Narasaraopeta Engineering College (Autonomous)

Kotappakonda Road, Yellamanda (P.O), Narasaraopet- 522601, Guntur District, AP.

Subject Code: R16CC2101

II B.Tech I Semester Supple Examinations, October-2020

BUSINESS MANAGEMENT CONCEPTS FOR ENGINEERS

(Common to ECE &CSE)

Time: 3 hours **Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B.**

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A **[2+2+2+2+2+2]**

1. (a) Define law of Demand
   (b) What are the features of Monopoly?
   (c) What is Financial Accounting?
   (d) Define Management?
   (e) What is ABC Analysis?
   (f) What is Working Capital?

PART-B

4 X 12 = 48

2. Write any six demand forecasting techniques.
3. Discuss the significance and limitations of CVP analysis.
4. From the following particulars, prepare Final Accounts of M/S Rajendra Kumar for the year ending 31st March 2018.

Particulars	Amount (Rs.)	Particulars	Amount (Rs.)
Opening stock	1,250	Plant & Machinery	6,230
Sales	11,800	Return outwards	1,380
Depreciation	667	Cash in hand	895
Commission (Cr)	211	Salaries	750
Insurance	380	Debtors	1,905
Carriage inwards	300	Discount (Dr)	328
Furniture	670	Bills Receivable	2,730
Printing charges	481	Wages	1,589
Carriage outwards	200	Return inwards	1,659
Capital	9228	Bank Overdraft	4,000
Creditors	1780	Purchases	8,679
Bills payable	541	Cash in hand	47
		Bad debts	180

Adjustments: Value of Closing Stock as on 31st March 2018 – Rs.3,700/-

5. Discuss the contribution of F.W Taylor to scientific management.
6. Explain the functions of marketing manager.
7. Explain the functions of financial management.

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Subject Code: R16CE2101

II B.Tech I Semester Supple Examinations, October-2020

PROBABILITY AND STATISTICS

(CE)

Time: 3 hours **Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B.**

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

1. (a) The probability that a company director will travel by train is 1/5 and by plane is 2/3. What is the probability of his travelling by train or plane?
   (b) Find the moment generating function of a random variable X, given probability mass function of X as $P(X=k)=e^{-\lambda}\frac{\lambda^k}{k!}$ for $k=0, 1, 2, \ldots$
   (c) Define Estimate and point estimate.
   (d) Describe type I and type II errors.
   (e) Explain positive, negative and no correlation.
   (f) List out the steps for setting up process control.

[2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. (a) Six dice are thrown 729 times. How many times do you expect atleast 3 dice to show 5 or 6
   (b) The contents of urns I, II and III are as follows:
   2 white, 3 black and 4 red balls;
   3 white, 2 black and 2 red balls;
   4 white, 1 black, 3 red balls respectively. An urn is chosen at random and two balls are drawn. They happen to be white and red. What is the probability that they come from urns I, II or III?

3. (a) A fair coin is tossed 12 times. Determine the probability P that the number of heads occurring is between 4 and 7 inclusive, by using the normal approximation to the binomial distribution.
   (b) Suppose the life time of a certain kind of an emergency backup battery (in hours) is a random variable X having the Weibull distribution with $\alpha = 0.1$, $\beta = 0.5$. Find
   (i) The mean life time of these batteries
   (ii) The probability that such a battery will last more than 300 hours.

4. (a) The mean length of life of a certain cutting tool is 41.5 hours with a standard deviation of 2.5 hours. What is the probability that a simple random sample of size 50 drawn from this population will have a mean between 40.5 hours and 42 hours?

(b) The average monthly electricity consumption for a sample of 100 families is 1250 units. Assuming the standard deviation of electric consumption of all families is 150 units, construct a 95 percent confidence interval estimate of the actual average monthly electricity consumption.

5. (a) A firm believes that the tyres produced by process *A* on an average last longer than tyres produced by process *B*. To test this belief, random samples of tyres produced by the two processes were tested and the results are as follows:

Process	Sample size	Average life time (in kms)	Standard Deviation (in kms)
A	50	22,400	1000
B	50	21,800	1000

Is there evidence at a 5% level of significance that the firm is correct in its belief?

(b) In a random sample of 500 people belonging to urban area, 200 are found to be commuters of public transport. In another sample of 400 people belonging to rural area, 200 are found to be commuters of public transport. Discuss whether the data reveal a significant difference between urban area so far as the proportion of commuters of public transport is concerned.

6. The following data give the ages and blood pressure of 10 women

Age	56	42	36	47	49	42	60	72	63	55
Blood Pressure	147	125	118	128	145	140	155	160	149	150

(i) Find the correlation coefficient between age and blood pressure

(ii) Determine the least square regression equation of blood pressure on age

(iii) Estimate the blood pressure of a woman whose age is 45 years.

7. (a) During an examination of equal length, the following number of defects were observed: 2, 3, 4, 0, 5, 6, 7, 4, 3, 2. Draw a control chart for the number of defects and comment whether the process is under control or not.

(b) The following data refer to defects found at the inspection of the first 10 samples of size 100. Use them to obtain the upper and lower control limits for percentage defective in sample of 100. Represent the first ten sample results in the chart you prepare to show the central line and control limits.

Sample number	1	2	3	4	5	6	7	8	9	10
No. of defectives	2	1	1	3	2	3	4	2	2	0

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Kotappakonda Road, Yellamanda (P.O), Narasaraopet- 522601, Guntur District, AP.

Subject Code: R16CE2102

II B.Tech I Semester Supple Examinations, October-2020

BUILDING MATERIALS AND CONSTRUCTION

(CE)

Time: 3 hours **Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B.**

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

1. (a) What are the characteristics of a good tile?
(b) Distinguish between English bond and Flemish bond in brick masonry.
(c) List out the various ingredients of lime.
(d) Distinguish between the structural behaviour of a lintel and an arch.
(e) What are the different parts of scaffolding?
(f) What are the characteristics of a good foundation?

[2+2+2+2+2+2]

PART-B

4×12 M = 48 M

2. (a) Explain the different methods of stone quarrying. (6 M)
2. (b) Explain the various steps involved in the process of manufacturing of bricks. (6 M)

3. (a) Explain the classification of stone masonry. (6 M)
3. (b) Explain the various defects in timber. (6 M)

4. (a) Explain the classification of limes. (6 M)
4. (b) Explain the various laboratory tests carried out for cement. (6 M)

5. (a) Explain the different types of floors. (6 M)
5. (b) Explain the classification of roofs. (6 M)

6. (a) Describe the procedure of white washing a surface. (6 M)
6. (b) Explain various types of paints. (6 M)

7. (a) Explain the different types of shallow foundations. (6 M)
7. (b) What is the necessity of pile foundation? Explain the types of piles based on their use. (6 M)

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Subject Code: R16CE2103

II B.Tech I Semester Supple Examinations, October-2020

BUILDING PLANNING AND DRAWING

(CE)

Time: 3 hours **Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B.**

Answer any Three questions from Part-A

Answer One Question from Part-B

PART-A

12 X 3 = 36

1. a) what are the objectives of building Byelaws? (6M)

b) Explain the usefulness of specifying the minimum standards in buildings. (6M)

2.What are the important parameters to be considered for selection of site for residential building?

3.a) Differentiate between the following: (6M)

i) Hotel and Motel

ii) Auditorium and Foyer

iii) Dispensary and Clinic

b) Explain the planning standards of Industries? (6M)

4.a) Elaborate floor area, Carpet area, floor space index, floor area ratio and how to calculate the Plinth area of a building. (9M)

b) Write any four principles underlying building byelaws. (3M)

5. Explain the zoning regulations and Orientation of buildings and the factors effecting orientation of Buildings. (12M)

PART-B

24 X 1 = 24

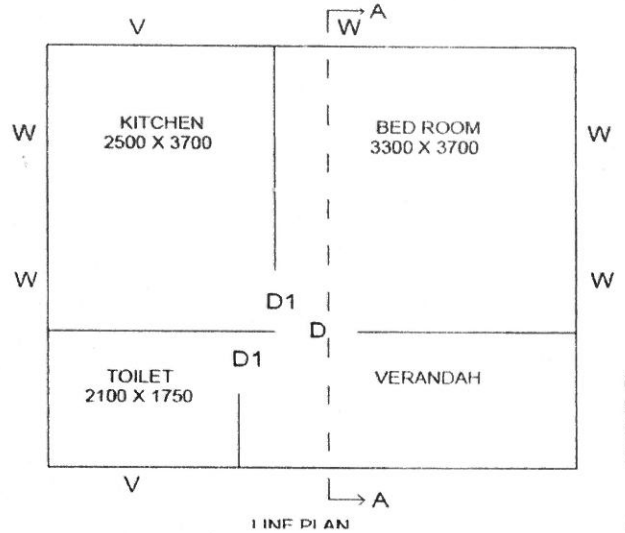
6.Draw neat conventional signs for the following items (in 40mm*40mm blocks).

