyse the frame shown in Fig: 4 by Kani's method and find support reactions.   [7]

Fig.4

14. a) Differentiate two hinged and three hinged arches.   [3]

b) A three-hinged parabolic arch, of span 18m and rise 3m, carries a uniformly distributed   [7]
load of 30kN/m over left 6m. Find bending moment, normal reaction and radial shear at
4m from left support.

15. a) Explain the importance of strain energy in the analysis of trusses.   [3]

b) A pin-jointed truss is shown in Fig:5 below. Determine the vertical deflection of joint   [7]
E by using unit load method. All members have same cross-sectional area of 300 sq.mm.
and same modulus of elasticity of 200GPa.
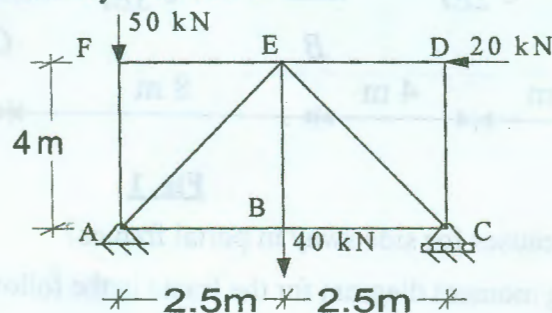
Fig.5

16. a) Find static and kinematic indeterminacies of following structures: [4]

(i) Beam supported on three rollers, all producing vertical reactions.
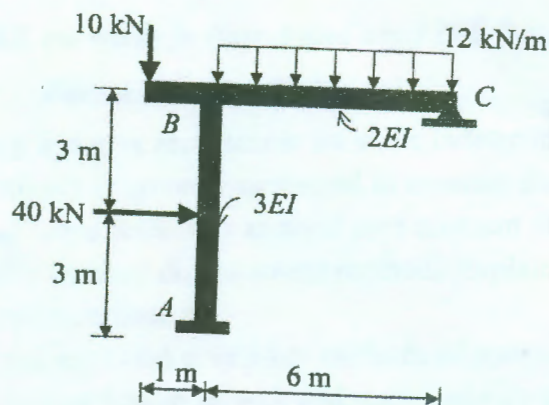(ii) A portal frame with fixed supports and an internal hinge.

b) Explain steps involved in analysis of continuous beam with sinking of supports using   [6]
slope deflection method.

17. Answer any *two* of the following:

    a) Using Kani's method, analyse the frame shown in the Fig:6 and draw bending moment [5] diagram.
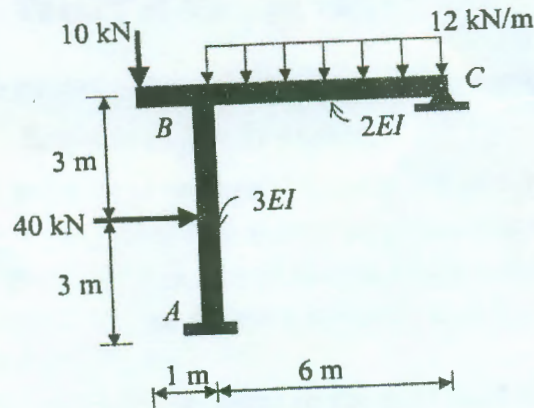

Fig.6

    b) Explain the procedure of portal method of analysis. [5]

    c) Describe in detail the principle in performing analysis of indeterminate trusses. [5]

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VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD
B.E. (EEE) III Year I-Semester Main & Backlog Examinations, December-2017
Power Electronics

Time: **3** hours   Max. Marks: **70**

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

1. What is secondary breakdown in BJT?
2. Why it is necessary to use fast recovery diodes for high speed applications?
3. Distinguish between voltage and current commutation.
4. Mention the significance of high frequency pulse triggering of SCR.
5. Explain the principle of phase control in rectifiers.
6. A 230V, 50 Hz, single pulse SCR is triggered at a firing angle of 60^0 and the load current extinguishes at an angle of 220^0. Find the circuit turn off time.
7. What do you mean by switching mode regulators?
8. List out the applications of cycloconverter.
9. What is the purpose of diodes in inverter circuits?
10. Define modulation index.

Part-B (5 × 10=50 Marks)
(All bits carry equal marks)

11. a) What is schottky diode? How it is different from general purpose diode?

    b) Discuss about the advantages and disadvantages of MOSFET over IGBT.

12. a) With the help of a circuit diagram explain how SCR can be triggered using UJT.

    b) Explain the driver circuits used to turn-ON IGBT.

13. a) With relevant waveforms, explain the operation of three phase half wave controlled rectifier feeding a resistive load.

    b) A single phase fully controlled bridge rectifier is feeding power to an R - L - E load of R = 2Ω and E = 80V. The value of load inductance is large enough to keep load current virtually constant. Input voltage to the rectifier is 230V at 50Hz. Firing angle is 30°. Calculate average output voltage, average output current and input power factor.

14. a) Explain the operation of a boost converter with appropriate waveforms. Also derive the expression for output voltage.

    b) A 230V, 1kW electric heater is fed through an AC voltage controller from 230V, 50Hz source. Find the load power for a firing angle delay of $70^0.$

15. a) Discuss different PWM techniques used in inverters.

    b) Compare 120^0 and 180^0 modes of operation of three phase inverter.

16. a) Draw and explain the switching characteristics of MOSFET.

    b) With necessary circuit diagram, explain the triggering circuit used for single phase bridge rectifier.

17. Answer any *two* of the following:
    a) Explain the operation of Dual converter.
    b) Voltage control methods in choppers
    c) Current source inverters.

