

FACULTY OF ENGINEERING

B.E. (Civil) IV - Semester (CBCS) (Suppl.) Examination, Dec. 2018 / January 2019

Subject : Hydrology and Water Management**Time : 3 Hours****Max. Marks: 70****Note: Answer all questions from Part-A & any five questions from Part-B.****PART – A (20 Marks)**

- 1 What are the different forms of precipitation? (2)
- 2 Define the term dependable rainfall. (2)
- 3 Write the Horton's equation for infiltration? (2)
- 4 What are the different methods of stream gauging? (2)
- 5 State Darcy's law for measuring velocity of groundwater. (2)
- 6 Distinguish between confined and unconfined aquifer. (2)
- 7 Distinguish between safe yield and specific yield. (2)
- 8 What is meant by readily available soil moisture? (2)
- 9 What are the different methods of irrigation? (2)
- 10 The Probability of a 10 cm rain in 1 hr occurring in Hyderabad was found to be 1/60. What is the probability that the 1hr rain of magnitude 10cm or larger will occur once in 30 successive years? (2)

PART-B (50 Marks)

- 11 (a) List out the various types of rain gauges. Explain any one recording type of rain gauge with neat sketch. (5)
- (b) The annual normal rainfall at stations A, B, C&D in a basin are 80.97,67.59,76.28&92.01 cm respectively. In a year 2005, the station D was inoperative and the station A, B & C recorded annual precipitations of 91.11, 72.23 and 79.89 cm respectively. Estimate the rainfall at D in that year. (5)
- 12 (a) List out the various factors affecting runoff. Describe their influence on the peak discharge of the hydrograph. (5)
- (b) For a storm of 2hr duration the rainfall rates are as follows. If ϕ - index is 3cm/hr, Estimate the surface run off. Also determine W-index. (5)

Time period(min)	20	20	20	20	20	20
Rainfall rate (cm/hr)	2.5	2.5	10	7.5	5.1	1.25

- 13 (a) What are the assumptions, limitations and application of unit hydrograph theory? (5)
- (b) The Flood –frequency computations for the river by using Gumbel's method yielded. The following results. Estimate the flood magnitude in this river with a return period of 500 years. (5)

Rainfall period T(years)	50	100
Peak flood(m ³ /sec)	40,809	46,300

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- 14 (a) Derive the expression for steady state discharge from a well in a homogeneous unconfined aquifer. State clearly the assumptions made in the derivation. (5)
- (b) In recuperation test following data was collected.
Diameter of the open well=3m
Initial head of percolation=4m
Final depression head=2.5m
Time of recuperation = 2hr.
Determine the specific capacity of the well and yield under a head of 3m. (5)
- 15 (a) Discuss in brief the measures of Central tendency and Dispersion. (5)
- (b) A bridge has an expected life of 25 years and is designed for a flood magnitude of return period 100 years..(i)What is the risk of this hydrologic design?
(ii) If a 10% risk is acceptable, what return period will have to be adopted? (5)
- 16 (a) Define Duty, Delta and base period. Establish the relationship among them. (5)
- (b) After how many days the water is to be supplied to soil in order to ensure sufficient irrigation of the given crop if:
Field capacity of soil =28%
Permanent wilting point=15%
Dry Density of soil = 1.5gm/cm³
Effective depth of root zone =80 cm
Daily consumptive use of water =12 mm
Assume any other data suitably. (5)
- 17 Write short notes on (10)
- (a) Depth area Duration curves
(b) Frequency analysis
(c) Crop rotation

FACULTY OF ENGINEERING

B.E (EEE) IV- Semester (CBCS) (Suppl.) Examination, Dec. 2018 / January 2018

Subject: Electrical Circuits-II

Time: 3 Hours

Max. Marks: 70

Note: Answer All Questions From Part-A, & Any Five Questions From Part-B.