(a) (i)Lead (ii) Earth (iii) Rock (iv) Copper alloys (8M)

(b) Draw the plans of English Bond odd and even courses of one, one and half, two, two and half brick walls in thickness at the junction of a corner. (16M)

7.a) Draw the elevation and section of Panelled door of size 2.1 m x 1.2 m. (08M)

b) Draw the plan and elevation of the given line diagram. (16M)



LINE PLAN

REFERENCE

D - DOOR	- 900 X 1950
D1 - DOOR	- 800 X 1950
W - WINDOW PANELED	- 1200 X 1000
V - VENTILATOR GLAZED	- 800 X 300

ALL DIMENSIONS ARE IN mm

Narasaraopeta Engineering College (Autonomous)

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Subject Code: R16CE2104

II B.Tech I Semester Supple Examinations, October-2020

SURVEYING - I

(CE)

Time: 3 hours **Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B.**

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

1. (a) Define Surveying and explain the principle on which chain survey is based.
   (b) What are the sources of errors in chain surveying and precautions to eliminate them?
   (c) Distinguish between the prismatic compass and Surveyor's compass.
   (d) List the fundamental lines of Dumpy Level?
   (e) Define contour and contour intervals.
   (f) What are the advantages and limitations of plane table survey?

[2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. (a) Explain the different methods of chaining on sloping ground. What is hypotenusal allowance?
   (b) Discuss in brief the different sources of errors in surveying.
3. (a) A 30 m tape standardized in catenary as 29.990 m at 100 N is used in the field with a tension of 80 N in catenary. Calculate the Sag correction if the mass of the tape is 0.33 kg per m.
   (b) State the reasons for incorrect length of Chain?
4. (a) What are the sources of errors in compass Surveying and precautions to eliminate them?
   (b) The following are the bearings of a closed traverse. Find out which of the stations are affected by local attraction. Tabulate the corrected bearings of lines.

Line	F.B	B.B
AB	N50^{0}30'W	S47^{0}30'E
BC	N54^{0}00'E	S53^{0}00'W
CD	S3^{0}30'E	N4^{0}00'W
DE	S41^{0}30'E	N41^{0}30'W
EA	S79^{0}30'W	N78^{0}00'E

5. (a) Describe the profile leveling method?
   (b) Find out the missing (?) F.S and B.S values in table of a Leveling field book given.

Station	B.S	I.S	F.S	Rise	Fall	Remarks
1	4.550					Starting Point
2	2.125		?		0.750	Change Point
3		2.225				
4	?		1.975			Change Point
5		2.445		1.500		

6. (a) Discuss the characteristics of contours, give suitable sketches.
   (b) Explain about direct and indirect methods. Contours and their uses
7. (a) What is two-point problem? How is it solved?
   (b) Describe briefly the use of various accessories of a plane table.

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Subject Code: R16CE2105

II B.Tech I Semester Supple Examinations, October-2020

FLUID MECHANICS

(CE)

Time: 3 hours **Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B.**

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

1. (a) Write the expression for capillary rise when a glass tube is immersed in a liquid.
   (b) What is Pascal's law?
   (c) Write condition for irrotational flow.
   (d) What is Pitot tube?
   (e) Write the expression for discharge through a triangular notch.
   (f) What is an equivalent pipe?

[2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. (a) Define i) Relative density (ii) Bulk Modulus (iii) Vapour pressure
   (b) A cylinder 100 mm diameter rotates in an annular sleeve 102 mm internal diameter at 100 rpm. The cylinder is 300 mm long. If the dynamic viscosity of the lubricant between the two cylinders is 0.1 Pa-s, find the torque needed to drive the cylinder against viscous resistance.
3. (a) Derive the expressions for magnitude and location of hydrostatic pressure acting on an inclined plane immersed in a liquid
   (b)) A differential U-tube manometer is used to connect two pressure pipes P and Q which are at same elevation. The pipe P contains a liquid having specific gravity of 1.8. The pipe Q contains another liquid having specific gravity 0f 0.9. Find the difference of pressure if the manometric liquid mercury level in the limb of U-tube connected to P is 1.0 m below pipe P while it is 1.4 m below pipe Q in the other limb.
4. (a) Derive the continuity equation of 3-D flow in differential form.
   (b) Find the velocity potential for the given stream function $\psi=y^2-x^2$.
5. (a)Derive Euler's equation of motion. Mention the assumptions made while deriving.
   (b) A venturimeter is connected to a pipe of diameter 5 cm. The throat diameter of venturimeter is 3 cm. The inlet and throat of venturimeter is connected to a U-tube mercury differential manometer. Find the discharge through the pipe if the difference in mercury levels is 10 cm. Assume coefficient of discharge of venturimeter as 0.98.
6. (a) Derive discharge equation through a large rectangular orifice.
   (b) Find the discharge through a rectangular weir of 3m width when the head of water above the sill of the notch is 1.5 m. Assume coefficient of discharge as 0.7. Consider effect of end contraction.
7. (a) Derive Darcy-Weisbach equation for head loss in pipe flow.
   (b) Two reservoirs are connected by two pipes laid in parallel. The diameters of the pipes are 100 mm and 300 mm. If the discharge through pipe of 100 mm diameter is 40 lps, find the discharge through the 300 mm pipe. Assume length and friction factor for both pipes are equal.

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Subject Code: R16CE2106

II B.Tech I Semester Supple Examinations, October-2020

MECHANICS OF SOLIDS

(CE)

Time: 3 hours Max Marks: 60

Question Paper Consists of Part-A and Part-B.

Answering the question in Part-A is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

1. (a) State St. Venant's Principle. [2 M]

(b) Draw the state of stress at the centroid of the cross-section of a simply supported beam of span 3 m and rectangular cross-section 150 mm × 300 mm subjected to udl of 25 kN/m. [2 M]

(c) Write the relation between rate of loading, shear force and bending moment. [2 M]

(d) Determine the magnitude and location of maximum shear stress of a beam of circular section radius 100 mm subjected to flexural shear force of 150 kN. [2 M]

(e) What are the modes of failure of short and long columns. [2 M]

(f) State the assumptions made in the derivation of torsion equation. [2 M]

PART-B

4 × 12M = 48 M

2. (a) Draw the stress strain curve for mild steel and explain the salient points. [4 M]

(b) A steel rod of 50 mm diameter is enclosed by a copper tube of 60 mm external diameter and wall thickness of 4 mm. The composite bar of length 600 mm is subjected to an axial tensile force of 150 kN. Find the stresses in each bar and the load carried by each bar. Adopt E for Steel is 200 GPa and E for Copper is 110 GPa. [8 M]

3. (a) The state of stress at a point of a loaded member is shown in Fig.1, Using Mohr's Circle of stresses, determine the

(i) Magnitude and the direction of principal stresses and

(ii) Magnitude of the maximum shear stress and its plane. [8 M]

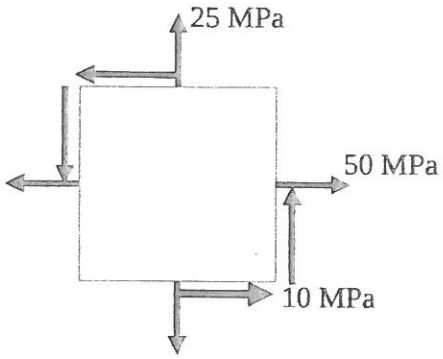

Fig.1

(b) State and explain the maximum shearing stress failure theory and also indicate the failure criterion. [4 M]

4. Draw the shear force and bending moment diagrams for a simply supported beam loaded as shown in Fig.2. [12 M]

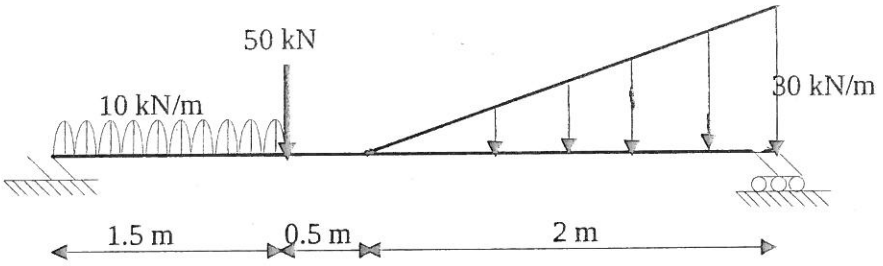

Fig.2

5. (a) A simply supported steel beam of span 4 m, has cross-section shown in Fig.3. Find the intensity of uniformly distributed load that the beam can carry if the permissible stresses in compression and tension are 125 N/mm^2 and 150 N/mm^2, respectively. The total depth of the section is 250 mm.