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VASAVI COLLEGE OF ENGINEERING (*Autonomous*), HYDERABAD
B.E. (C.S.E.) IV Year I-Semester Main Examinations, December-2017
Information Security

Time: **3** hours

Max. Marks: **70**

*Note: Answer **ALL** questions in **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

1. What are the Components of Information Security?
2. Differentiate threat vs attack.
3. List the strategies for controlling risk?
4. What is meant by cost benefit analysis?
5. Define enterprise information security policy.
6. List the different processing modes in Firewall.
7. Convert the plaintext to cipher text by using Transposition cipher
   Plain text: TOP SECRET
   1->2, 5->3, 3->4, 4->6, 7->9, 8->7, 9->8, 2->1, 6->5
8. Differentiate Symmetric vs Asymmetric key cryptosystems.
9. What is meant by bull's eye model?
10. List some digital forensic methodologies.

Part-B (5 × 10 = 50 Marks)

11. a) Categories and Explain the threats to information Security. [5]
    b) Construct the 3-D NSTISSC Security Model and explain its importance in information security. [5]

12. a) Explain risk management and risk mitigation .What are the three planning approaches that reduce the impact of the risk? [5]
    b) Calculate the Risk Factor to Information asset A has a value score of 50 and has one vulnerability: Vulnerability 1 has a likelihood of 1.0 with no current controls; and you estimate that assumptions and data are 90% accurate. [5]

13. a) Explain the Physical Design of firewalls. [5]
    b) Describe Security policy, Standards and Practices. [5]

14. a) Explain active intrusion prevention mechanisms. [7]
    b) Convert the plain text into cipher text using one time pad Cipher method
       Plain text is : Information Security [3]

15. a) What is the need for project management. [5]
    b) Explain the Negative Feedback Loop. [5]

16. a) Explain types of law in information security. [5]
    b) Calculate ALE (Annualized Loss Expectancy) to the web site that might suffer a deliberate act of vandalism and thus has an SLE of $90,000 and an ARO of 0.50. [5]

17. Answer any *two* of the following:
    a) Explain VPNs [5]
    b) Describe the Intrusion Detection mechanisms [5]
    c) What is Digital Forensics. [5]

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VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD
B.E. (CSE) III Year I-Semester Main & Backlog Examinations, December-2017
Software Engineering

Time: **3 hours**   Max. Marks: **70**

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

1. What is the CMMI assessment method for process improvement?

2. How can you say that prototyping is an evolutionary process model?

3. What is the importance of a project plan and when is it developed?

4. Differentiate between cohesion and coupling.

5. UML is a standard language for developing blueprints. Justify.

6. Define an Interface and give an example.

7. Describe an artifact with diagram?

8. Draw a use-case diagram for a library management system.

9. Compare and contrast verification and validation.

10. What is defect removal efficiency? How is it used to measure software quality?

Part-B (5 × 10 = 50 Marks)

11. a) Write the importance of agile methodology and Explain that how is the scrum meeting effective technique than traditional software model?   [5]

    b) Write a brief note on component based development process model.   [5]

12. a) What is requirement elicitation? Briefly describe the various activities performed in requirement elicitation phase.   [4]

    b) How is risk mitigation, monitoring and management done with a RMMM plan?   [6]

13. a) What are the various relationships between classes? Give relevant examples.   [4]

    b) Draw an advanced class diagram for "college management system". Connect the corresponding interfaces in class diagram.   [6]

14. a) What is Isomorphic diagrams? Write the reason for isomorphic diagram. Draw isomorphic diagram for online exam system.   [4]

    b) List the components in swimlane diagram. Draw a swimlane diagram for online trading system.   [6]

15. a) What is white-box testing? Draw a sample flow graph and determine the cyclomatic complexity.   [6]

    b) A program state the following for an input field: The program shall accept an input value of 4 digit integer equal or greater than 2000 and less than or equal 8000. Determine the test cases using   [4]

       i) Equivalence class partitioning

       ii) Boundary value analysis

16. a) How is requirements validation done? Who are the stakeholders involved in it? [4]

    b) What are the projects for which specialized process models are more suitable? Elaborate. [6]

17. Answer any *two* of the following:

    a) Describe structural and behavioral things in UML. [5]

    b) Draw state machine diagram and deployment diagram for a startup company and explain the things used in it. [5]

    c) Write the metrics used for software maintenance. [5]

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VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
B.E. (Mech. Engg.) III Year I-Semester Main & Backlog Examinations, December-2017
Manufacturing Processes

Time: **3 hours**

Max. Marks: **70**

Note: Answer ALL questions in Part-A and any FIVE questions from Part-B

Part-A (10 × 2 = 20 Marks)

1. Explain the purpose of chaplets and chills.
2. Why is the sand used for moulding?
3. List the inspection methods to find out fine surface and sub-surface defects.
4. Discuss the merits and demerits of hot chamber die casting process over cold chamber die casting process.
5. Explain why the carburizing flame is the longest flame?
6. Outline the function of flux in forge welding process.
7. Define weldability. List the parameters that influence weldability of a material.
8. "Spots cannot be made closer than 16 times the thickness of the sheets in spot welding. But in case of projection welding closer spots are possible" Justify the statement.
9. Compare piercing and blanking processes.
10. What are the merits of nonconventional forming processes over conventional forming processes?