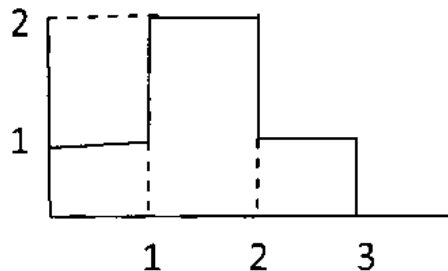
Part-A (20 Marks)

1. Determine the even & odd parts of the function $f(t) = t \sin t$
2. For the one port network it is given that $I = 10 \cos t + 5 \cos(2t - 45^\circ)$ &
 $V = 2 \cos(t + 45^\circ) + \cos(2t + 45^\circ) + \cos(3t - 60^\circ)$. Find the average Power.
3. A ramp voltage $2r(t-2)$ is applied in series RC circuit at $t=0$ where $R=3$ & $C=1F$. Assuming initial conditions to be zero find $i(t)$
4. Check whether the function is Hurwitz or not $F(s) = S^4 + S^3 + 5S^2 + 3S + 4$
5. Find the number of poles, Zeros & Scale factor for the following function
 $F(s) = (2S+1)/[4(S+2)(S+3)]$
6. The transmission parameters of a certain two port network are $A=1, B=2, C=1$ & $D=3$. Find the h parameters. Is the network symmetrical?
7. List the properties of incidence matrix
8. For a certain two port network $V_1 = 60I_1 + 20I_2$ & $V_2 = 20I_1 + 40I_2$. Find Y parameters of the network
9. Why do we need study the initial conditions & When are they important?
10. How do we identify the LC networks? Explain in brief

PART-B (50 Marks)

- 11 A series RL circuit with $R=100$ & $L=20H$ has a D.C voltage of 200V applied through a switch at $t=0$ Using LT [10M]
- a) Find the equation of current & voltages across different elements
 - b) current at $t=0.5\text{sec}$ & $t=1\text{sec}$
 - c) time at which $V_R=V_L$

- 12 a) Find the LT of the following waveform [4M]

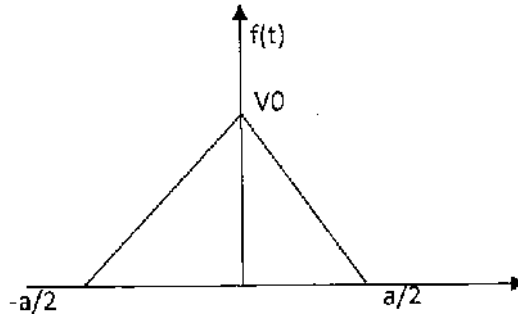


- b) Find the ILT using convolution theorem for $f(t) = 1/[(S+a)(S+b)(S+c)]$ [6M]

- 13 Given the periodic waveform $v(t) = t^2, 0 < t < T$. For special case $T=1$ determine the Fourier Coefficients & plot the amplitude & phase spectra. [10M]

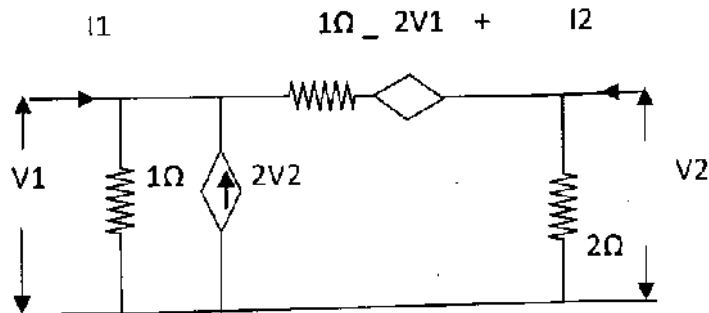
14 Realize $Y(s) = \frac{(s+2)(s+4)}{(s+3)(s+7)}$ in both cauer forms with equivalent networks [10M]

15a) Determine the FT of the following waveform [5M]