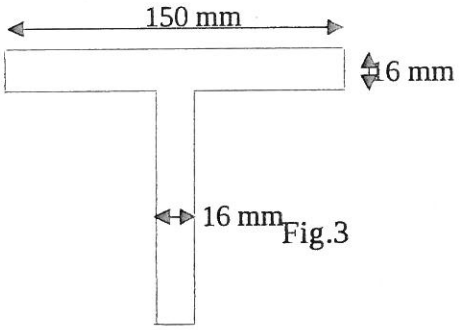

Fig.3

(b) A simply supported beam of span 5 m carries a uniformly distributed load of 60 kN/m over the entire span. The cross-section of the beam is as shown in Fig.4. Draw the distribution of shear stress across the quarter-span section.

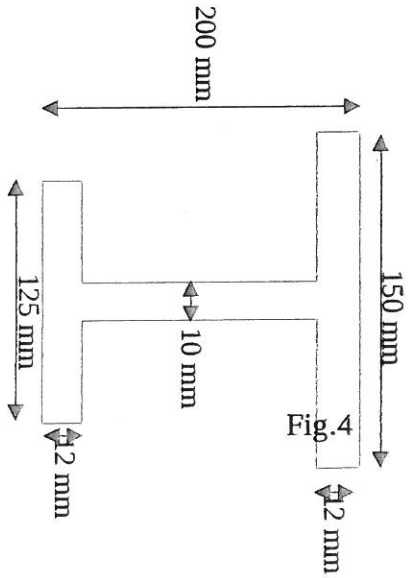

Fig.4

6. (a) Explain the limitations of Euler's theory.

6. (b) A hollow circular section mild steel column, 6 m long with both ends hinged has to carry an axial load of 450 kN. Design the cross-section of the column, using a factor of safety of 3. Adopt the internal diameter is 0.75 times the external diameter. Assume the Rankine's constants are f_c = 315 MPa and $\alpha = \frac{1}{7500}$

7. (a) Design steel shaft subjected to a torque of 50 kNm and a bending moment of 30 kNm. Assume the maximum shear stress is not to exceed 50 N/mm^2.

7. (b) A thin steel cylindrical shell of thickness 12 mm, 1.5 m diameter and 3.6 m long is carrying a fluid at a pressure of 2.5 N/mm^2. Find the change in volume of the cylinder.

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Subject Code: R16EE2101

II B.Tech I Semester Supple Examinations, October-2020

ELECTRICAL CIRCUIT ANALYSIS - II

(EEE)

Time: 3 hours Max Marks: 60

Question Paper Consists of Part-A and Part-B.

Answering the question in Part-A is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

1. (a) Explain the purpose of star delta transformation
(b) Write few methods available for measuring in 3-phase load
(c) What is transient state?
(d) Write ABCD parameters in terms of Z-parameters
(e) Give the applications of filter
(f) What are the advantages of fourier transforms

[2+2+2+2+2+2]

PART-B

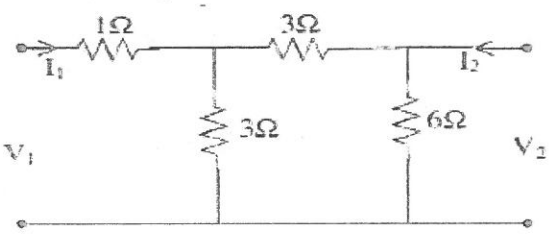
4 X 12 = 48

2. (a) A symmetrical three phase 400V system supplies a balanced delta connected load. The current in each branch circuit is 20A and phase angle 40° (lag) calculate the line current and total power.
(b) A balance load of (16+j12)Ω per phase, connected in star, is fed from a three-phase, 230V supply. Find the line current, power factor, total power, reactive VA and total VA.

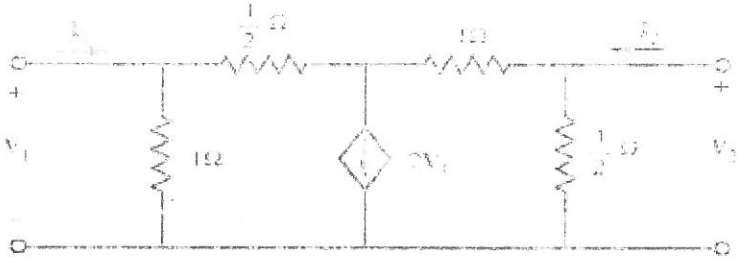
3. (a) With a neat circuit and phasor diagram explain the three phase power measurement by two wattmeter methods
(b) A 440V, 50Hz, 3ϕ supply has delta connected load having 50Ω between R & Y, 159mH between Y & B and 15.9μF between B & R. Find (i) The line current for the sequence RYB (ii) The value of star connected balanced resistors for the same power.

4. (a) A series RLC circuit with R=5Ω, L=0.1H and C=500μF, has a sinusoidal voltage source V(t)=1000sin250t. Derive the expression for current and the resulting current if the switch is closed at t=0.
(b) Define and explain the properties of Laplace Transforms.

5. (a) Determine the Z-parameters and Y-parameters for the network shown below

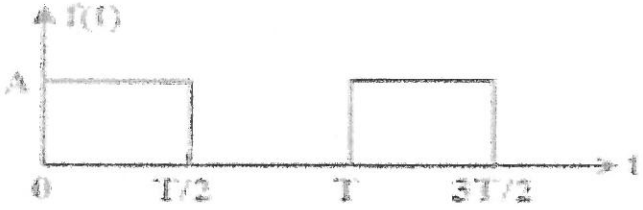


(b) Obtain Z-parameters for the network shown below



6. (a) Draw and explain the operation of high pass and low pass filters using RC
(b) Each of the series elements of a T-type Low pass filter consists of an inductance of 30mH having negligible resistance and the shunt element has a capacitance of 0.2μF. Calculate the cut-off frequency and determine the iterative impedance at a frequency of 1000Hz

7. (a) Obtain the trigonometric form of the fourier series.
(b) Find the Fourier series expansion of the wave form shown



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Subject Code: R16EE2102

II B.Tech I Semester Supple Examinations, October-2020

ELECTRONIC DEVICES AND CIRCUITS

(EEE)

Time: 3 hours Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B.**

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

1. (a) Explain the concept of mobility in semiconductors?
   (b) Draw the V-I characteristics of diode in forward and reverse bias?
   (c) Write the applications of Varactor diode?
   (d) Draw the input and output characteristics of common base and common emitter configuration?
   (e) What is the significance of operating point in transistors?
   (f) Define drain resistance and amplification factor in FET?

[2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. (a) Explain in detail about Drift and Diffusion current? (6M)
   (b) State and explain the phenomenon of Hall Effect? (6M)

3. (a) Derive the expression for diode current equation? (6M)
   (b) Explain the mechanism of breakdown in PN junction diode? (6M)

4. (a) Derive the expression for ripple factor, efficiency and form factor of half-wave rectifier? (6M)
   (b) Explain the construction and operation of tunnel diode? (6M)

5. (a) Explain how transistor is used as a switch? (6M)
   (b) Briefly explain the concept of early effect in transistor? (6M)

6. (a) What is the need of biasing in transistors? (6M)
   (b) Explain the operation of Fixed-bias technique? (6M)

7. (a) With the neat sketches explain the operation of depletion mode MOSFET? (6M)
   (b) Explain the construction and operation of UJT? (6M)

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Subject Code: R16EE2103

II B.Tech I Semester Supple Examinations, October-2020

ELECTRO MAGNETIC FIELDS

(EEE)

Time: 3 hours **Max Marks: 60**

Question Paper Consists of Part-A and Part-B.