Part-B (5 × 10=50 Marks)
(All bits carry equal marks)

11. a) State the types of gates and explain about their relative merits and demerits along with the applications
    b) Design the riser for the casting section of 25 cm X 15cm X 5 cm using NRL method. Use following table

Shape factor	2	4	6	8	10	12	14	16
Riser volume/casting volume	0.8	0.7	0.55	0.5	0.46	0.43	0.41	0.4

12. a) Explain the investment casting process along with merits and demerits.
    b) Recommend the suitable casting processes for the following components with suitable justification (i) large cast iron pipes (ii) gas turbine blades of aero engines (iii) Carburetor (iii) cylinder head for 4 wheeler.

13. a) What are the merits and demerits of friction welding process? Explain the process in detail.
    b) Discuss the procedure of soldering. Classify the soldering operations explain about them in brief.

14. a) Recommend the process and procedure used for welding of rails.
    b) Explain the principal of resistance welding? Explain the seam welding process with a neat sketch.

15. a) Discuss hot working and cold working processes? Write their relative merits and demerits.
    b) Explain the electromagnetic forming with a neat sketch.

16. a) What are various pattern allowances? Explain about them in brief.
    b) Explain about hot chamber die casting process with a neat sketch.

17. Answer any *two* of the following:
    a) Explain about plasma arc welding with a neat sketch.
    b) Explain about electro slag welding process with a neat sketch
    c) State and explain about various types of forging processes.

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VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD
B.E. (Civil Engg.) IV Year I-Semester Main Examinations, December-2017
Construction Management and Administration

Time: **3** hours   Max. Marks: **70**

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

1. List out the functions of construction Management.

2. What are the demerits of line & staff organization?

3. Mention the limitations of bar charts.

4. Mention the Fulkerson rules of node numbering.

5. Define 'Cost slope'. What does it indicate?

6. How are the weights assigned to three time estimates in expression of "Estimated activity duration".

7. Mention a few safety gadgets used in construction industry.

8. List out the advantages of negotiated contracts.

9. What is the main limitation associated with graphical method of solving LP?

10. Mention the role of surplus variable and slack variable.

Part-B (5 × 10 = 50 Marks)

11. a) Describe the principles of organization?   [7]

    b) What is the significance of construction Management?   [3]

12. a) What is a bar chart? Brief any three of its limitations.   [4]

    b)

Activity	Duration (days)	Activity	Duration (days)	Activity	Duration (days)
1-2	16	4-7	3	8-9	14
2-3	5	4-10	2	9-10	2
2-4	1	5-7	2	10-11	2
3-6	1	6-7	2	10-12	3
4-5	0	7-8	4	11-12	0

Draw a network diagram and find out the critical path and total project duration for the following   [6]
project data.

13. a) Explain the use of normal distribution curve in PERT problems. [3]

b) The following table shows the list of activities along with their time estimates. [7]
   Activity Duration (Weeks)

Activity	Duration (Weeks)		
	t_o	t_m	t_p
1-2	3	6	15
1-6	2	8	14
2-3	6	12	30
2-4	2	5	8
3-5	5	11	17
4-7	3	6	15
5-8	1	4	7
6-7	3	9	27
7-8	4	19	28

Draw the network. Find estimated activity duration, variance of each activity, and slack for each event.

14. a) What are the important conditions of contract? [3]

b) What are different types of organizations? Discuss their relative merits and demerits. [7]

15. a) Brief the steps in solving LPP by graphical method. [3]

b) Solve the following problem by suitable LP (Linear programming) method. [7]

Maximize

$Z=500X_1+600X_2$

Subject to

$3X_1+2X_2 \le 64$

$X_1+4X_2 \le 68$

and $X_1, X_2 \ge 0$

16. a) Write a note on "Construction team". [7]

b) What are the applications of CPM and PERT? [3]

17. Answer any *two* of the following:

a) Briefly explain about 'Work order". [5]

b) What is an "Infeasible solution". Brief as to how it can be identified in graphical and Simplex methods. [5]

c) Briefly explain about 'Project updating". [5]

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Code No. : 41014

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD

B.E. (Civil Engg.) IV Year I-Semester Main Examinations, December-2017

Construction Management and Administration

Time: 3 hours   Max. Marks: 70

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

1. List out the functions of construction Management.

2. What are the demerits of line & staff organization?

3. Mention the limitations of bar charts.

4. Mention the Fulkerson rules of node numbering.

5. Define 'Cost slope'. What does it indicate?

6. How are the weights assigned to three time estimates in expression of "Estimated activity duration".

7. Mention a few safety gadgets used in construction industry.

8. List out the advantages of negotiated contracts.

9. What is the main limitation associated with graphical method of solving LP?

10. Mention the role of surplus variable and slack variable.

Part-B (5 × 10 = 50 Marks)

11. a) Describe the principles of organization?   [7]

    b) What is the significance of construction Management?   [3]

12. a) What is a bar chart? Brief any three of its limitations.   [4]

    b)

Activity	Duration (days)	Activity	Duration (days)	Activity	Duration (days)
1-2	16	4-7	3	8-9	14
2-3	5	4-10	2	9-10	2
2-4	1	5-7	2	10-11	2
3-6	1	6-7	2	10-12	3
4-5	0	7-8	4	11-12	0

Draw a network diagram and find out the critical path and total project duration for the following project data.   [6]

13. a) Explain the use of normal distribution curve in PERT problems.   [3]

   b) The following table shows the list of activities along with their time estimates.   [7]
      Activity Duration (Weeks)

Activity	Duration (Weeks)		
	t_o	t_m	t_p
1-2	3	6	15
1-6	2	8	14
2-3	6	12	30
2-4	2	5	8
3-5	5	11	17
4-7	3	6	15
5-8	1	4	7
6-7	3	9	27
7-8	4	19	28

   Draw the network. Find estimated activity duration, variance of each activity, and slack
   for each event.

