Hall Ticket Number:

Code No. : 13106

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

B.E. (CBCS) Civil Engg. III-Semester Main Examinations, December-2017

Surveying -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. The magnetic bearing of a line is $43^0\ 31'$. What is the true bearing of the line if the magnetic declination is $1^0\ 25'$ E?
2. State the different types of errors in compass surveying?
3. Define resection?
4. Write the radiation method of plane table surveying?
5. What is the need of application of curvature and refraction corrections to staff measurements?
6. What is balancing of foresight and backsight?
7. State the trapezoidal formula and Simpsons formula for calculation of areas
8. Find out the volume of earthwork in a road cutting 120 m long from the following data:

   The formation width 10m, side slopes 1 to 1; average depth of cutting along the centre line is 5m; slopes of ground in cross section 10 to 1.
9. State the basic working principle of any EDM equipment?
10. Define and state the applications of Gale's traverse table?

Part-B (5 × 10=50 Marks)

11. a) Explain the working principle of Prismatic Compass with a neat sketch? [5]

    b) P and Q are two points 210 m apart along a bank of a river which flows from east to west The bearings of a tree on the far bank as observed from A and B are N $50^0\ 00'$E and N $43^0\ 00'$ W respectively. Determine width of the river ? [5]
12. a) Explain the three point problem by trial and error method? [5]

    b) Explain traversing method of plane table surveying? [5]
13. a) Determine the missing data from the following level field book and apply usual checks: [6]

Station	BS	IS	FS	Rise	Fall	RL	Remark
1	3.125					?	BM
2	?		?	1.325		125.505	TP
3		2.320			0.055		
4		?				125.850	
5	?		2.655				TP
6	1.620		3.205		2.165		TP
7		3.625					
8			?			123.090	TBM

b) Derive an expression for determination of sensitivity of level tube? Use standard notations [4]

Contd...2

Code No. : 13106

14. a) The following notes refer to three level cross-sections at two sections 50m apart: [5]

A.	1.8	2.7	4.8
	7.8	0.0	10.8
B.	2.8	3.7	6.8
	8.8	0.0	12.8

The width of cutting at the formation level is 12m. Calculate the volume of cutting between two stations.

b) The following perpendicular offsets were taken from a chain line to a hedge [5]

Chainage (m)	0	15	30	45	60	70	80	100	120	140
Offsets(m)	7.6	8.5	10.7	12.8	10.6	9.5	8.3	7.9	6.4	4.4

Calculate the area between the survey line, the hedge and end offsets by (A) Trapezoidal rule and (b) Simpsons rule

15. a) A closed traverse was conducted round an obstacle and the following observations were made. Work out the missing quantities [5]

Side	Length in m	Azimuth
AB	-	33°45'
BC	300	86°23'
CD	-	169°23'
DE	450	243°54'
EA	268	317°30'

b) Write the equations used and procedure adopted for balancing of a closed traverse as per Bowditch's method. [5]

16. a) Explain the intersection method of plane table surveying? [3]

b) The following are the bearings taken on the closed traverse [7]

Line	FB	BB
AB	S 37° 30' E	N 37° 30' W
BC	S 43° 15' W	S 44° 15' E
CD	N 73° 00' W	S 72° 15' E
DE	N 12° 45' E	S 13° 15' W
EA	N 60° 00' E	S 59° 00' W

Compute the interior angles and correct them for observational errors. Assuming the observed bearing of the line AB to be correct, adjust the bearing of the remaining sides

17. Answer any ***two*** of the following:

a) Measurement of volume from contour plan [5]

b) Reciprocal levelling [5]

c) What are the capabilities of Total station and how they are useful for land surveying? [5]

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Hall Ticket Number:

Code No. : 13406

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

B.E. (ECE : CBCS) III-Semester Main Examinations, December-2017

Electronic Materials & Devices

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. Compare Avalanche and Zener Breakdown mechanisms.
2. Draw the DC and AC models of PN junction diode.
3. A 230V, 50Hz voltage is applied to the primary of a 4:1 step down transformer used in a bridge rectifier having a load resistance of 600Ω. Assuming the diodes to be ideal, determine d.c. output voltage and d.c. power delivered to the load.
4. What is meant by Tunneling effect?
5. What is meant by thermal runway in transistor amplifier circuits?
6. The following quantities are measured in a transistor: $I_C = 5mA$ and $I_B = 100\mu A$. Determine α and β.
7. Draw the equivalent h-parameter model for CB configuration.
8. Compare V-I characteristics of DIAC and SCR.
9. List the advantages of MOSFET over JFET.
10. Determine the values of resistors R_D and R_S for the self-biased n-channel JFET having the parameters. $V_P = -5$ V, $I_{DSS} = 12mA$, $V_{DD} = 12$ V, $I_D = 5$ mA and $V_{DS} = 6$ V.