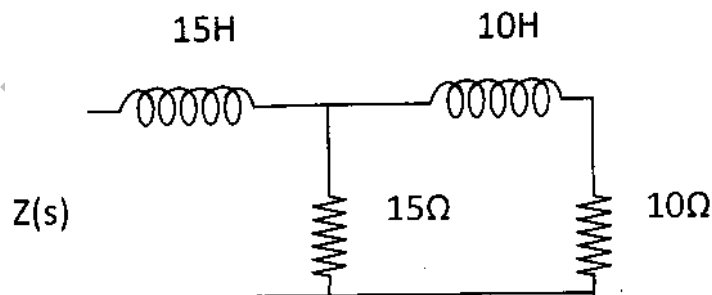


b) Check for the Positive realness of the function $P(x) = x^4 - 8x^3 + 21x^2 - 22x + 8$ [5M]

16) For the network find Y parameters .Hence find Z parameters .Find whether the network is reciprocal [10M]



17a) Obtain the pole zero plot in S plane of the driving point impedance function for the network shown in fig [4M]



b) Obtain the Foster form of the following functions $F(S) = \frac{2(S+1)(S+3)}{S(S+2)}$ [6M]

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B.E. (Inst.) IV - Semester (CBCS) (Suppl.) Examination, Dec. 2018/ January 2018

Subject : Electrical Machines

Time : 3 Hours

Max. Marks: 70

Note: Answer all questions from Part-A & any five questions from Part-B.**PART – A (20 Marks)**

- 1 What are the unwanted effects of armature reaction? (2)
- 2 What is the function of a commutator? (2)
- 3 Compare DC shunt and series motors with respect to their characteristics. (2)
- 4 What is the advantage of predetermining the performance of a transformer through open and short circuits test data? (2)
- 5 What is meant by armature reaction of a synchronous machine? (2)
- 6 What frequency is generated by a 6-pole alternator that rotates at 1200 rpm? (2)
- 7 Why will a synchronous motor always runs at synchronous speed? (2)
- 8 Name the two types of 3-phase induction motors. What are the differences in construction between the two? (2)
- 9 List the applications of a stepper motor. (2)
- 10 Draw the torque-slip characteristics of a 3-phase Induction Motor. (2)

PART – B (50 Marks)

- 11 a) Explain the internal and external characteristics of a separately excited dc generator. (4)
- b) A dc shunt generator has an induced voltage on open circuit of 127 V. When the machine is on load the terminal voltage is 120 V. Find the load current if the field resistance is 15 ohms and the armature resistance is 0.02 ohm. Ignore armature reaction. (6)
- 12 a) Derive an expression for torque of a dc motor. Hence draw torque v/s current characteristic of a dc shunt motor. (5)
- b) A 250-V, 4-pole shunt motor has two-circuit armature winding with 500 conductors. The armature circuit resistance is 0.25 ohm, field resistance is 100 ohms and the flux per pole is 0.02 Wb. Neglect armature reaction. If the motor draws 14.5 A from the mains, then compute the speed and the gross (internal) torque developed. (5)
- 13 a) Obtain the equivalent circuit of a single-phase transformer. Explain how to evaluate the equivalent circuit of a transformer from open circuit & short circuit tests. (5)
- b) A 5 kVA, 220 / 110 volts, 1-phase transformer has a maximum efficiency of 96.97 % at 0.8 p.f. lagging. It has a core loss of 50 watts and the full load regulation at 0.8 p.f. lagging is 5 %. Find the efficiency and regulation at full load 0.9 p.f. lagging. (5)