Answering the question in Part-A is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

1. (a) State Coulomb's law?
(b) State Ohm's law in point form?
(c) State Biot -Savart law?
(d) Define self and mutual inductances?
(e) Write the Lorentz force equation?
(f) What is displacement current?

[2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. Derive the expression for electric field intensity due to sheet of charge with charge density P_s C/ m^2

3. (a) Derive the expression for capacitance of a spherical capacitor
(b) A parallel plate capacitor has plate area 200 cm^2 and plate separation of 3mm, the charge density is μ C/m^2 and air is the dielectric. Find i) capacitance of the capacitor ii) Voltage between the plates

4. Derive the expression for magnetic field intensity due to a straight current carrying filamentary conductor of finite length AB and also derive the expression for magnetic field intensity when the conductor is infinite in length.

5. Calculate the self inductance per unit length of an infinitely long Solenoid

6. Define magnetic dipole moment and derive the expression for the torque on a current loop place in a magnetic field

7. Write all the Maxwell's equations in point and integral forms for time varying fields

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Narasaraopeta Engineering College (Autonomous)

Kotappakonda Road, Yellamanda (P.O), Narasaraopet- 522601, Guntur District, AP.

Subject Code: R16EE2104

II B.Tech I Semester Supple Examinations, October-2020

FLUID MECHANICS AND PRIME MOVERS

(EEE)

Time: 3 hours **Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B.**

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

1. (a) Define Vapour pressure?
   (b) State equation of continuity for one dimensional flow
   (c) What is the principle on which the venturimeter works?
   (d) What is hydrodynamic force?
   (e) what is draft tube?
   (f) Define utilization factor?

[2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. (a) How does the viscosity of fluid vary with temperature? 4M
   (b) A simple manometer is used to measure the pressure of oil (0.8) flowing in a pipe line. Its right limb is open to the atmosphere and left limb is connected to the pipe. The centre of the pipe is 9cm below the level of mercury (13.6) in the right limb. If the difference of mercury level in the two limbs is 15cm. Determine the absolute pressure of oil in the pipe 8M

3. (a) Classify the types of flows? 5M
   (b) Derive an expression for Bernoulli's theorem from first principle 7M

4. (a) What are the minor losses in pipe flow? Explain in detail 5M
   (b) An orifice meter with orifice diameter 10 cm is inserted in a pipe of 20 cm diameter. The pressure gauges fitted upstream and downstream of the orifice meter gives readings of 19.62 N/cm^2 and 9.81N/cm^2 respectively. Coefficient of discharge for the orifice meter is given as 0.6. Find the discharge of water through pipe 7M

5. (a) Derive the equation for the impact of jet striking a moving inclined plate in the direction of the jet 5M
   (b) Explain the working of a single-stage centrifugal pump with neat sketch. 7M

6. (a) How will you classify turbines? 4M
   (b) Explain the working of pelton wheel with neat sketch 8M

7. (a) Show that the capacity factor is equal to the product of the load factor and utilization fact
   (b) Explain about the pumped storage system [5M+7M]

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Subject Code: R16EE2105

II B.Tech I Semester Supple Examinations, October-2020
COMPLEX VARIABLES AND STATISTICAL METHODS
(EEE)

Time: 3 hours **Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B.**
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) Write short notes on (i) Analytic Function (ii) Cauchy-Riemann Equations.
   (b) Evaluate $\int(2y + x^2)dx + (3x - y)dy$ along the parabola x = 2t, y = t^2+3 joining (0,3) and (2,4)
   (c) State the residue theorem.
   (d) Define the random variable and also write the types of random variables.
   (e) A random sample of 100 are taken from an infinite population have mean 76 and variance 256. What is the probability that $\bar{X}$ will be between 75 and 78?
   (f) Write short notes on Null and Alternative hypothesis.

[2+2+2+2+2+2]

PART-B **4 X 12 = 48**

2. (a) If f(z) is an analytic function of z, prove that $\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right)|\text{Re f(z)}|^2 = 2|f'(z)|^2$.
   (b) Find the imaginary part of analytic function whose real part is $e^x(x.\text{Cos}y - y.\text{Sin}y)$.
3. (a) Evaluate using Cauchy's integral formula $\int_C \frac{z^3 - \text{Sin}3z}{(Z - \pi/2)^3}$ where C is the curve $|z|$= 2.
   (b) Obtain the Laurent series expansion $f(z) = \frac{7z-2}{(z+1)z(z-2)}$ in the annulus $1 < |z+1| < 3$.
4. (a) Evaluate $\int_0^{\pi} \frac{1}{1+a.\text{Cos}\theta} d\theta, 0 < a < 1$ using Residue theorem.
   (b) Find the poles of the function $f(z) = \frac{z^2}{(z-1)}$ and the residues at these poles.
5. (a) Two dice are thrown x assign to each point if S is the sum of the variables on the faces. Find the Mean, Variance and S.D of the random variable.
   (b) In a sample of 1000 cases, the mean of a certain test is 14 and standard deviation is 2.5. Assuming the distribution to be normal, find (i) How many students score between 12 and 15. (ii) How many score above 18 (iii) How many score below 8.
6. (a) A population consists of five numbers 2, 3, 6, 8 and 11. Consider all possible samples of size two which can be drawn without replacement from the population. Find (a) The mean of the population (b) The S.D of the population (c) The mean of the sampling distribution (d) The S.D of the sampling distribution of means and verify.

(b) A random sample of size 100 are taken from a population with $\sigma = 5.1$. Given that the sample mean is $\bar{X} = 21.6$. Construct the 95% confidence interval for the population mean μ.

7. (a) A lady stenographer claims that she can take dictation at the rate of 120 words per minute. Can we reject her claim on the basis of 100 trails in which she demonstrate with mean 116 words and S.D of 15 words.

(b) A simple sample of heights of 6400 Englishmen has a mean of 67.85 inches and S.D 2.56 inches, while a sample of heights of 1600 Australians has a mean 68.55 inches and S.D 2.52 inches. Do the data indicate that Australian is on the average taller than Englishmen?

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Narasaraopeta Engineering College (Autonomous)

Kotappakonda Road, Yellamanda (P.O), Narasaraopet- 522601, Guntur District, AP.

Subject Code: R16EE2106

II B.Tech I Semester Supple Examinations, October-2020

ELECTRICAL MACHINES - I

(EEE)

Time: 3 hours **Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B.**

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

1. (a) List the applications of DC shunt and series Generators.
   (b) Define critical speed of a DC generator.
   (c) What are the advantages of swinburne's test.
   (d) What is the condition for maximum efficiency of a transformer?
   (e) State various conditions required for parallel operation of transformers.
   (f) What are different types of three-phase transformers?

[2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. Briefly Explain construction features and principle of operation of a DC Generator with suitable diagrams and write functions of each part. [12M]
3. (a)Explain the Experimental procedure to obtain the open circuit characteristics of a DC shunt Generator. [6M]
   (b)Two shunt Generators operating in parallel to supply together 2500A.The machines have armature resistances 0.04Ω and 0.02Ω ,field resistances of 25Ω and 20Ω and induced emfs of 440V and 420V respectively. Find the bus bar voltage and output of each machine. [6M]
4. (a) Derive the equation for torque developed by a dc motor. [6M]
   (b)Explain the Armature control method and field control method of controlling the speed of a DC shunt motor [6M]
5. (a)Explain the constructional details and principle of operation of a Transformer [6M]
   (b)A 10KVA ,500/250V,50HZ, single phase transformer has a net area of cross section of $90cm^2$ and maximum flux density is 1.2T. Calculate the number of turns on both primary and secondary. [6M]
6. (a)Explain the procedure to conduct OC&SC test on a Transformer with a neat diagram.
   (b) With the instruments located on the high-voltage side and the low-voltage side short-circuited, the short-circuit test readings for the 50-kVA ,2400/240-V transformer are 48 V, 20.8 A, and 617 W. An open-circuit test with the low voltage side energized gives instrument readings on that side of 240 V, 5.41 A, and 186 W. Determine the efficiency and the voltage regulation at full load, 0.80 power factor lagging. [6M+6M]
7. (a) Explain the concept of three phase to two phase conversion(Scott connection) with a neat circuit diagram. [6M]
   (b) A Scott connected transformer is fed from a 6000 V, 3-Φnetwork and supplies 2-Φ power at 500 V/Ph. Calculate the line current on 3-Φsystem, if the load on the 2-Φsides are 500A at 0.8 pf lagging (teaser) and 400 A at 0.8 lagging (main). [6M]

Narasaraopeta Engineering College (Autonomous)
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Subject Code: R16ME2101

II B.Tech I Semester Supple Examinations, October-2020

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

(ME)

Time: 3 hours Max Marks: 60

Question Paper Consists of Part-A and Part-B.