Part-B (5 × 10 = 50 Marks)

11. a) Derive the expression for the transition capacitance C_T and depletion width in case of $P\text{-}N^+$ junction diode. [6]

    b) Determine the position of the Fermi-level with respect to the edge of the conduction band of the p-type Ge at 300K if the conductivity is $100(\Omega\text{-cm})^{-1}$ and intrinsic concentration is $2.5\times10^{13}/cm^3$. Assume $N_V = 6\times10^{19}/cm^3$ and $E_G = 0.72eV$ at 300K. [4]

12. a) Design a filter for full wave rectifier circuit with LC filter to provide an output voltage of 25 V with a load current of 100mA and its ripple is limited to 3%. [5]

    b) Explain the construction and working principle of LED. What are the merits of LED over LCD. [5]

13. a) Draw the circuit of self-biased CE amplifier using diode compensation for V_{BE}. Describe how bias compensation is achieved. [5]

    b) Derive the expression for stability S and S' of a CE amplifier self – bias circuit. [5]

14. a) How will you find h-parameters for transistor in CE configuration using graphical method? [5]

    b) Explain the working operation of UJT. List its applications. [5]

Contd... 2

15. a) Explain the basic construction of a N-channel depletion type MOSFET. Draw and explain its characteristics. [6]

    b) A FET has a drain current of 4mA. If I_{DSS} = 8 mA and $V_{gs(off)}$ = -6 V. Find the values of V_{gs} and V_p. [4]

16. a) Explain Schottky and Ohmic junctions with help of energy-band diagrams. [4]

    b) A full wave rectifier with a centre-tapped transformer supplies a dc current of 100 mA to a load resistance of R = 20 Ω. The secondary resistance of transformer is 1 Ω. Each diode has a forward resistance of 0.5 Ω. Determine the following: [6]

    i) Rms value of the signal voltage across each half of the secondary.

    ii) DC power supplied.

    iii) PIV rating for each diode.

    iv) AC power input to the rectifier.

    v) Conversion efficiency.

17. Answer any ***two*** of the following:

    a) Distinguish between d.c and a.c load lines of BJT with suitable examples. [5]

    b) Write short notes on TRIAC as a switch. [5]

    c) Draw and explain the Source follower circuit. [5]

Hall Ticket Number:

Code No. : 13606

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

B.E. (I.T.: CBCS) III-Semester Main Examinations, December-2017

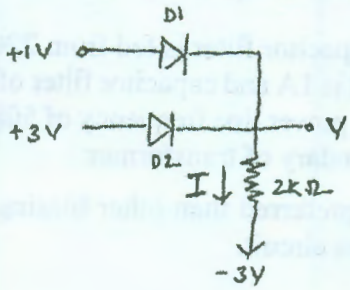
Basic Electronics

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. Define the concept of depletion region in a pn junction diode.
2. For the circuit shown below, assuming ideal diode, determine current I, and Voltage V.



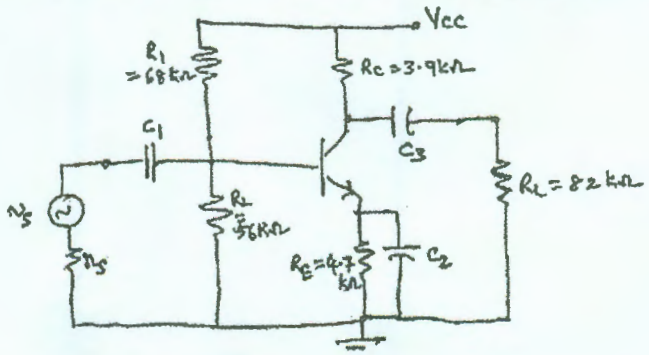
3. Compare BJT and FET.
4. Explain the need for biasing a transistor.
5. List the important characteristics of FET.
6. Implement NOT gate using CMOS circuit.
7. Define Barkhausen Criterion for oscillations.
8. Write the expression for frequency of Oscillation of a tuned LC Oscillator.
9. Define the terms (i) Slew rate (ii) CMRR
10. Draw the circuit diagram for op-amp as differentiator.

Part-B (5 × 10 = 50 Marks)

11. a) Explain how Zener diode acts as a regulator. [4]

    b) Derive the expressions for PIV, Ripple factor and Conversion Efficiency of a Full wave rectifier. [6]

12. a) A common Emitter circuit shown below, has the following h- parameters: h_{ie}=2.1KΩ, h_{fe}=75 and h_{oe}=1μS. Determine input impedance and output impedance. [6]



    b) Explain how transistor is used as a switch. [4]

Contd... 2

13. a) Briefly explain the operation of CMOS inverter. [5]

    b) Compare the various digital integrated circuit logic families. [5]

14. a) Draw the different topologies in a negative feedback amplifier. Explain the effect of feedback on the input and output impedances in each case. [5]

    b) Draw the circuit diagram of Colpitts oscillator. Derive the expression for its frequency of Oscillation. [5]

15. a) Explain the operation of op-amp as current controlled voltage source. [5]

    b) Briefly explain the operation of op-amp as instrumentation amplifier. [5]

16. a) A bridge rectifier with capacitor filter is fed from 220V to 40V step-down transformer. If average dc current is load is 1A and capacitor filter of 800μF, calculate the load regulation and ripple factor, assume power line frequency of 50Hz. Neglect diode forward resistance and dc resistance of secondary of transformer. [5]

    b) Why self bias circuit is preferred than other biasing circuits? Derive the expression for stability factor of self bias circuit. [5]

17. Answer any ***two*** of the following:

    a) CMOS-NAND implementation [5]

    b) Draw the RC-phase shift oscillators and derive its frequency of oscillation. [5]

    c) Op-amp as a Analog multipliers [5]

Hall Ticket Number:

Code No. : 13306

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

B.E. (CBCS: EEE) III-Semester Main Examinations, December-2017

Electrical Circuits-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. Explain passive sign convention using suitable example.
2. A Pure inductor acts as a short circuit to DC at steady state. Justify.
3. Draw power triangle and hence define power factor.
4. With respect to an Alternating Quantity, differentiate between frequency and angular velocity 'ω'.
5. Find by superposition theorem current through 4Ω resistor for the circuit shown in fig.1

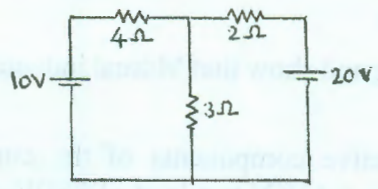


Fig.1

6. State Tellegan's theorem as applied both ac & dc networks.
7. Define Q factor. What is its significance?
8. Is resonant frequency dependent on circuit resistance? Comment.
9. Deduce the relationship between line & phase quantities in a 3□ Star system.
10. Explain the concept of mutual inductance with respect to a transformer.