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- 14 a) What is armature reaction? Explain the effect of armature reaction on the terminal voltage of an alternator at unity power factor load. (4)
- b) From the following test results, determine the regulation of a 2 kV single phase alternator delivering a current of 100 A at 0.8 pf leading:- Full load current of 100 A is produced on short circuit by a field excitation of 2.5 A. An emf of 500 V is produced on open-circuit by the same current. The armature resistance is 0.8 ohm. (6)
- 15 a) Derive the expression for the emf generated in the armature winding of a synchronous machine. (5)
- b) Explain the construction and principle of operation of a synchronous motor. (5)
- 16 a) Explain the terms: Maximum torque, Full load torque, Starting torque & No-load torque of a 3-phase Induction Motor. (5)
- b) An 8-pole, 50 Hz, 3 phase slip ring Induction Motor has effective resistance of 0.08 / phase. The speed correspond to maximum torque is 650 rpm. What is the value of resistance to be inserted in rotor circuit to obtain maximum torque at starting? (5)
- 17 a) What are uncompensated and compensated series commutator motors? (5)
- b) Explain the working principle and applications of a single phase shaded pole motor. (5)

FACULTY OF ENGINEERING**B.E. (ECE) IV – Semester (CBCS) (Suppl.) Examination, Dec. 2018/Jan. 2019****Subject: Electromagnetic Theory & Transmission Lines****Time: 3 Hours****Max.Marks: 70****Note: Answer all questions from Part – A and any five questions from Part – B.****PART – A (20 Marks)**

- 1 Write the ranges of the variables in spherical coordinate systems.
- 2 Plane $Z=10\text{m}$ carries charge 20 nC/m^2 . The electric field intensity at the origin is?
- 3 Define the vector magnetic potential.
- 4 State Ampere's Circuit Law. Write the related expression.
- 5 Write the expression for uniform plane waves in free space.
- 6 Define characteristic impedance of EM waves and write its standard Expression.
- 7 A lossless transmission line with $Z_0=50$ is 30m long and operates at 2MHz . The line is terminated with a load $Z_L= 60 + j40$. If $\beta = 0.6\text{C}$ on line find reflection coefficient.
- 8 Define Campbell's formula for loading of transmission lines.
- 9 Define voltage reflection coefficient and write its expression.
- 10 Draw the block diagram of single stub Tuner.

PART – B (5 x 10 =50 Marks)

- 11 a) Determine the electric field of a uniformly charged sphere.
b) Two dipoles with dipole moments $-5a_z \text{ nc/m}$ and $9a_z \text{ nc/m}$ are located at points $(0, 0, -2)$ and $(0, 0, 3)$ respectively. Find the potential at the origin.
- 12 a) Explain the conductor – dielectric boundary conditions in electrostatic.
b) Two extensive homogeneous isotropic dielectrics meet on plane $Z=0$. For $Z>0$, $\epsilon_{r1} = 4$ and for $Z< 0$, $\epsilon_{r2} = 3$. A uniform field $E_1 = 5a_x - 2a_y + 3a_z \text{ kv/m}$ exists for $Z > 0$. Find E_2 for $Z < 0$.
- 13 a) Explain the reflection by a perfect Dielectric – on Normal incidence.
b) Given a uniform plane wave in air as $E_i = 40 \cos(\omega t - \beta z)a_x + 30 \sin(\omega t - \beta z)a_y \text{ v/m}$. Find H_i .
- 14 a) A distortionless line has $Z_0 = 60$, $\beta = 20 \text{ m N/pm}$, $\mu = 0.6\text{C}$, where C is the speed at light in a vacuum. Find R, L,G,C and β at 100 MHz .
b) Find the characteristic impedance of open circuit transmission lines.
- 15 a) A lossless transmission line with $Z_0 = 50$ is 30m long and operates at 2MHz . The line is terminated with a load $Z_L = 60 + j40$. If $\beta = 0.6 \text{ C}$ on the line, find
i) The reflection coefficient.
ii) The standing wave ratio
iii) The input impedance.
b) Briefly explain the short circuit line and its significance.
- 16 a) State and prove pointing theorem.
b) Discuss the determination of the reflected and transmitted wave fields of a uniform plane wave incident normally on to a plane boundary between two material media.
- 17 Write short notes on:
a) Laplace and Poisson's equations
b) Maxwell's equations for static and time varying fields.