Answering the question in Part-A is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

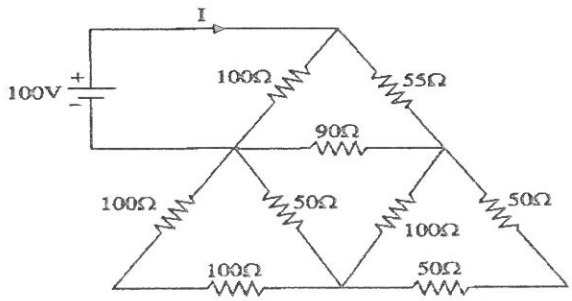
1. (a) What will be the current drawn by a lamp rated at 250V, 40 watts connected to a 230V supply?
   (b) Write the EMF equation of a generator.
   (c) How do you reduce leakage flux in a transformer?
   (d) State the condition for maximum torque of and induction motor under running condition.
   (e) Distinguish NPN and PNP configurations.
   (f) List the ideal characteristics of OPAMP.

[2+2+2+2+2+2]

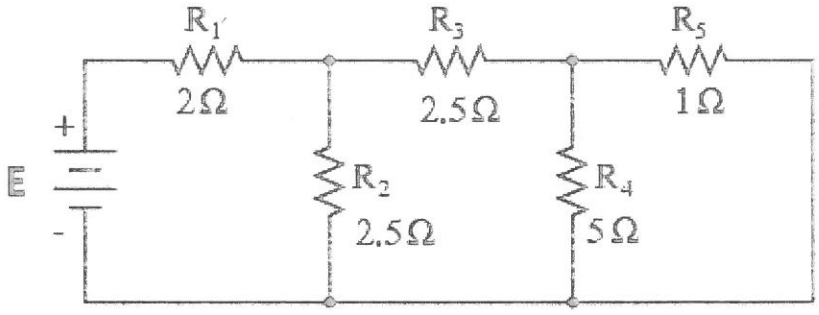
PART-B

4 X 12 = 48

2. (a) Determine the total current taken from the source. (6)



(b) Find the supply voltage E such that the power in the 1 Ω resistor is 100W. (6)



3. (a) With a circuit explain how to conduct OC and SC test on single phase transformer. (8)
   (b) Draw the equivalent circuit of a single phase transformer from the OC and SC test parameters. (4)

4. (a) A separately excited generator running at 1000 rpm is supplied 200 A at 125 V. What will be the load current when the speed drops to 800 rpm if filed current is unchanged? Given that armature resistance = 0.04 ohm and brush drop = 2 V. (8)
(b) Derive the necessary equations for the Separately excited generator setup. (4)

5. (a) Sketch and explain the torque slip characteristics of three phase cage and slip ring induction motors. (10)
(b) Show the stable region in the torque slip characteristics. (2)

6. (a) With a neat circuit, describe the working of a half rectifier with relevant waveforms. (6)
(b) Considering NPN transistor in common emitter configuration, brief how it works as voltage amplifier. (6)

7. (a) Illustrate how do you operate an OP AMP in an inverting amplifier mode in closed loop configuration with the derivation for closed loop gain. (6)
(b) With respect to OPAMP define the following terms and give their typical values. (6)
i. PSRR ii. CMRR iii. Slew rate

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Narasaraopeta Engineering College (Autonomous)
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Subject Code: R16ME2102

II B.Tech I Semester Supple Examinations, October-2020

MECHANICS OF SOLIDS

(ME)

Time: 3 hours Max Marks: 60

Question Paper Consists of Part-A and Part-B.

Answering the question in Part-A is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

1. (a) what is the difference between normal stress and shear stress
(b) List the various types of Beams
(c) List the various assumptions made in the theory of simple bending
(d) What is Macaulay's method? Where it is used??
(e) A cylinder of internal diameter 2.5 m and of thickness 5 cm contains gas. If the tensile stress in the material is not to exceed 80 N/mm^2, determine the internal pressure of the gas.
(f) Define torsional rigidity.

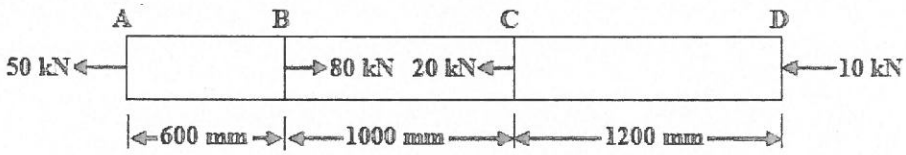
[2+2+2+2+2+2]

PART-B

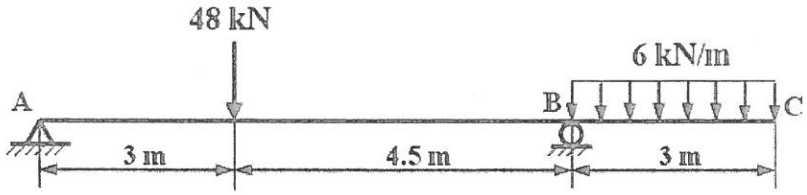
4 X 12 = 48

2. (a) A bar of 30 mm diameter is subjected to a pull of 60 kN. The measured extension on guage length of 200 mm is 0.1 mm and change in diameter is 0.004 mm. Calculate i) Young's modulus ii) Poisson's ratio and iii) Bulk modulus. (6M)

(b) A brass bar having a cross sectional area of 1000 mm^2 is subjected to axial forces as shown in figure. Determine the total elongation of the bar if E = 105 GPa (6M)



3. An overhanging beam ABC supported at A and B and it overhangs from B to C and is loaded as shown in figure. Draw the shear force and bending moment diagrams. (12M)



4. (a) Derive the equation from theory of simple bending (7M)

$$\frac{M}{I} = \frac{\sigma}{y} = \frac{E}{R}$$

(b) A cantilever of length 2m fails when a load of 2kN is applied at the free end. If the section of the beam is 40mm x 60mm, find the stress at the failure (5M)

5. (a) Derive an expression for the slope and deflection of a beam subjected to uniform bending moment (6M)

(b) A beam of rectangular section 200mm wide and 300mm deep is simply supported at its ends. It carries a uniformly distributed load of 9kN/m run over the entire span of 5m. If the value of E for the beam material is $1x10^4$ N/mm^2, find

(i) the slope at it the support (ii) maximum deflection (6M)

6. A steel cylinder of 200 mm external diameter is to be shrunk onto another steel cylinder of 60 mm internal diameter. The diameter at the junction after shrinking is 120 mm. Before shrinking on, the difference of diameters at the junction is 0.08 mm. Calculate the radial pressure at the junction and the hoop stresses developed in the two cylinders after shrinking on. Take E = 200 GPa. (12M)

7. Determine the diameter of a solid shaft which will transmit 300kW at 250rpm. The maximum shear stress should not be exceed 30 N/mm^2 and twist should not be more than 1^0 in the shaft length of 2m. Take modulus of rigidity $=1x10^5$ N/mm^2. (12M)

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Narasaraopeta Engineering College (Autonomous)

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Subject Code: R16ME2103

II B.Tech I Semester Supple Examinations, October-2020

MATERIAL SCIENCE AND METALLURGY

(ME)

Time: 3 hours **Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B.**

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

1. (a) Write the necessity of alloying?
   (b) Define equilibrium diagram?
   (c) Explain Lever Rule ?
   (d) Draw TTT diagram for eutectoid steel ?
   (e) What are the properties of copper?
   (f) State various applications of composite materials

[2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. (a) Explain in detail metallic bonding and its properties [6M]
   (b) Explain the methods that are used for determining the grain size [6M].