14. a) What are the important conditions of contract?   [3]

   b) What are different types of organizations? Discuss their relative merits and demerits. [7]

15. a) Brief the steps in solving LPP by graphical method.   [3]

   b) Solve the following problem by suitable LP (Linear programming) method.   [7]

   Maximize

   $$Z=500X_1+600X_2$$

   Subject to

   $$3X_1+2X_2 \leq 64$$
   $$X_1+4X_2 \leq 68$$
   and $X_1, X_2 \geq 0$

16. a) Write a note on "Construction team".   [7]

   b) What are the applications of CPM and PERT?   [3]

17. Answer any *two* of the following:
   a) Briefly explain about 'Work order'.   [5]
   b) What is an "Infeasible solution". Brief as to how it can be identified in graphical and   [5]
      Simplex methods.
   c) Briefly explain about 'Project updating'.   [5]

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VASAVI COLLEGE OF ENGINEERING (*Autonomous*), HYDERABAD
B.E. (IT) IV Year I-Semester Main Examinations, December-2017
VLSI Design

Time: **3** hours

Max. Marks: **70**

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

1. List the conditional statements used in Verilog.

2. Write about Timing Control used in Verilog.

3. Define threshold voltage and write the threshold voltages of nMOS and pMOS.

4. Design $f = \overline{a + bc}$ using CMOS.

5. Draw the layout of series and parallel connected FET.

6. Explain how doped silicon layers are created using ion implantation.

7. List out the lambda-based Design Rules for Polysilicon.

8. Illustrate Dependence of mid-point voltage V_M on Relative Aspect ratio (i.e. β_n/β_p) of CMOS inverter.

9. Write the Verilog code of a D flip flop.

10. Draw the logic gate diagram of a PLA.

Part-B (5 × 10 = 50 Marks)
(All bits carry equal marks)

11. a) Write about switch level modeling and write the Verilog switch level code for inverter

    b) Explain RTL modeling, write the Verilog code for 2:4 decoder using RTL modeling

12. a) Give RC model of a FET and Explain

    b) Demonstrate CMOS Bubble pushing using an example

13. a) List and explain the masking sequence

    b) Explain with a neat diagram Photolithography

14. a) Develop the equation of rise time and fall time delay.

    b) Discuss about delay minimization in inverter cascade

15. a) Explain the working of a carry look ahead adder and write the Verilog code of same

    b) With a neat diagram explain the working and various operating modes of a 1T DRAM

16. a) Briefly explain various Data types Supported by Verilog HDL with necessary syntax and examples

    b) Design an 8:1 multiplexer using Transmission Gate based 2:1 MUX.

17. Answer any *two* of the following:
    a) Describe the layers used to create a MOSFET
    b) Write about cell concepts and cell based design
    c) Construct EEPROM Using Floating gate nFET.

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Hall Ticket Number:

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
B.E. (ECE) IV Year I-Semester Main Examinations, December-2017
## Mobile Cellular Communication

Time: **3 hours**   Max. Marks: **70**

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

1. Find the traffic intensity offered by a user if he uses 3 calls per hour at an average duration of 3 minutes each.

2. If Signal-to-interference ratio of 18 dB is required for satisfactory performance of a cellular system. What is the cluster size that should be used for maximum capacity if path loss exponent is 3. Assume that the co-channel cells of first tier are at equidistant from the mobile.

3. Compute mean excess delay and rms delay spread for the following Power-Delay profile.
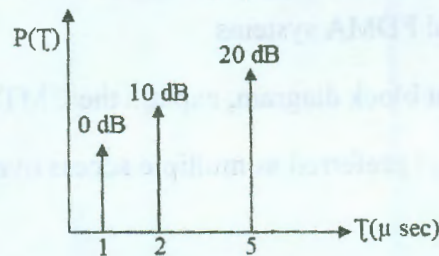
4. Calculate the power received at a receiver at 10 Km from a 10 W transmitter with f_c= 6 GHz, G_t= Gr=1. Assume free space propagation

5. Give the expression for frame efficiency in TDMA systems

6. Draw the block diagram of FHMA system?

7. List the air interface specifications of GSM system.

8. Explain the importance of RAKE receivers in CDMA systems

9. List out the features of 3G technology

10. Write the radio interface specifications of W-CDMA system.

Part-B (5 × 10 = 50 Marks)

11. a) Explain various handoff procedures in different generations of mobile communications with neat diagrams [6]

    b) Describe the techniques to improve the coverage and capacity in cellular systems. [4]

12. a) Derive the expression for the received signal strength for ground reflected propagation model with neat diagrams. [5]

    b) Mention different types of small scale fading and explain in detail [5]

13. a) Explain why and how slotted ALOHA protocol provides high throughput than ALOHA protocol. [5]

    b) Explain the working of SDMA system with neat diagrams [5]

14. a) Explain the speech signal processing in GSM system with the help of neat block diagram. [5]

b) Describe the Forward CDMA channel modulation process with neat block diagram [5]

15. a) Compare the performance parameters of IEEE 802.11a/g/n Wireless LAN standards. [5]

b) Explain the working principle of Bluetooth technology. [5]

16. a) Derive an expression for Signal to Interference Ratio (SIR) for hexagonal cellular system. [5]

b) Why the structure of a cell in cellular systems is chosen hexagonal shape? [5]