Part-B (5 × 10 = 50 Marks)

11. a) Derive for the energy stored in an inductance. [3]

    b) A pure inductance of 3 mH carries a current of the wave form shown in fig.2 Sketch the wave forms of v(t) & p(t). Also determine the average power consumed by the inductor [7]

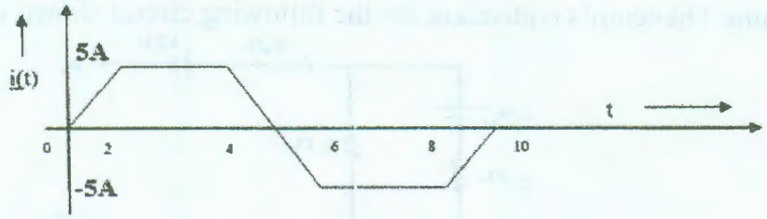


Fig.2

12. a) Perform steady state analysis for a pure capacitor and hence show that the power factor is zero lagging. [5]

    b) A series circuit consisting of a 10 Ω resistor, a 100 μF capacitance and a 10 mH inductance is driven by an AC source of 100V, 50 Hz. Calculate the equivalent impedance, current, power factor & power dissipated in the circuit. [5]

Contd... 2

13. a) State and explain Reciprocity theorem. [5]

b) By Norton's theorem find the current through 5Ω resistor for the circuit shown in fig.3. [5]

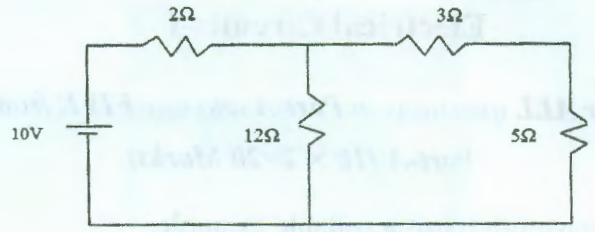


Fig. 3

14. a) Draw the current locus of a network having fixed resistance & variable capacitance. [5]

b) A series RLC with 10 Ω, 1 mH& 1 μF is connected across a sinusoidal source of 20 V & variable frequency. Determine: [5]

i. The resonant frequency
ii. Q factor
iii. Half power frequencies

15. a) Explain coefficient of coupling and show that Mutual inductance is directly dependant on this factor. [4]

b) Calculate the active and reactive components of the current in each phase of a star connected generator supplying at 11KV to a load of 5MW at 0.8 pf lagging. What is the value of new output if the total current is same and the pf is raised to 0.85? [6]

16. a) By taking an example explain the concept of a Super node. [5]

b) Find form factor for the waveform shown in fig.4. [5]

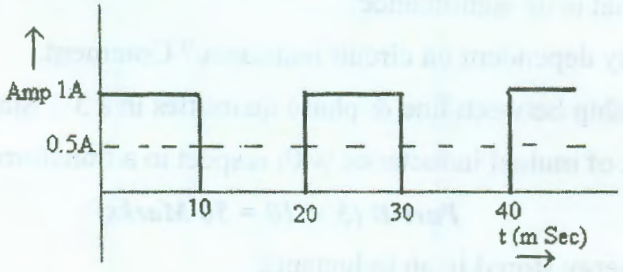


Fig.4

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

a) Determine Thevenin's equivalent for the following circuit shown in fig.5.

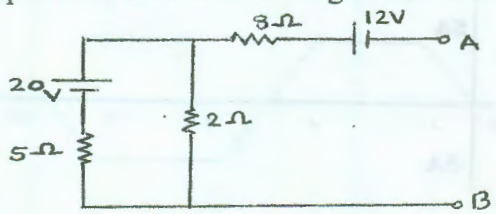


Fig.5

b) Show that quality factor (Q) = $\frac{\omega_0}{BW}$ for a series RLC circuit. [5]

c) A star connected load with $Z_R = 10\angle 0^0\ \Omega$, $Z_Y = 10\angle 60^0\ \Omega$ and $Z_B = 10\angle -60^0\ \Omega$ is connected to a 3-phase 3-wire 400 V RYB system. Find the voltages across the load impedances V_{RO}, V_{YO}, V_{BO} and V_{ON}. [5]

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Hall Ticket Number:

Code No. : 13206

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

B.E. (CSE: CBCS) III-Semester Main Examinations, December-2017

Logic & Switching Theory

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. Simplify the given function $f=(A+(BC)^1)^1 (AB^1+ABC)$
2. Determine the Sum of Minterms form for $F(x,y,z)=x^1y+z^1+xyz$
3. Implement EX-NOR gate using only NOR gates.
4. Implement the following Boolean function with NAND-NAND logic.
   $F(A,B,C)=\sum(0,1,3,5)$
5. Implement the following Boolean function using 4:1 multiplexer.
   $F(A,B,C)=\sum(1,3,5,6)$
6. Design a combinational logic circuit with three input variables that will produce a logic1 output when more than one input variables are logic1.
7. Compare Synchronous & Asynchronous Sequential Circuits.
8. Draw the logic diagram, logic symbol and Truth table of JK Flip flop.
9. Design a combinational circuit using ROM that accepts a 3-bit number and outputs a binary number equal to the square of the input number.
10. Draw the structure of PLA.