3. (a) Write eutectic, peritectic, eutectoid and peritectoid reactions? [6M]
   (b) Draw Fe-Fe_3C diagram? Explain the important phases [6M]

4. (a) Explain the types of cast iron and their applications [6M]
   (b) Explain in detail the properties and applications of medium carbon steel? [6M]

5. (a) How do you find the hardenability? Explain [6M]
   (b) Explain hardening and tempering process [6M]

6. (a) Explain the properties and applications of aluminium and its alloys? [6M]
   (b) Explain the properties of alpha-beta titanium alloys? [6M]

7. (a) What are cermets? Explain with examples [6M]
   (b) Explain the manufacture of fiber reinforced composites? [6M]

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Narasaraopeta Engineering College (Autonomous)
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Subject Code: R16ME2104

II B.Tech I Semester Supple Examinations, October-2020
FLUID MECHANICS
(ME)

Time: 3 hours **Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B.**

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B.All questions carry equal marks of 12.

PART-A

1. (a) Differentiate between absolute pressure, gauge pressure and vacuum pressure.
   (b) Define and distinguish between streamline, path line and streak line.
   (c) What is a pitot tube?
   (d) Define Reynolds number and what is its significance?
   (e) What are the various minor losses in pipes?
   (f) Define boundary layer thickness and displacement thickness. **[2+2+2+2+2+2]**

PART-B **4 X 12 = 48**

2. (a) Define dynamic viscosity and kinematic viscosity. Also state their units of measurement.
   (b) A cylindrical shaft of 90 mm diameter rotates about a vertical axis inside a fixed cylindrical tube of length 50 cm and 95 mm internal diameter. If the space between the tube and the shaft is filled by a lubricant of dynamic viscosity 2.0 poise, determine the power required to overcome the viscous resistance when the shaft is rotated at a speed of 240 rpm.
3. (a) Explain different types of fluid flow.
   (b) Water flow through a pipe AB of 1.2 m diameter at a velocity of 3 m/s and then passes through a pipe BC 1.5 m diameter. At C, the pipe branches into CD and CE. Branch CD is 0.8 m in diameter and carries one-third of the flow in AB. The flow velocity in branch CE is 2.5 m/s. Find the volume rate of flow in AB, the velocity in BC, the velocity in CD and diameter of CE.
4. (a) Derive Bernoulli's equation, mentioning clearly the assumptions underlying it
   (b) A 30cm by 15cm venturimeter is inserted in a vertical pipe carrying water, flowing in the upward direction. A differential mercury manometer connected to the inlet and throat gives a reading of 20 cm. Find the discharge. Take Cd = 0.98
5. (a) Explain the Buckingham Pi theorem
   (b) A partially submerged body is travelling in water facing resistance R to its motion which depends on the density ρ, the length l, the velocity V, the viscosity μ and the acceleration due to gravity g. Using Buckingham Pi theorem, express the functional relationship between the variables in a dimensionless form.
6. (a) Derive the expression for mean velocity for laminar flow through a circular pipe.
   (b) Two reservoirs are connected by a pipeline consisting of two pipes in series, one of 15 cm diameter and 6m long and another of 22.5 cm diameter and 15m long. If the difference in water levels of the reservoirs is 6m, calculate the discharge by considering all the losses. Assume f = 0.02 for both the pipes.
7. When a fluid flows over a flat surface and the flow is laminar, the boundary layer profile may be represented by the equation $u/U = 2(y/\delta) - (y/\delta)^2$, Where y is the height within the layer and δ is the thickness of the layer. u is the velocity within the layer and U is the velocity of the main stream. Derive the expressions for boundary layer thickness and coefficient of drag in terms of Reynolds number.

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Subject Code: R16ME2105

II B.Tech I Semester Supple Examinations, October-2020

THERMODYNAMICS

(ME)

Time: 3 hours **Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B.**

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

1. (a) Enlist the similarities between heat and work.
(b) What is the difference between Refrigerator and heat pump..
(c) What are the corollaries of Carnot theorem?
(d) Define a pure substance. Can air be treated as pure substance? Explain.
(e) Write the Maxwell's equations and its significance.
(f) What are the assumptions made in the analysis of an air standard cycle?

[2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. (a) What is meant by thermodynamic equilibrium? Explain with the help of examples.
(b) A blower handles 1kg/s of air at 20^0C and consuming a power of 15 kw. The inlet and outlet velocities of air are 100 m/s and 150 m/s respectively. Find the exit air temperature, assuming adiabatic conditions. Take *Cp* of air as 1.005 kJ/kg.k.

3. (a) Derive the steady flow energy equation and apply in to a Heat exchanger.
(b) In a gas turbine unit, the gases flow through the turbine is 15 kg/s and the power developed by the turbine is 12000 kW. The enthalpies of gases at the inlet and outlet are 1260 kJ/kg and 400 kJ/kg respectively and the velocity of gases at the inlet and outlet are 50 m/s and 110 m/s respectively. Calculate:
(i) The rate at which heat is rejected to the turbine, and
(ii) The area of the inlet pipe given that the specific volume of the gases at the inlet is 0.45 m^3/kg.

4. (a) What are the conditions for reversibility? Explain.
(b) A heat engine operating between two reservoirs at 1000 K and 300 K is used to drive heat pump which extracts heat from the reservoir at a rate twice that at which engine rejects heat to it. If the efficiency of the engine is 40% of the maximum possible and the co efficient of performance of heat pump is 50% of the maximum possible, make calculations for the temperature of the reservoir to which the heat pump rejects heat. Also work out the rate of heat rejection from the heat pump if the rate of supply of heat to the engine is 50 kW.

5. (a) Explain P – T , T-S diagram of a pure substance.
(b) Explain I) dryness fraction ii) Mollier chart

6. (a) What are the Daltons Law of partial pressures? How it is different from Avogadro's law?

(b) At steady state, 100m^3/min of dry air at 320C and 1 bar is mixed adiabatically with a stream of oxygen (O_2) at 127^{0}C and 1 bar to form a mixed stream at 47^{0}C and 1 bar. The kinetic an potential energy effects are negligible. Determine (i) Mass flow rates of dry air and oxygen in kg/min, (ii) The mole of fraction of dry air and oxygen in the existing mixture, and (iii) Time rate of entropy production, in kJ/K.min.

7. (a) Explain the working of reversed Brayton cycle.

(b) An engine working on the Otto cycle is supplied with air at 0.1 MPa, 35^{0}C. The compression ratio is 8. Heat supplied is 2100 kJ/kg. Calculate the maximum pressure and temperature of the cycle, the cycle efficiency and the mean effective pressure. For air. Cp = 1.005, Cv = 0.718, and R = 0.287 kJ/kg-K.

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Narasaraopeta Engineering College (Autonomous)
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Subject Code: R16EC2102

II B.Tech I Semester Supple Examinations, October-2020

ELECTRONIC DEVICES AND CIRCUITS

(ECE)

Time: 3 hours Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B.**

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

1. (a) What is the difference between Drift current and Diffusion current?
(b) What is the difference between Diffusion capacitance and Transition capacitance?
(c) What is the difference between Zener Breakdown and Avalanche Breakdown?
(d) A transistor has a typical β (beta) of 100. If the collector the current is 40 mA. What is the value of emitter current?
(e) Why do you need biasing?
(f) What is break over voltage of SCR?