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B.E. (M/P/AE) IV - Semester (CBCS) (Suppl.) Examination, Dec. 2018 / Jan. 2019

Subject : Kinematics of Machines

Time : 3 Hours

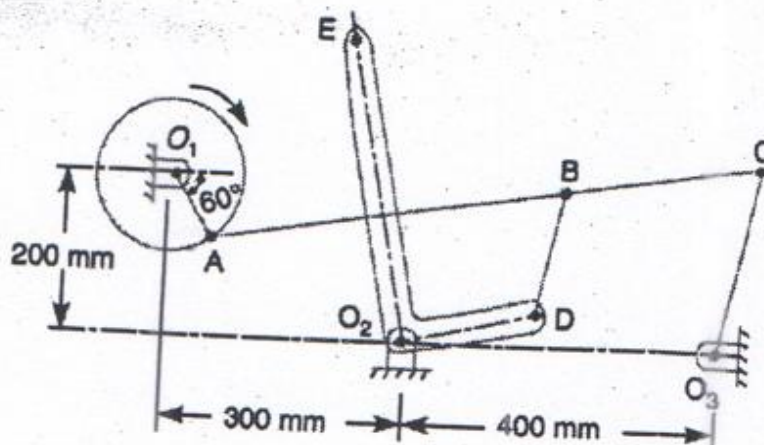
Max. Marks: 70

Note: Answer all questions from Part-A & any five questions from Part-B.**PART – A (20 Marks)**

- 1 State the condition for proper steering of automobile vehicle.
- 2 Sketch the panto graph and indicate the necessary conditions.
- 3 State the magnitude and direction of coriolis component of acceleration.
- 4 Sketch the slider crank mechanism and indicate all the I centers in it.
- 5 State the importance of uniform pressure used wear rate criterion with suitable applications.
- 6 Differentiate absorption and transmission type of dynamometers.
- 7 Sketch the various types of cam and followers.
- 8 State the fundamental law of gearing.
- 9 What is meant by interference in involutes gears?
- 10 Sketch neatly reverted gear train and mention its applications.

PART – B (50 Marks)

- 11 Define the term inversion. Explain neatly with figures inversions of double slider crank chain.
- 12 The mechanism of a warping machine, as shown in figure 1, has the dimensions as follows: $O_1A=100$ mm ; $AC = 700$ mm ; $BC = 200$ mm ; $BD = 150$ mm ; $O_2D=200$ mm ; $O_2E = 400$ mm ; $O_3 C = 200$ mm.

*Fig. 1*

The crank O_1A rotates at a uniform speed of 100 rad / s. For the given configuration, determine: (i) Linear velocity of the point E on the bell crank lever, (ii) acceleration of the points E and B, and (iii) angular acceleration of the bell crank lever.

- 13 A cone clutch is required to transmit 7.5 KW of power at 900 rpm. The cone has a face angle of 12° . The width of the face is half of the mean radius. The normal pressure between the contact faces is not exceed 0.09 N/mm². Assuming uniform wear and coefficient of friction is 0.2 . Find the dimensions of the clutch and axial force required to engage clutch.