Part-B (5 × 10 = 50 Marks)

11. a) Prove using De-Morgans theorem that XOR and XNOR are complement to each other. [5]

    b) Convert the following equation into the standard POS form. [5]
    $Y= (A+B)(A+C)(B+C^1)$.

12. a) Simplify the following function and find essential prime implicants. [6]
    $F(A,B,C,D)=)=\sum m(0,1,2,3,4,6,8,9,10,11)$

    b) Implement Y=AC+BC+AB+D with NOR-NOR logic. [4]

13. a) Design a 2 to 4 decoder using NOR gates only. [5]

    b) Design a circuit with three inputs (A, B, C) and 2 outputs (X, Y), where the outputs are the binary count of the number of "ON" (HIGH) inputs. [5]

14. a) Design a sequence detector for the sequence 10110. Use JK Flip-Flop. [6]

    b) Show how a JK flip flop can be constructed using a T flip flop and other logic gates. [4]

15. a) Derive the PLA program table for a combinational circuit that squares a 3-bit number. Minimize the number of product terms. [5]

    b) Construct a 128×8 ROM with four 32×8 ROM chips with an enable input, external connections and a decoder. [5]

Contd... 2

16. a) Find the complement of $f=A+[(B+C^1).D+E^1]F$. [4]

    b) Express the following functions in sum of min terms and product of max terms. [6]

    i) F(A,B,C) = 1 ii) F(A,B,C) = (AB+C) (B+AC)

17. Answer any ***two*** of the following:

    a) Explain the design procedure for combinational circuits. [5]

    b) Design a 3-bit UP/DOWN counter which counts up when the control signal M=1 and counts down when M=0. [5]

    c) Write short notes on Programmable Array Logic. [5]

Hall Ticket Number:

Code No. : 13603

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

B.E. (I.T. : CBCS) III-Semester Main Examinations, December-2017

Discrete Mathematics

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. Which of the following are Propositions? What are the truth values of those that are propositions?
   i) Answer this question.
   ii) $5 + 7 = 10$.
2. Define the principle of Strong Induction.
3. What is the quotient and remainder when -11 is divided by 3?
4. Use Euclidean algorithm to find GCD (123, 277).
5. State Vandermonde's Identity.
6. How many different functions are there from a set with 10 elements to a set with 5 elements?
7. List all the ordered pairs in the relation R = {(a, b) / a divides b} on the set {1, 2, 3, 4, 5, 6}.
8. Represent the relation R={(1,2),(1,3),(1,4),(2,1),(2,3),(2,4),(3,1),(3,2),(3,4),(4,1),(4,2), (4,3)} on {1,2,3,4} with a matrix.
9. How many edges does a graph have if its degree sequence is 4, 3, 3, 2, 2?
10. Define Strongly connected graph and Weakly connected graph.

Part-B (5 × 10 = 50 Marks)

11. a) Show that if n is an integer and $n^3 + 5$ is odd, then n is even using i) Proof by Contradiction ii) Proof by Contrapositive. [4]

    b) Prove that $3 + 3.5 + 3.5^2 + \ldots + 3.5^n = 3\,(5^{n+1} - 1) / 4$, where n is a non-negative integer. [6]

12. a) If $a \equiv b \pmod m$ and $c \equiv d \pmod m$ then prove that $a + c \equiv (b + d) \pmod m$ and $ac \equiv bd \pmod m$. [4]

    b) State and prove Fermat's Little Theorem. [6]

13. a) The English alphabet contains 21 consonants and 5 vowels. How many strings of six lowercase letters of the English alphabet contains i) Exactly one vowel ii) At least one vowel. [4]

    b) State and prove the Generalized Pigeon-hole principle. [6]

14. a) Draw the Hasse diagram for *inclusion relation* on the set P(S), where S = {a, b, c, d}. Also determine the greatest and least elements, if any, exist. 5 [5]

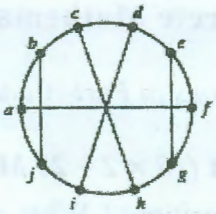
    b) If R is a relation on the set of ordered pairs of positive integers such that $((a, b), (c, d)) \in R$ if and only if $ad = bc$ then prove that R is an equivalence relation. [5]

Contd... 2

Code No. : 13603

15. a) State and prove Euler's formula on planar graphs. [6]

b) Determine whether the given graph is Planar. If so, draw it so that no edges cross. [4]



16. a) Express these statements using quantifiers, predicates and logical connectives if necessary. [5]

i) Every computer science student needs a course in Discrete Mathematics.

ii) There is a student in this class who can speak Hindi.

iii)All users on the campus network can access all websites whose url has a *.edu* extension.

b) Define a Linear Congruence and solve the Linear Congruence $4x \equiv 5 \pmod 9$. [5]

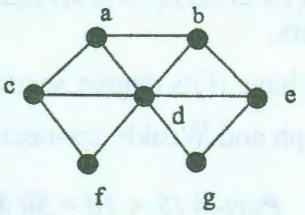
17. Answer any ***two*** of the following:

a) Consider the Non Homogeneous linear recurrence relation $a_n = 3a_{n-1} + 2^n$. Show that $a_n = -2^{n+1}$ is a solution of this recurrence relation. [5]

b) Define *i)* comparable elements of a poset with an example. [5]

ii) Is there a greatest element and a least element in the poset $(Z^+, /)$?

c) *i)* Find the Chromatic number of the given Graph? [5]



ii) Prove that an undirected graph has an even number of vertices of odd degree.

Hall Ticket Number:

Code No. : 13103 O

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

B.E. (CBCS) II Year I-Semester Examinations, December-2017

Mathematics-III

(Civil, CSE, ECE & Mech.)