[2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. (a) Explain hall effect clearly with applications [6]
(b) What do you mean by continuity equation and explain? [6]

3.(a) Derive the expression for diffusion capacitance of PN junction diode. [6]
(b) Explain how zener diode can be work as a voltage regulator. [6]

4. Explain the working of full wave rectifier and derive expression for ripple factor, voltage, current, efficiency, PIV and transformer utilization factor [12]

5. (a) Draw the CE,CB,CC configurations and explain the relation among α, β, and γ. [6]
(b) Explain photo transistor [6]

6. (a) What is the difference between Fixed Bias, Collector-to-base Bias and Self Bias and explain any two biasing techniques [8]
(b) Explain Thermal Runaway

7. (a) Describe the construction and working of Silicon Controlled Rectifier [6]
(b) What are differences between JFET and MOSFET [6]

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Narasaraopeta Engineering College (Autonomous)
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Subject Code: R16EC2103

II B.Tech I Semester Supple Examinations, October-2020

SIGNALS AND SYSTEMS

(ECE)

Time: 3 hours **Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B.**

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

1. (a) Define Unit step function and Ramp function.
(b) Define linear system. When the system is said to be LTI system
(c) Define Time shifting property of Fourier transform
(d) Define Laplace transform
(e) Define aliasing effect?
(f) Mention the difference between signal and system bandwidth

[2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. Explain the following Classification of Signals:
   a) Analog, Discrete-time, & Digital signal
   b) Periodic & Aperiodic signals
   c) Even & Odd signals,
   g) Energy & Power signals,
3. (a) Obtain the Fourier series coefficients for $x(t) = A\text{Sin}\omega_0 t$
   (b) Discuss the following Properties of Fourier Series:
   (i) Linearity (ii) Parseval's Relation.
4. (a) Find the Fourier transform of x(t) = u(2t), where u(t) is the unit step function
   (b) State and prove the following properties of Fourier Transform
   i) Differentiation property in both time & frequency ii) Duality
5. Determine the inverse Laplace of the following functions.
   i) $1/s(s+1)(s+3)$ ii) $3s^2+8s+6 / (s+8)(s^2+6s+1)$ (iii) $1/(s+1)$
6. (a) List the properties of Cross correlation function.
   (b) Give the relation between auto correlation function and energy/power spectral density function.
7. Discuss the following:
   (a) System and its types
   (b) Region of Convergence
   (c) Relationship between bandwidth and rise time.

Narasaraopeta Engineering College (Autonomous)
Kotappakonda Road, Yellamanda (P.O), Narasaraopet- 522601, Guntur District, AP.

Subject Code: R16EC2104

II B.Tech I Semester Supple Examinations, October-2020

CONTROL SYSTEMS

(ECE)

Time: 3 hours Max Marks: 60

Question Paper Consists of Part-A and Part-B.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

1. (a) What is the feedback? What are the characteristics of negative feedback? (2 M)
   (b) Define transfer function. Write the Mason's gain formula to find transfer function and explain each term in it. (2 M)
   (c) Give the expression for the rise time of the step response for a second order system. (2 M)
   (d) What is the need of angle of asymptotes in Root-locus? (2 M)
   (e) Define gain-cross over frequency and phase-cross over frequency. (2 M)
   (f) What is meant by state, state variable and state model? (2 M)

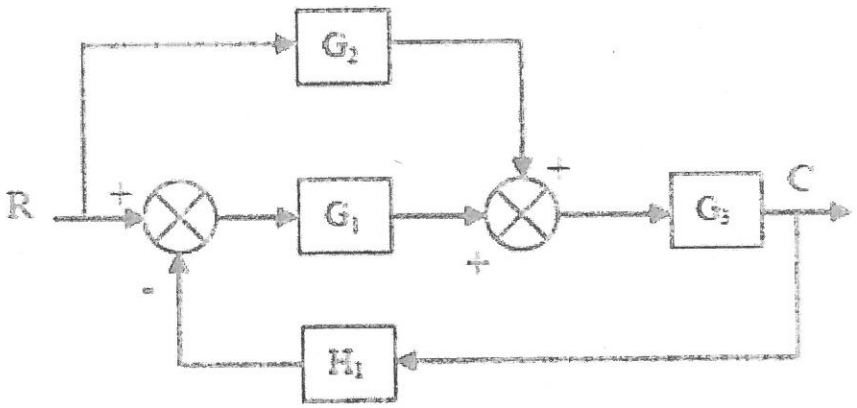
[2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. (a) What are the various types of control systems? Give an example of each. What are the advantages and disadvantages of open loop and closed loop systems? (6 M)
   (b) Give the Force-voltage analogy of mechanical translational system and electrical system. (6 M)

3. (a)) Determine the transfer function C(S) / R(S) for the following block diagram. (6 M)



   (b) What are differences between block diagram reduction and signal flow graph reduction? (6 M)

4. (a) Find the steady state errors for the unit step, unit ramp and unit parabolic inputs for the system whose transfer function is (6 M)

$$G(s) = \frac{1000(s+1)}{(s+10)(s+50)}$$

(b) Why derivative controller is not used in control systems? What is the effect of PI controller on the system performance. (6 M)

5. (a) Sketch the root locus plot of a unity feedback system whose open loop T.F is (6 M)

$$G(s) = \frac{K(s^2-2s+2)}{(s+2)(s+3)(s+4)}$$

(b) The characteristic equation of system is $S^4 + 21S^3 + 21S^2 + 36S + 20 = 0$. Find whether the systems are stable or not using RH Criterion. (6 M)

6. (a) For the given transfer function:

$$G(s) = \frac{1}{s(s+2)(s+4)}$$

sketch the Bode asymptotic magnitude and asymptotic phase plots. (6 M)

(b) Consider the unity feedback system shown with the transfer function:

$$G(s) = \frac{8000}{(s+6)(s+20)(s+35)}$$

Find the : (i) Gain margin. (ii) Phase margin. (iii) Zero dB frequency. Using Nyquist diagram. (6 M)

7. (a) Discuss the significance of State Space Analysis. (6 M)
(b) Consider the matrix. Compute e^{At} (6 M)

$$A = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix}$$

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Subject Code: R16EC2105

II B.Tech I Semester Supple Examinations, October-2020

DATA STRUCTURES

(ECE)

Time: 3 hours Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B.**

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

1. (a) What are the limitations of arrays? How can it be overcome?
(b) Explain about external sorting?
(c) Explain stack over flow and under flow with real time examples.
(d) How to create a node in double linked list. Give its structure.
(e) Define Tree. Which linked list is used for representing trees, give an example.
(f) Define DFS and BFS. What is the difference between them?

[2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. (a) Explain transposing of a matrix with an example. Also write a function for its implementation.[6M]
(b) Define data structure. Explain the types of data structures in detail. [6M]

3. Explain merge sort algorithm with a suitable example. [12M]

4. (a) Write ADT for array implementation [6M]
(b) Convert given Infix expression: (a + b * c ^ d) * (e + f / g) to Postfix expression using Stack and show the details of Stack at each step of conversion. (Note: ^ indicates exponent operator).[6M]

5. (a) Write an algorithm to delete an element anywhere from doubly linked list. [6M]
(b) Discuss sparse matrix representation using linked list. [6M]

6. (a) What is a binary tree? Construct a binary tree for the given pre-order traversal and in order traversals: [6M]

Pre-Order Traversal: G B Q A C K F P D E R H
In-Order Traversal: Q B K C F A G P E D H R

(b) Show that the maximum number of nodes in a binary tree of height H is 2H+1 -1. [6M]

7. (a) What is a graph? Explain the properties of graphs. [5M]
(b) Write an algorithm for BFS. Explain BFS with an example. [7M]

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Subject Code: R16EC2106

II B.Tech I Semester Supple Examinations, October-2020
ELECTRICAL AND MECHANICAL TECHNOLOGY
(ECE)

Time: 3 hours Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B.**
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. a) What is the function of a transformer?
   b) Write down the equation for the speed of the rotating magnetic field?
   c) Define controlling torque?
   d) Explain the resistance welding?
   e) Define the term radiation intensity?
   f)What is a Worm and a Worm wheel?