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- 14 Design a cam to raise a valve with simple harmonic motion through 50 mm in $1/3$ of a revolution, keep it fully raised through $1/12$ revolution and lower it with harmonic motion is $1/6$ revolution. The valve remains closed during the rest of the revolution. The diameter of the roller is 20 mm and the minimum radius of the cam is 25 mm. The diameter of the camshaft is 25 mm. The axis of the valve rod passes through the axis of the camshaft. If the camshaft rotates at uniform speed of 100 r.p.m.; find the maximum velocity and acceleration of a valve during raising and lowering.
- 15 A pair of spur wheels with involute teeth is to give a gear ratio of 3 to 1. The arc of approach is not to be less than the circular pitch and the smaller wheel is the driver. The pressure angle is 20° . What is the least number of teeth that can be used on each wheel? What is the addendum of the wheel in terms of the circular pitch?
- 16 A leather belt 125 mm wide and 6 mm thick, transmits power from a pulley 750 mm diameter which runs at 500 r.p.m. The angle of lap is 150° and $\mu = 0.3$. If the mass of 1 m^3 of leather is 1 Mg and the stress in the belt is not to exceed 2.75 MPa, find the maximum power that can be transmitted.
- 17 Write short notes on the following with diagrams:
- Contact ratio in spur gears
 - Friction circle and friction axis
 - Grubler's criterion of DOF

FACULTY OF ENGINEERING

B.E. (CSE) IV - Semester (CBCS) (Suppl.) Examination, Dec. 2018 / Jan. 2019

Subject : Programming Languages

Time : 3 Hours

Max. Marks: 70

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

PART – A (20 Marks)

- 1 Write about Haskell. (2)
- 2 State the primary influences on language design. (2)
- 3 Compare readability to writability. (2)
- 4 State the importance of finally clause in java. (2)
- 5 State the evaluation of axiomatic semantics. (2)
- 6 State the design issues of arrays. (2)
- 7 How would you explain the implicit type conversion? (2)
- 8 Write the typical activation record for an ALGOL like language. (2)
- 9 What is lazy evaluation? (2)
- 10 Write about functions in python. (2)

PART – B (50 Marks)

- 11 List and explain language evaluation criteria. (10)
- 12 Compare and contrast between compilation and hybrid implementation systems. (10)
- 13 Define binding, binding time. Explain possible binding times by using suitable examples. (10)
- 14 Discuss in detail semaphores, monitor, message passing as methods for providing synchronization. (10)
- 15 Write in detail about design issues, advantages of built-in exception handling. Give suitable examples using Ada, Java. (10)
- 16 Write about LISP, applications of functional programming languages. (10)
- 17 Compare functional and imperative programming languages. (10)

FACULTY OF ENGINEERING**B.E. IV-Semester (CBCS) (I.T) (Suppl.) Examination, Dec. 2018 / Jan. 2019****Subject: Data Communications****Time: 3 Hours****Max. Marks: 70****Note: Answer all questions from Part-A and Any five questions from Part-B.****PART – A (20 Marks)**

- 1 What are the communication tasks of a data communication system?
- 2 What is bit stuffing?
- 3 List the most common techniques for flow control and explain why flow control is needed?
- 4 Explain the types of frames in HDLC.
- 5 Differentiate FDM and TDM.
- 6 Write notes on ADSL.
- 7 Explain Bus and Star Topology.
- 8 What are the functions of MAC sub layer?
- 9 Explain about Bluetooth Scatternet.
- 10 Give the frame format of IEEE 802.11.

PART – B (50 Marks)

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| 11. a) Explain the TCP/IP protocol suite. | [6M] |
| b) Explain the digital to analog encoding techniques. | [4M] |
| 12. a) Explain the sliding window flow control technique. | [6M] |
| b) Discuss stop and wait ARQ mechanism. | [4M] |
| 13. a) Differentiate circuit switching and packet switching. | [5M] |
| b) Describe the architecture of ATM. | [5M] |
| 14. a) Differentiate Fast and Gigabit Ethernets | [5M] |
| b) Explain the protocol architecture of LAN. | [5M] |
| 15. a) Discuss IEEE 802.11 architecture and services. | [6M] |
| b) Write notes on Zigbee. | [4M] |
| 16. a) Differentiate Asynchronous and Synchronous transmission. | [6M] |
| b) Write notes on frame relay. | [4M] |
| 17. a) What are the rules of CSMA/CD. | [4M] |
| b) Explain Bluetooth architecture and layers. | [6M] |