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 coefficient of cos2x in the Fourier series expansion of $f(x)=\pi-x$, for $0<x<2\pi$
2. Is the function defined as $f(x)=\begin{cases}3x+4\cos x+x^2, 0<x<a\\ 3x-4\cos x-x^2, -a<x<0\end{cases}$ even or odd?
3. Find the PDE whose complete solution represent all spheres whose centre lie on z-axis.
4. Solve $\frac{\partial z}{\partial x}+\frac{\partial z}{\partial y}=1$
5. Write Lagrange's interpolation formula for unequal interval.
6. Write the Newton's forward and backward formulae for interpolation.
7. Define a random variable .what is continuous and discrete random variable.
8. Write short notes on Testing of Hypothesis.
9. Write the normal equation for straight line.
10. Explain coefficient of correlation.

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

11. a) Find the Fourier series of $f(x)=x^3, -\pi<x<\pi$.

    b) Find the Fourier series of $f(x)=\begin{cases}x+\pi, 0\le x\le\pi\\ -x-\pi, -\pi\le x\le 0\end{cases}$. $f(x+2\pi)=f(x)$

12. a) Solve the PDE $\frac{y-z}{yz}p+\frac{z-x}{xz}q=\frac{x-y}{yx}$ where $p=\frac{\partial z}{\partial x}, q=\frac{\partial z}{\partial y}$

    b) A rod of length L with insulated sides is initially at a uniform temperature 'u'. Its ends are suddenly cooled to zero degrees and are kept at that temperature. Find the temperature at any point and at any time t of the rod.

13. a) Find y(0.06) by taking the step size 0.02 from $\frac{dy}{dx}=x^2+y, y(0)=1$ using Euler's Modified method

    b) Construct a fourth order interpolating polynomial for the following data:

x	0	0.1	0.3	0.6	1.0
F(x)	-6	-5.894	-5.650	-5.578	-4.282

Contd...2

14. a) The two regression lines are given by 5x+2y-32=0 and 3 x+5y-23=0. Find(i) which one t represent the regression line of y on x(ii) correlation coefficient.(iii) find the ratio of variance of x to variance of y.

b) Fit a linear curve of y on x from the following.

x	1	2	3	4	5
y	14	27	40	55	68

15. a) A survey of 320 families with 5 children is given below. Using Chi-square test, test the hypothesis that the male and female births are equally possible.

No of boys	5	4	5	2	1	0	Total
No of Girls	0	1	2	3	4	5	
No families	14	56	110	88	40	12	320

b) Find the moment generating function of Poisson distribution. Find the first four moments of it.

16. a) Find the Fourier cosine series of the periodic function defined by $f(t) = \text{Sin}\left(\frac{\pi t}{2}\right), 0 < t < 2$

b) Using Charpit's method, solve $\left(p^2 + q^2\right) y = qz$, *where* $p = \frac{\partial z}{\partial x}, q = \frac{\partial z}{\partial y}$

17. Answer any ***two*** of the following:

a) Use R-K method to find u at t=0.2 from the IVP $\frac{du}{dt} = -2tu^2, u(0) = 1$ .Take step size h=0.2

b) The life of army shoes is normally distributed with mean 8 months and standard deviation of 2 months. If 5000 pairs are issued how many pairs would be expected to need replacement after 12 months.

c) Find the correlation coefficient from the following data:

x	25	30	32	35	37	40	42	45
y	8	10	15	17	20	23	24	25

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Hall Ticket Number:

Code No. : 41013

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

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

Water Resources Engineering-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. Differentiate between Cross regulator & Head regulator.
2. What is a canal fall?
3. List two components of a weir.
4. What is creep length?
5. Discuss the properties of good lining material.
6. Discuss the remedial measures for water logging in irrigated soils.
7. List the hydraulic causes of failures of earth dam.
8. Define phreatic line.
9. Differentiate between Storage & Pondage.
10. What is load factor?

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

11. a) Explain in detail with the help of a neat sketch the design of a trapezoidal notch fall.
    b) Choose the provision of various outlets depending on the requirement.
12. a) Explain the causes of failures of weirs on permeable foundations.
    b) Write a note on Bligh's Creep theory.
13. a) Discuss the advantage of lined canals.
    b) Explain the reasons for irrigated soils getting either saline or alkaline.
14. a) Explain the method of plotting the Phreatic line for a homogenous earthern dam with horizontal filter at downstream.
    b) Discuss the methods of construction of earthern dams.
15. a) Explain the functions of surge tanks.
    b) Discuss the selection process of suitable type of turbine for a Hydroelectric scheme.
16. a) Explain the suitability of various types of cross drainage works.
    b) Discuss the criteria for correction of slope in method of independent variables.
17. Answer any ***two*** of the following.
    i) Economics of canal lining.
    ii) Seepage control devices through embankment.
    iii) Penstocks.

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Hall Ticket Number:

Code No. : 13103

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD
B.E. (CBCS) III-Semester Main Examinations, December-2017
Engineering Mathematics-III
(Common to Civil, CSE, ECE & Mech.)