[2+2+2+2+2+2]

Part-B

2. a) From first principles, derive the EMF equation of a transformer? [6M]
   b) Determine the flux per pole for 6 pole DC machine having 240 wave connected conductors, which generates on open circuit voltage of 500V while running at 1000 rpm? [6M]

3. a) Explain the principle of working of a three phase induction motor? [6M]
   b) Draw the torque-slip characteristics of a three phase slip ring induction motor? [6M]

4. Explain the following i) Damping torque ii) Energy meter [12M]

5. Write short notes on i) Arc welding ii) Gas welding iii) Brazing and soldering [12M]

6. a) What are the various thermo physical properties and explain? [6M]
   b) Explain the term thermal Radiation? [6M]

7. a) Discuss briefly the various types of belts used for the transmission of power? [6M]
   b) Discuss relative merits and demerits of belt, rope and chain drive for transmission of power? [6M]

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Narasaraopeta Engineering College (Autonomous)

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Subject Code: R16CS2102

II B.Tech I Semester Supple Examinations, October-2020

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

(CSE)

Time: 3 hours **Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B.**

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

1. (a) Construct truth table for the compound predicate: $p(\neg q \wedge r)$
   (b) Explain universal quantifier.
   (c) What is a Power set? If S={a, b, c} then P(S) is?
   (d) Explain adjacency matrix of the graph?
   (e) In how many ways can 20 similar books be placed on 5 different shelves?
   (f) Define recurrence relation? Show that $\{a_n\}$ is a solution of recurrence relation

$$a_n = -3a_{n-1} + 4a_{n-2} \quad if \ a_n = 1$$

[2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. (a) Explain pdnf, pcnf with suitable examples. [4+4]
   (b) Show that the following statement is a tautology. $(\sim P \wedge (P \square Q)) \square \sim Q$ [4]
3. (a) Prove or disprove the validity of the following arguments using the rules of inference.
   i) All men are fallible ii) All kings are men iii) Therefore, all kings are fallible [5]
   (b) Use the mathematical induction to prove that $1^3+ 2^3+\ldots.+n^3=[(n(n+1))/2]^2$, whenever n is a positive integer. [7]
4. (a) Verify the following relation R on X = {1, 2, 3, 4} is an equivalence relation or not? Given R = {(1, 1), (1, 4), (4, 1), (2, 2), (2, 3), (3, 4), (3, 3), (3, 2), (4, 3), (4, 4)}. [6]
   (b) If A={1, 2,3,4}, B{w, x, y, z} and f={(1,w),(2,x),(3,y),(4,z)}then Prove that f is both one-to-one and onto. [6]
5. (a) How to determine adjacency matrix for a graph. Explain properties of adjacency matrix by taking suitable graph with minimum 7 nodes and more than 8 edges. [6]
   (b) Define isomorphism? And explain isomorphism with suitable example? [6]
6. (a) Find the number of permutations of the letters of the word MASSASAUGA,
   i) In how many of these, all four A's are together?
   ii) How many of these of them begin with S? [3+3]
   (b) Find the number of positive integer less than 10,000 and are divisible by 5 or 7? [6]

7. (a) Solve the recurrence relation $a_n+4a_{n-1}+4a_{n-2} = 8$ for n>=2 where $a_0=1$, $a_1=2$. [6]
   (b) What is a Generating function and explain the operations on generating functions? [6]

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Subject Code: R16CS2103

II B.Tech I Semester Supple Examinations, October-2020

JAVA PROGRAMMING

(CSE)

Time: 3 hours **Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B.**

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

1. (a) List any two applications of Object Oriented Programming?
   (b) Explain Identifiers Naming Conventions in Java?
   (c) List the Types of Inheritance supported in Java?
   (d) Define a Thread in Java?
   (e) List any two applications of Applets?
   (f) Explain the need of AWT?

[2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. (a) Explain the following Object Oriented Programming Concepts with suitable examples?
   i) Encapsulation ii) Inheritance
   (b) Explain the differences between Procedural languages and OOP?

3. (a) write a Java Program to print the prime numbers between 100 to 200?
   (b) Explain constructor overloading with suitable example?

4. (a) Define an Abstract Class with suitable example? Define super keyword and final keyword?
   (b) write a Java program using user defined exception?

5. (a) write a multithreading program in Java using isAlive() and join() functions?
   (b) Explain the following with suitable examples?
   i) Byte Stream ii) Console iii) Character Stream

6. (a) Explain Applet Life Cycle?
   (b) Explain Event Delegation Model?

7. (a) To design a registration form for a competition, give the suitable attributes (fields) for the following: i) Checkbox ii) Radio buttons iii) List boxes iv)Choice boxes v) Text field vi) Text area
   (b) Explain the following with syntax?
   i)JScrollPane ii) SplitPane iii) Dialog box

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Subject Code: R16CS2104

II B.Tech I Semester Supple Examinations, October-2020

DATA STRUCTURES

(CSE)

Time: 3 hours Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B.**

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

1. (a) List out operations of Data Structure.
(b) What are the disadvantages of binary search?
(c)What are the applications of Stacks?
(d) Differentiate between circular and single linked list.
(e)What is Degree of a node?
(f) Why are Graphs Useful?

[2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. (a) Explain classification of Data Structure in detail. [6M]
(b) Write an algorithm to print Fibonacci series and GCD Number. [3+3]

3. (a) Explain Binary search and its complexity. [6M]
(b) Explain the Quick sort algorithm. [6M]

4. (a) Write algorithm for basic operations of Queue. [6M]
(b) Evaluate and explain the following postfix expression 7 3 4 + - 2 3 5 + / * 6 / 7 + - [6M]

5. (a) Explain in detail about the single linked list. [6M]
(b) Write algorithms to insert into and delete elements from double linked list. [6M]

6. (a) Write short note on a) Expression Trees b) Forest [6M]
(b) Write algorithms for insertion and deletion of elements from a binary search tree. [6M]

7. (a) Explain BFS in detail with example. [6M]
(b) How to represent a graph using Adjacency Matrix? Explain. [6M]

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Subject Code: R16CS2105

II B.Tech I Semester Supple Examinations, October-2020

COMPUTER ORGANIZATION

(CSE)

Time: 3 hours **Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B.**

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

1. (a) Describe various Logical micro operations.

(b) Define Interrupt.

(c) Which addressing modes does not require Fetch operation.

(d) How to convert Virtual address in to Physical address.

(e) How handshake process is performed in Asynchronous data transfer.

(f) Perform the addition of the given two numbers in signed 2's complement representation.
(-6) + (-13).

[2+2+2+2+2+2]

PART-B

4 X 12 = 48M

2. (a) Describe functional view of the computer with its architecture. [6M]

(b) Draw and explain the 4-bit arithmetic Circuit. [6M]

3. Describe various types register reference instructions and memory reference instructions with suitable examples to each. [12M]

4. (a)Define Reverse Polish Notation. Describe the process of evaluating an arithmetic expression using reverse polish notation. [6M]

(b)What is subroutine. Draw and explain the format of micro instruction. Explain with an example. [6M]

5. Draw block diagram of associative memory and explain briefly with one word of Associative memory. [12M]

6. (a) With the help of neat sketch explain about DMA controller. [8M]

(b) Write a short notes on Input – Output Interface. [4M]

7. Explain modified Booth's multiplication algorithm with an example. [12M]

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Subject Code: R16CS2106

II B.Tech I Semester Supple Examinations, October-2020

FORMAL LANGUAGES AND AUTOMATA THEORY

(CSE)

Time: 3 hours **Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B.**

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

1. (a) What are the elements of FSM?
(b)What is Context Free Language?
(c) Differentiate between DFA and NFA.
(d) What are the uses of Regular Expression.
(e) Define PDA.
(f) List out the components of Turing machine

[2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. (a) What are the different classes of automata? How they are classified? Explain in detail.[6M]
(b) What is FSM? What are the examples of FSM? [6M]

3. (a) Consider a language L* , where L={ab,cd} with $\sum$={a,b,c,d}. [3+3]
(i) write all words in L* that have six or less letters/symbols
(ii) What is the shortest string in $\sum$ * that is not in the language L* ?
(b) What is the relationship between Grammar and Language? Explain about Context Sensitive Language with an example. [6M]

4. (a) Explain by constructing a NFA with ε which accepts a language consisting the strings of any number of 0's followed by any number of 1's followed by any number of 2's. [6M]
(b) Define Moore and Mealy machines with examples. [6M]

5. (a) What is 2DFA? Write about DFA vs. 2DFA. [6M]
(b) State Arden's Theorem. Explain about the properties of Regular Expression. [6M]

6. (a) Eliminate Useless symbols from the following grammar S → aA | a | Bb | cC A → aB
B → a | Aa C → cCD D → ddd [6M]
(b) Explain in detail about Chomsky Normal Form. [6M]

7. (a) Explain about P and NP classes of languages. [4M]
(b) Design and Explain a Turing Machine to accept L={WWR | W is in (a+b)*} [8M]

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