17. Answer any *two* of the following: [5]

a) Compare TDMA and FDMA systems

b) With the help of neat block diagram, explain the UMTS system architecture in detail [5]

c) Why W-CDMA is not preferred as multiple access over OFDMA for 4G system? [5]

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Code No. : 41414

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
B.E. (Mech. Engg.) IV Year I-Semester Main Examinations, December-2017
Operations Research

Time: 3 hours   Max. Marks: 70

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

1. With "n' variables and "m" constraints, how many basic solutions are there in LPP.
2. If 2 constraints intersect at the same point on the x axis of the feasible region, what happens to the solution of LPP?
3. What solution do you get for dual when the primal solution is unbounded?
4. How do you solve LPP by Dual simplex method?
5. Write the generalized LPP form of an assignment problem.
6. If there is movement between Depots of a transportation network how do you find the optimal solution?
7. Write the condition of finite difference equation in the replacement of an equipment without time value.
8. Define the terms pure strategy and zero sum game with reference to game theory
9. When do you get an alternate optimal solution in sequencing problem by Johnson Algorithm?
10. Distinguish infinite and finite population queueing models.

Part-B (5 × 10 = 50 Marks)

11. a) How do you resolve degeneracy in LPP   [2]

    b) A company produces exactly 200 kgs of animal feed by taking 2 ingredients A and B.   [8]
       The cost of A is Rs 3/kg while B costs Rs 8/kg. Not more than 80 kgs of A and a
       minimum of 60 kgs of B must be used. Formulate as LPP and solve by simplex method.

12. a) Write the relation between primal and dual of an LPP   [2]

    b) Maximize P=5x+12y+4z   [8]
       $x+2y+z \le 5$
       $2x-y+3z \ge 2$

    All variables are nonnegative

    Find optimal solution. Discuss the effect of changing the right hand side constants of
    the constraints from *(i)* (5, 2) to (7, 2) *(ii)* (5, 2) to (3, 9).

13. a) Explain Vogel Approximation Method in Transportation Problem.   [2]

    b) The table below shows the transportation cost matrix, cost of production and sales price   [8]
       Find the maximum profit solution.

		Depots					
		E	F	G	H	Capacity	Cost of production/unit
	A	7	5	6	4	10	10
Plant	B	3	5	4	2	15	15
	C	4	6	4	5	20	16
	D	8	7	6	5	15	15
	Demand	8	12	18	22		
	Sales price/unit	20	22	25	18		

14. a) Discuss about types of failure mechanisms in replacement theory.   [2]

    b) Solve following game using graphical method   [8]

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B

		I	II
	I	6	12
A	II	-2	14
	III	8	-4

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15. a) Derive an expression for length of queue in a single server infinite population model.   [4]

    b) Find optimal sequence, minimum elapsed time and idle time for each machine for the following sequencing problem without passing rule. Show the idle time in Gantt chart.   [6]

Job	1	2	3	4	5	6
M/C -A	3	12	5	2	9	11
M/C -B	8	6	4	6	3	1
M/C -C	13	14	9	12	8	13

16. a) Write the dual of the following primal problem with all variables non negative   [5]
       Minimize $Z = 30x+80y$
       $2x+2y = 400$
       $x \leq 160$
       $y \geq 120$

    b) Solve the LPP   [5]
       Maximize $z = 40x+100y$
       $|5-(1/3)x| \leq 1$
       $3 \leq y \leq 6$
       All variables are positive

17. Answer any *two* of the following:

    a) What do you understand by traveling salesman problem? Explain it as a special case of assignment.   [5]

    b) Formulate a payoff matrix when two players A and B play a game in which both toss one rupee coin each; player A wins if coins match otherwise B wins. However matching of heads have double premium.   [5]

    c) If customers arrive at the rate of 10 per hour and served at the rate of 15 per hour what is the queue length? If the arrival rate increases by 10%find the %change in queue length?   [5]

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VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD
B.E. (EEE) III Year I-Semester Main & Backlog Examinations, December-2017
Linear Integrated Circuits

Time: 3 hours

Max. Marks: **70**

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

1. Define the following:
   i) Input offset current ii) Input bias current

2. Define Schmitt trigger? Mention few applications of the same.

3. Distinguish between AC amplifier and DC amplifier.

4. What is a peak detector?

5. What is Barkhausen criteria for the circuit to produce oscillations? Explain.

6. State the terms associated with PLL?

7. Briefly explain about fixed voltage regulator? How it is different from variable voltage regulator?

8. Mention the limitations of linear voltage regulators.

9. Why the active filters are considered to be superior over conventional passive filters? Explain.

10. What is a universal filter?

Part-B (5 × 10 = 50 Marks)
(All bits carry equal marks)

11. a) Define slew rate. How does this limit the response of an Op-amp? How can the slew rate be improved?

    b) Explain the operation of a voltage to current converter by deriving the necessary equations.

12. a) Draw the circuit of a multiplier using OP AMPS and explain its operation.

    b) Explain the operation of a half-wave precision rectifier.

13. a) Design a square wave generator to operate at a frequency of 1.5 kHz.

    b) Explain dual slope integrating type ADC.

14. a) Explain the operation of a triangular wave generator by drawing the output waveform and derive the expression for frequency of oscillations.

    b) Derive the expression for the period of a pulse generated when a 555 timer is used as a monostable multivibrator.

15. a) State the merits and demerits of active filters over passive filters.

    b) Determine i) 'Q' factor ii) f1 and f2 for a second order band pass filter with a center frequency of 1 kHz and bandwidth = 20 Hz.