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 Dirichlet's conditions for existence of Fourier series of a function $f(x)$ in $(\alpha, \alpha+2\pi)$.
2. Find the coefficient b_1 in the half-range Fourier sine series of $f(x)=\begin{cases}1, & 0<x<\frac{1}{2}\\ 0, & \frac{1}{2}\le x<1\end{cases}$
3. Solve $p-q=z^2$.
4. Find the complete integral of the partial differential equation $(px+qy-z)^2=p^2+q^2$
5. Find $\Delta(x+\cos x)$, if $h=\pi$.
6. Using Euler's method, find the approximate value of $y(0.2)$ for the initial value problem $y'=x^2+y^2, y(0)=1$.
7. Derive normal equations for fitting a straight line by the method of least squares.
8. The equations of two regression lines are $2x-3y=0$ and $4y-5x-8=0$. Find the mean values $\bar{x}$ and $\bar{y}$.
9. A fair die is tossed. Let the random variable X denote the twice the number appearing on the die. Find the probability distribution of X.
10. If $M_X(t)=\frac{2}{2-t}$ is the moment generating function of a random variable X, find the variance of X.

Part-B (5 × 10 = 50 Marks)

11. a) Obtain the Fourier series for $f(x)=\begin{cases}-\pi, & -\pi<x<0\\ x, & 0<x<\pi\end{cases}$. Hence deduce that

$$\frac{1}{1^2}+\frac{1}{3^2}+\frac{1}{5^2}+---=\frac{\pi^2}{8}.$$ [7]

b) Express $f(x)=x$ as a cosine series in $0<x<2$. [3]

12. a) Find all possible second order partial differential equations by eliminating the arbitrary constants a,b,c from $\frac{x^2}{a^2}+\frac{y^2}{b^2}+\frac{z^2}{c^2}=1$. [4]

b) A tightly stretched string with fixed end points $x=0$ and $x=\pi$ is initially at rest in its equilibrium position. If it is set vibrating by giving each point a velocity $0.03\sin x-0.04\sin 3x$, find the displacement at any point of the string at any time t. [6]

Contd...2

13. a) The following table gives the velocity v of a particle at time t. Find its acceleration at t=2. [5]

t:	0	2	4	6	8	10	12
v:	4	6	16	34	60	94	131

b) Using Newton's divided difference formula, find the missing value from the following table: [5]

x:	1	2	4	5	6
y:	14	15	5	-	9

14. Find the coefficient of correlation and the equations of the two lines of regression from the following data: [10]

x	1	3	4	6	8	9	11	14
y	1	2	4	4	5	7	8	9

15. a) If a continuous random variable X has the distribution function

$$F(x)=\begin{cases}0, & x\le 1\\ k(x-1)^4, & 1<x\le 3\\ 1, & x>3\end{cases}$$

, find the i) probability density function $f(x)$ ii) k and iii) mean. [3]

b) Two independent samples of sizes 8 and 7 respectively had the following values of the variable: [7]

$Sample\,1$: 9 11 13 11 15 9 12 14

$Sample\,2$: 10 12 10 14 9 8 10

Is the difference between the means of samples significant? (Given $t_{0.05}(13)=2.16$)

16. a) Expand $f(x)=|\cos x|$ in Fourier series for $-\pi<x<\pi$. [5]

b) Find the general solution of $x(z^2-y^2)p+y(x^2-z^2)q=z(y^2-x^2)$. [5]

17. Answer any ***two*** of the following:

a) Find the cubic polynomial which takes the following values using Newton's backward interpolation formula. [5]

x:	0	1	2	3
f(x):	0	2	1	10

b) If θ is the acute angle between the two regression lines, show that [5]

$$\tan\theta=\frac{1-r^2}{r}\frac{\sigma_x\sigma_y}{\sigma_x^2+\sigma_y^2}.$$

c) If X is a normal variate with mean 30 and standard deviation 5, find the probabilities that i) $26\le X\le 40$ and ii) $X\ge 45$. [5]

(Given $P(0<z<2)=0.4772$, $P(0<z<0.8)=0.2881$, $P(0<z<3)=0.4987$)

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Hall Ticket Number:

Code No. : 13303

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD
B.E. (CBCS) III-Semester Main Examinations, December-2017
Partial Differential Equations & Numerical Methods

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. Express $f(x) = x$ as a Fourier series in the interval $-\pi < x < \pi$
2. Write Dirichlet's conditions.
3. Obtain the Partial differential equation by eliminating the arbitrary function f from $f(x + yz,\ x^2 + y^2 - z^2) = 0$
4. Find the complete integral of $p^2q^2(px + qy - z) = 2$
5. Use Method of separation of variables to solve $\frac{\partial u}{\partial x} = 2\frac{\partial u}{\partial t} + u$ *where* $u(x, 0) = 6e^{-3x}$
6. Write one –dimensional Heat equation
7. Find a real root of the equation $x^3 - 5x + 1 = 0$ using Bisection method.
8. Evaluate $\Delta tan^{-1}x$
9. Fit a straight line $y = a + bx$ for the following data.

x	0	1	3	6	8
y	1	3	2	5	4

10. If two regression lines are $3x + 2y = 26$ *and* $6x + y = 31$.then find the mean values and the correlation coefficient between x *and* y

Part-B (5 × 10 = 50 Marks)

11. a) Obtain the Fourier series for $f(x) = e^{-x}$ in the interval $0 < x < 2\pi$ [5]

    b) Find the Fourier series expansion for $f(x) = \begin{cases} -\pi, & -\pi < x < 0 \\ x, & 0 < x < \pi \end{cases}$ [5]

    Hence show that $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + - - - - - = \frac{\pi^2}{8}$

12. a) Solve $6yz - 6pxy - 3qy^2 + pq = 0$ by Charpit's method. [5]

    b) Solve $(x + y^2)p + yq = z + x^2$. [5]

13. a) A tightly stretched string of length l with fixed ends is initially in equilibrium Position. It is set vibrating by giving each point a velocity $v_0 sin^3 \frac{\pi x}{l}$. Find the displacement $y(x, t)$ [6]

    b) Find the solution of Laplace equation by the Method of separation of variables. [4]