16. Explain the operation of a state variable filter. Derive the transfer functions for all the filters available in it.

17. Answer any *two* of the following:

    a) Draw the functional diagram of 555 Timer.
    b) Explain Balanced Modulator.
    c) Explain voltage controlled oscillator.

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VASAVI COLLEGE OF ENGINEERING (*Autonomous*), HYDERABAD
B.E. (I.T.) III Year I-Semester Main & Backlog Examinations, December-2017
Software Engineering

Time: **3 hours**   Max. Marks: **70**

Note: Answer ALL questions in Part-A and any FIVE from Part-B
Part-A (10 × 2 = 20 Marks)

1. Give the IEEE definition of Software Engineering.
2. List two advantages of Spiral model of software development.
3. Differentiate between layered cohesion and functional cohesion.
4. Define software design process.
5. Identify two basic features of object constraint language.
6. List the steps involved in the User Interface Design.
7. Compare black box testing with white box testing.
8. Compute Cyclomatic complexity for a given graph G.
9. What is the use of Software Maturity Index and write the formula for it.
10. Summarize the metrics for source code.

Part-B (5 × 10 = 50 Marks)

11. a) Identify the drawbacks of waterfall model. Explain Prototype model of software [7]
       development.

    b) In an agile model, a build is expected to be ready within 2 to 4 weeks of time? How is [3]
       this possible?

12. a) Explain all design concepts in design engineering. [5]

    b) Demonstrate Data modeling concepts with an example. [5]

13. a) Describe any three architectural styles with the help of a diagram. [6]

    b) Explain the steps involved while conducting a component level design. [4]

14. a) Elaborate control structure testing with an example. [5]

    b) What is CMMI? Why is it used and explain all levels in CMMI. [5]

15. a) Describe the process of Software Configuration management. [5]

    b) Explain SQA Goals and Metrics. [5]

16. a) With the help of a diagram explain incremental process model. [5]

    b) Explain Behavioral modeling with an example. [5]

17. Answer any *two* of the following:

    a) Design Architectural Diagram for *Safe Home Security Function* application. [5]

    b) Classify ISO 9000 Quality Standards. [5]

    c) Explain RMMM. [5]

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VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
B.E.(Civil Engg.) III Year I-Semester Main & Backlog Examinations, December-2017
Environmental Engineering

Time: 3 hours   Max. Marks: 70

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

1. Describe the characteristics of potable water.
2. Write about Infiltration gallery.
3. Define Stoke's law and its validity.
4. Define break point chlorination with a neat sketch.
5. Outline the necessity of Sewer Appurtenances. List out them.
6. Appraise your understanding on self-cleansing velocity in sewers.
7. Explain the principle involved in trickling filter.
8. List the functions involved in preliminary treatment of wastewater.
9. Explain the working principle in oxidation pond.
10. List out the sources of solid waste.

Part-B (5 × 10 = 50 Marks)

11. a) List the permissible limits of chlorides, nitrates, hardness and fluorides for drinking water. Name the diseases caused if they exceed the permissible limits.   [4]

    b) Forecast the population of a town for two decades using incremental increase method using the population census given below.   [6]

Year	1970	1980	1990	2000	2010
Population	40000	45000	53000	58000	63000

12. a) Explain the functional problems and remedial measures in rapid sand filter.   [5]

    b) Explain the methods of disinfection in brief.   [5]

13. a) The 3 day 37^0C BOD of a wastewater sample is 300ppm. What will be its 5 day 30^0C BOD? Assume $K_{20} = 0.1$.   [5]

    b) Explain the self-purification of water.   [5]

14. a) Differentiate between trickling filter and Activated sludge process   [5]

    b) Explain the various aeration methods in Activated sludge process.   [5]

15. a) Explain the factors affecting sludge digestion   [4]

    b) Design the septic tank for the following data.   [6]

    No. of persons   = 1000
    Sewage/capita/day   = 120 litres
    Desludging period   = 1 year
    Length:Width   = 3:1

16. a) Explain the layouts of water distribution system.   [5]

    b) Describe the design principles of slow sand and rapid sand filters.   [5]

17. Answer any *two* of the following:

    a) What are Sewerage systems, explain them in brief.   [5]

    b) Explain the High Rate Trickling Filter.   [5]

    c) Explain the composition of solid waste.   [5]

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VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD
B.E. (ECE) III Year I-Semester Main & Backlog Examinations, December-2017
Microprocessors and Microcontrollers

Time: **3 hours**   Max. Marks: **70**

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

1. List the advantages of maximum mode operation of 8086μp.
2. Draw the flag register format of 8086μp and explain.
3. Explain the assembler directives (i) EVEN (ii) PTR.
4. Differentiate between conditional and unconditional jump instructions of 8086μp.
5. Draw the control word format of 8255 in I/O mode and explain.
6. List out the important parameters needs to be consider for serial transmission.
7. Write an ALP in 8051μc to complement the upper nibble of the given byte (47H) stored in accumulator.
8. Write about MOV, MOVC, MOVX instructions in 8051μc.
9. Mention function of RS, R/W, Enable signals of LCD module.
10. Draw the SCON register format of 8051μc and explain.

Part-B (5 × 10 = 50 Marks)

11. a) Briefly explain the addressing modes of 8086μp with suitable examples.   [5]
    b) Draw the read and write cycles diagrams of 8086μp under minimum mode of operation.   [5]
12. a) Write an ALP in 8086μp to sort the elements in descending order.   [6]
    b) Differentiate between procedures and macros with suitable examples.   [4]
13. a) Interface 8253 with 8086μp and explain its different modes of operation.   [5]
    b) Explain the architecture of 8279 when interfaced with 8086μp.   [5]
14. a) Discuss about the RAM and ROM memory organization of the 8051μc with suitable diagram.   [5]
    b) Write an ALP to generate the square on P1.3 of 8051μc with 2ms of delay using timer1 in mode1. (Assume xtal freq=11.0592Mhz)   [5]
15. a) Interface 16Kx8 DRAM and 16Kx8 PROM with 8051μc.   [5]
    b) Interface D/A converter to 8051μc to write an ALP to generate sawtooth waveform.   [5]
16. a) Write about the significance of bus interface unit in 8086μp architecture.   [5]
    b) Explain the following 8086μp instructions with examples   [5]
       (i)MOVSB (ii) DAA (ii) PUSHF (iv) WAIT (v) CLD
17. Answer any *two* of the following: [5]
    a) Interface two 16KX8 RAM chips and two 32KX8 EPROM chips to 8086μp (Choose suitable address map).   [5]
    b) Write about DJNZ, CJNE, LCALL, ROR, ADC instructions in 8051μc with examples.   [5]
    c) Interface 7-segment display to 8051μc to display 0-9 continuously.   [5]

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VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD
B.E. (CSE) III Year I-Semester Main & Backlog Examinations, December-2017
Managerial Economics and Accountancy

Time: **3** hours

Max. Marks: **70**

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Part-B (10 × 2 = 20 Marks)

1. What do you understand by macroeconomics?

2. Explain discounting principle.

3. What is equilibrium?

4. Illustrate marginal revenue.

5. Discuss economies of scale.

6. List the market structures.

7. Explain payback period.

8. Examine capital budgeting.

9. Discuss what 'Journal' is.

10. Examine the significance of three column cash book.

Part-B (5 × 10 = 50 Marks)
(All bits carry equal marks)

11. a) Explain the relationship of Managerial Economics with other subjects.

    b) Discuss the utility of managerial economics to engineers.

12. a) State the law of demand and explain the determinants of demand.

    b) Interpret the various elasticities of demand.

13. a) Draw the breakeven chart and explain its components.

    b) How is the price output determination done under monopoly?

14. a) Explain the discounted cash flow techniques.

    b) A Company has an investment opportunity costing Rs.40,000 with the following expected cash flows after taxes

Year	1	2	3	4	5	6	7	8	9	10
CFAT	7,000	7,000	7,000	7,000	7,000	8,000	10,000	15,000	10,000	4,000

Using 10% cost of capital determine net present value.

15. a) Examine the principles of double entry system of book keeping.

 b) Consider the following information of AllTech Ltd.

Balance Sheet of AllTech Ltd
as on 31 December 2015

Liabilities	Rs.	Assets		Rs.
Share Capital	15,56,000			
10% debentures	10,00,000	**Fixed Assets:**		
Current Liabilities:		Equipments:	12,00,000	
Creditors	3,00,000	Less: Depreciation	1,60,000	10,40,000
Bank Loan	6,00,000	**Current Assets:**		
		Cash		3,60,000
		Debtors		4,80,000
		Stock		13,20,000
		Prepaid Expenses		2,56,000
Total	**34,56,000**	**Total**		**34,56,000**

Profit and Loss Account of AllTech Ltd
for the year ended 31 December 2015

Sales	6,90,000
Cost of Goods sold	3,00,000
Gross Profit	3,90,000
Operating Expenses	1,80,000
PBIT	2,10,000
Interest	48,000
PBT	1,62,000
Tax	54,000
PAT	1,08,000

From the above information you are required to calculate the following ratios.

Ratios	AllTech Ltd
Current Ratio	
Quick Ratio	
Debt Equity Ratio	

16. a) Distinguish between risk and uncertainty.

 b) Differentiate Point and Arc Elasticity of demand.

17. Answer any *two* of the following:
 a) Elaborate the properties of isoquant.
 b) Discuss the short term sources of finance.
 c) How is trial balance prepared?

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14. a) A Kaplan turbine runner is to be designed to develop 7357.5kW of shaft power. The net [8] available head is 5.50m. Assume speed ratio is 2.09 and flow ratio is 0.68 and overall efficiency is 60%. Diameter of boss is 1/ 3 rd of the diameter of the runner. Determine (i) Diameter of the runner (ii) speed of the runner   (iii) specific speed of the turbine.

b) Calculate the specific speed of a turbine that develops 6400 kW of power under a head [2] of 16 m at 120 rpm.

15. a) Explain the working principle of gear pump with a neat diagram. [5]

b) With a neat sketch, explain the working of a 2/ 2 way, 3/2 way and 3/3 way directional [5] control valve.

16. a) Prove that the maximum force exerted by water jet striking a moving curved plate is [5] greater than that on a moving flat pate.

b) Show that the work saved in overcoming friction in the pipe lines by fitting air vessels [5] is 84.8% for a single acting reciprocating pump.

17. Answer any *two* of the following:
   a) Priming of a centrifugal pump. [5]
   b) Types of draft tubes and their functions. [5]
   c) Working of radial piston pump. [5]

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VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD
B.E. (Civil Engg.) III Year I-Semester Main & Backlog Examinations, December-2017

Fluid Mechanics-II

Time: 3 hours   Max. Marks: 70

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

1. Write the classification of flows in open channels.
2. What is the relation between Manning's and Chezy's equation?
3. By means of practical applications, show Mild slope.
4. State the assumptions made in the derivation of momentum equation for jump.
5. Define the term: Turbulent Boundary layer.
6. Write the effect of pressure gradient on boundary layer separation.
7. State Buckingham π-theorem.
8. What is distorted model?
9. A turbine develops 8050kW power under a head of 25m at 140rpm. Calculate the specific speed of the turbine and state the type of turbine.
10. List various pump characteristics.