14. a) Apply Runge-Kutta Fourth order method to find an approximate value of y for $x = 0.2$ insteps of 0.1. If $\frac{dy}{dx} = x + y^2$ given that $y(0) = 1$ [6]

    b) Find the cubic polynomial for the following data. [4]

X:	0	1	2	3
Y:	1	2	1	10

Contd...2

15. a) Obtain the regression line y *on* x for the following data. [5]

X:	1	2	3	4	5
Y:	2	5	3	8	7

b) If θ is the acute angle between the two regression lines then show that: [5]

$$tan\theta = \frac{1-r^2}{r}\frac{\sigma_x\sigma_y}{{\sigma_x}^2+{\sigma_y}^2}$$

Explain the significance when $r = 0$

16. a) Obtain the Fourier half- range cosine series for $f(x) = xsinx$ in the interval $0 < x < \pi$ [5]

b) Find the complete integral of $\sqrt{p} + \sqrt{q} = 2x^2 + y$ [5]

17. Answer any ***two*** of the following:

a) Use the Lagrange's interpolation formula to find the value of y when $x = 10$ for the following data. [5]

X:	5	6	9	11
Y:	12	13	14	16

b) Derive the normal equations by the method of least squares for the straight line $y = a + bx$ [5]

c) Solve one dimensional heat equation by variables separable method. [5]

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Hall Ticket Number:

Code No. : 13603 O

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

B.E. (I.T.) II Year I-Semester Backlog Examinations, December-2017

Discrete Mathematics

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 Tautology, Contradiction and Contingency.
2. Write the Converse and Contrapositive of " If it snows tonight then I will stay at home".
3. Compute 3071001 *mod* 102.
4. If a | b then prove that a | (b + c), where a, b and c are integers.
5. Explain Fibonacci relation.
6. Determine the coefficient of $x^{12}y^{13}$in the expansion of $(2x - 3y)^{25}$?
7. Define equivalence order relation and give an example of it.
8. Define Transitive closure of a relation.
9. Explain Eulerian graph with example.
10. State the First theorem of graph theory.

Part-B (5 × 10 = 50 Marks)

11. a) Show that $([(p \wedge \sim q) \rightarrow r] \rightarrow [p \rightarrow (q \vee r)])$ is a tautology. [5]

    b) What is meant by proof by contradiction? Use it to prove $\sqrt{5}$ is irrational. [5]

12. a) Let p be a prime which does not divide the integer a, then show that $a^{p-1} = 1 \ (mod\ p)$. [5]

    b) Find the greatest common divisor of 1071 and 462 and express it as the linear combination of these numbers. [5]

13. a) State and prove the generalized pigeon-hole priniciple. [5]

    b) Find all the solutions of the Recurrence Relation $a_n = 5a_{n-1} - 6a_{n-2} + 7^n$. [5]

14. a) Draw the Hasse diagram for the divisibility on the set {1,2,3,4,6,8,12}. Also determine the maximal and minimal elements of it. [5]

    b) Show that the relation $R = \{(a, b) / \ a \equiv b (mod\ m)\}$ is an equivalence Relation on the set of integers, where m is a positive integer greater than 1. [5]

15. a) State and prove Euler's Formula for planar graphs. [6]

    b) Define the chromatic number of a graph and what is the chromatic number of k_n. [4]

16. a) Use mathematical induction to show that $1 + 2 + 2^2 + \ldots\ldots\ldots + 2^n = 2^{n+1} - 1$ for all non-negative integers 'n'. [5]

    b) If $a = bq + r$ then prove that $\gcd(a, b) = gcd(b, r)$, where a, b, q & r are integers. [5]

Contd... 2

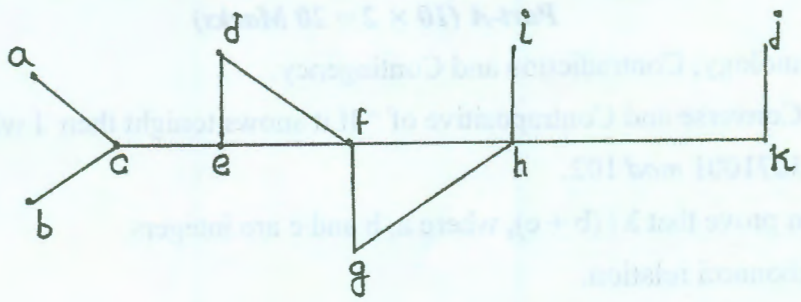
Code No. : 13603 O

17. Answer any ***two*** of the following:

a) How many solutions are there to the equation $x_1 + x_2 + \cdots + x_5 = 21$ where x_i is a non- negative integer and $i = 1,2,3,4,5$ such that $x_i \geq 2$ for all i. [5]

b) Define greatest and least elements of a poset. Is there a greatest and least element in the poset $(Z^+, /)$? [5]

c) Use a depth first search to find a spanning tree for the graph given below: [5]



Hall Ticket Number:

Code No. : 41213

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

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

High Voltage DC Transmission (Elective)

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 reliability and energy availability in view of HVDC Transmission.
2. Plot graph between cost and distance for HVAC& HVDC and define break even distance.
3. What is meant by neglecting overlap in Graetz in bridge circuit?
4. Define pulse number and write the equation for average output voltage for 6 pulse converter.
5. Sketch the schematic diagram of microprocessor based digital controller.
6. Explain the significance of angle of advance in inverter control.
7. List out different faults in a converter.
8. Mention the reasons for occurring of Non-characteristic harmonics.
9. What are the potential applications of MTDC systems?
10. Draw the diagram for parallel connected radial type and mesh type MTDC system.