Part-B (5 × 10 = 50 Marks)

11. a) A trapezoidal channel has side slopes of 1 horizontal to 2.5 vertical and the bed slope is 1 in 2200. The area of the section is $42m^2$. Find the dimensions of the section if it is most economical. Also determine the discharge of the most economical channel if C = 60 and also with n = 0.025.   [6]

    b) Write the conditions of critical flow.   [4]

12. a) Derive the dynamic equation of gradually varied flow listing the assumptions.   [5]

    b) The specific energy for a 6m wide rectangular channel is to be 7kg-m/kg. If the rate of flow through the channel is 27.5cumec, determine the alternative depths, head loss due to jump.   [5]

13. a) Explain the phenomena of boundary layer separation.   [5]

    b) A truck having projected area of $6.5m^2$ travelling at 70kmph has a total resistance of 2000N. Of this 20% is due to rolling friction and 10% is due to surface friction. The rest is due to form drag. Calculate the coefficient of form drag. Take density of air as 1.25 kg/m^3 [5]

14. a) Explain Rayleigh's method of dimensional analysis.   [5]

    b) The pressure difference (Δp) in a pipe of diameter (D) and length (l) due to viscous flow depends on the velocity (V), viscosity (μ) and density (ρ). Using Buckingham Π theorem: Obtain an expression for Δp.   [5]

15. a) Derive the equation to estimate the minimum speed for starting of a centrifugal pump.   [5]

    b) A reaction turbine works at 500rpm under a head of 100m. The diameter of the turbine at inlet is 100cm and the flow area is $0.335m^2$. The angles made by absolute and relative velocities at inlet are 15° and 60° respectively with the tangential velocity. Determine the volume of flow rate, efficiency and the power developed. Assume the whirl at the outlet to be zero.   [5]

16. a) Find in terms of specific energy E, an expression for critical depth in rectangular channel. [5]

b) Find the slope of surface in a rectangular channel of width 20m having depth of flow 5m. The discharge through the channel is 50m³/s. The bed of the channel is having a slope of 1 in 4000. Take chezy's constant as 60. [5]

17. Answer any *two* of the following:

a) Explain in detail about supplying additional energy from a blower method of preventing the separation of boundary layer. [5]

b) Show that the ratio of inertia force to viscous force gives Reynolds number. [5]

c) List out various characteristic curves of a turbine and explain in brief about Main characteristic Curves with neat sketches. [5]

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Code No. : 31122

VASAVI COLLEGE OF ENGINEERING (*Autonomous*), HYDERABAD
B.E. (CSE) III Year I-Semester Main & Backlog Examinations, December-2017
Operating Systems

Time: **3** hours

Max. Marks: **70**

*Note: Answer **ALL** questions in **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

1. What is the difference between a *program* and a *process*?

2. Draw a neat diagram to show the implementation of a system call.

3. If the size of physical memory is 4 GB and the size of virtual memory is 2 GB, how many page table entries will be there per process assuming a page size of 4 KB?

4. Write about the fields in File Control Block (FCB).

5. What is the necessary condition for a critical section problem to arise?

6. Is it possible for a deadlock to arise when resource preemption is allowed? Justify your answer.

7. Compare RAID level 0 with RAID level 1.

8. What is a device controller and device driver? How these two components are related to each other while performing I/O operation?

9. What are the goals of Operating system in ensuring protection?

10. List the design principles of Linux.

Part-B (5 × 10 = 50 Marks)
(All bits carry equal marks)

11. a) Explain two techniques for achieving load balancing in multiprocessor scheduling mechanisms.

    b) Compute turnaround time and waiting time for the following process given by using FCFS, SJF, SRTF and Round Robin CPU Scheduling algorithms, where time slice = 2msec

Process	Burst time	Priority	Arrival time
P1	2	2	0
P2	1	1	1
P3	8	4	2
P4	4	2	1
P5	5	3	2

12. a) What is the purpose of multi-level page table? Explain the utility using an example.

    b) A certain computer provides its users with a virtual memory space of 2^{32} bytes. The computer has 2^{22} bytes of physical memory. The virtual memory is implemented by using paging. The page size is 4096 bytes. A user process generates the virtual address 11123456. Explain how the system establishes the corresponding physical location.

13. a) Describe the solution for Readers-Writers problem with Semaphores

    b) Consider a system consisting of four resources of the same type that are shared by three processes, each of which needs at most two resources. Show that the system is deadlock free.

14. a) Compare NAS and SAN to attach disk storage to the system with the help of a neat diagram.

   b) Describe the functions of Kernel I/O subsystem in detail.

15. a) Discuss the strengths and weaknesses of implementing an access matrix using capabilities that are associated with domains and access list associated with objects.

   b) Draw a neat diagram to show the implementation of Services in Android Operating system.

16. a) Explain the advantages of Multithreading. Also explain with neat sketches to map user threads to kernel threads.

   b) What is the use of TLB (Translation Look Aside buffer) in efficient implementation of Paging? Compute effective memory-access time if 80% is the TLB hit ratio and 100 nanoseconds require to access main memory.

17. Answer any *two* of the following:

   a) Explain what is a *test_and_set* instruction. Demonstrate how mutual exclusion can be achieved using this instruction.

   b) Describe the major issues in Disk management.

   c) Explain major components of Windows Operating system with a neat diagram.

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