Part-B (5× 10=50 Marks)

11. a) Draw and explain the schematic of a single line diagram of a VSC based HVDC converter station? [6]
    b) Explain the modern technological developments in HVDC technology. [4]
12. a) Explain rectifier and inverter operation of a 6pulse converter with equivalent circuits. [5]
    b) A Graetz bridge operates with a delay angle of 15^0. The leakage reactance of the transformer is 10 ohms. The line to line AC voltage is 85kV. Compute the overlap angle and DC voltage for (i) I_d=2000A and (ii) I_d=4500A [5]
13. a) Explain the constant current control (CCC) with neat circuit diagram. [5]
    b) Explain the converter control characteristics for rectifier and inverter with neat sketches. [5]
14. a) What are the different types of converter faults and explain the reasons for causes of converter faults? [6]
    b) Distinguish between characteristic and non-characteristic harmonics? [4]
15. a) Explain two ACR method for control of MTDC systems [6]
    b) Discuss series multi terminal HVDC system and its control. [4]
16. a) Explain the effect of corona losses in AC and DC system and also suggest to improve the corona losses. [5]
    b) What is the effect of pulse number on output voltage of a converter? [5]
17. Answer any ***two*** of the following:
    a) Distinguish between SVC and STATCOM. [5]
    b) Give the principle of different types of DC circuit breaker schemes. Why is a surge diverter needed across the DC Circuit Breaker? [5]
    c) Compare series and parallel MTDC systems. [5]

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Hall Ticket Number:

Code No. : 41313

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

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

Computer Networks

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. Compare Bus, Star, Ring and Hybrid Line configurations.
2. Discuss the design issues for data link layer and the advantages of layered protocol.
3. What are Hidden and Expose terminal problem?
4. Mention the functional differences between Circuit Switching and Packet Switching.
5. What is congestion control and how it is different from flow control?
6. List the design goals of Network layer.
7. Transport layer service is similar to the network layer service, then what is the necessity of having two distinct layers?
8. Define fragmentation and mention its necessity.
9. Describe the importance of MIME.
10. Outline the necessity of Digital signatures in network security.

Part-B (5 × 10 = 50 Marks)

11. a) Differentiate OSI and TCP/IP model. [5]
    b) Determine the limitations of stop and wait protocol. Discuss various ARQ Protocols. [5]

12. a) Explain CSMA protocol. [6]
    b) What is a Virtual Circuit? Explain in detail how a virtual circuit operates. [4]

13. a) Give the classification of routing algorithm and explain any two of them in detail. [6]
    b) Draw the architecture of ATM networks and explain layers functionality. [4]

14. a) Describe TCP protocol and explain all the fields in the TCP header. [6]
    b) Discuss any four primitives of transport services. [4]

15. a) Describe SNMP and its role in network management. [5]
    b) Differentiate Symmetric key and public key algorithms. [5]

16. a) Draw the HDLC frame format and explain in detail. [6]
    b) Describe IEEE 802.16 standard and compare it with IEEE 802.11. [4]

17. Write short notes on any *two* of the following:
    a) Leaky bucket algorithm [5]
    b) UDP protocol and TCP protocols [5]
    c) Message formats used in E-mail. [5]

Hall Ticket Number:

Code No. : 41413

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

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

Production and Operations Management

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. Identify factors affecting plant location.
2. What is Break Even analysis?
3. Explain Delphi technique.
4. What is meant by forecasting?
5. List the objectives of MRP.
6. Explain master production schedule.
7. What is the importance of inventory control?
8. List out assumptions in EOQ.
9. What do you mean by crashing of network?
10. Explain Fulkerson's rule in constructing network.

Part-B (5 × 10 = 50 Marks)

11. a) Explain the steps involved in time study. [5]

    b) Distinguish between job shop and Batch production systems with examples. [5]

12. a) Explain least square method of forecasting. [4]

    b) The demand for a product during last 10 years is given below. Estimate the demand for the next two years by the method of regression. [6]

Year	1	2	3	4	5	6	7	8	9	10
Units	124	135	145	150	167	157	161	170	187	168

13. a) List the principle inputs & outputs of a material requirement planning system. [5]

    b) Explain in detail about various costs in aggregate planning. [5]

14. a) What is ABC analysis? Explain it with an example. [4]

    b) The annual demand for an automobile component is 24,000 units. The carrying cost is Rs. 0.4/unit/year, the ordering cost is Rs. 20 per order & the shortage cost is Rs.10/unit /year. Find the optimal values of the following: [6]

    i) EOQ

    ii) Maximum shortage quantity

    iii) Maximum inventory

    iv) Cycle time.

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Code No. : 41413

15. a) Distinguish between CPM & PERT. [4]

    b) Draw the PERT network for the activities whose three time estimates are given in the table. From the three time estimates obtain the expected times of all the activities & slacks of all the events. Also find the critical path. [6]

Activity	Predecessor Activity	Optimistic Time	Pessimistic Time	Most Likely Time
A	-	1	5	3
B	-	2	4	3
C	-	3	5	4
D	A	2	10	9
E	C	4	6	5
F	B,D,E	5	13	6
G	A	2	6	4
H	G,F	0	6	3

16. a) Define the symbols, activity names used in method study for charting of the process with examples. [5]

    b) Explain about simple regression & multiple regression. [5]

17. Answer any *two* of the following:

    a) Briefly discuss what you understand by MRP1 & MRP2. [5]

    b) Write different types of inventory models. [5]

    c) With reference to CPM define the following terms with a brief description of each of them. [5]

    i) Critical Path

    ii) Total float, Free float and Independent float

    iii) Early start & Early finish times.