

FACULTY OF ENGINEERING

**B.E. II / IV (Civil) II – Semester (NON-CBCS) (Backlog) Examination,
March / April 2022**

Subject: Electrical Technology (PART-A)

Time: 1 ½ Hours

Max. Marks: 37

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.

(13 Marks)

1. State Kirchhoff's laws.
2. Define the terms (i) Power factor (ii) RMS value
3. Define the efficiency of a transformer and what is the condition for maximum Efficiency.
4. What is ideal transformer?
5. Define the terms (i) Slip (ii) Synchronous speed
6. Define (i) Depreciation factor (ii) Utilization factor

PART – B

Note: Answer any three questions.

(3 x 8 = 24 Marks)

7. (a) A coil having a resistance of 8Ω and an inductance of 31.8mH is connected to 230V , 50Hz supply. Calculate (i) the circuit current (ii) power factor (iii) power consumed.
(b) Obtain the voltage and current relations for three phase star connections.
8. (a) Explain working of actual transformer under no load condition.
(b) In a 100kVA transformer, the iron loss is 500W and full load copper loss is 800W .
Find the efficiency at full load at 0.8 power factor lagging.
9. (a) Explain the torque-slip characteristics of a three-phase induction motor.
(b) Discuss in detail about polar curves.
10. (a) The frequency of e.m.f.in the stator of a 4-pole, 3-phase induction motor is 50Hz and that in the rotor is 1.5Hz . Determine (i) the slip (ii) speed of the motor.
(b) Explain in detail about conducting short circuit test on transformer.
11. Write short notes on:
 - (a) Star-delta connections
 - (b) Calculations of street lighting

FACULTY OF ENGINEERING
B.E. II / IV (Civil) II – Semester (NON-CBCS) (Backlog) Examination,
March / April 2022
Subject: Mechanical Technology (PART-B)

Time: 1 ½ Hours

Max. Marks: 37

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.

(13 Marks)

1. Differentiate between Earth moving and Excavating equipments.
2. What is the function of Hoist winch?
3. List out the application of Paving breaker.
4. Define Gyration Crusher.
5. Give the application of Whirler Crane?

PART – B

Note: Answer any three questions.

(3 x 8 = 24 Marks)

6. (a) Explain the construction and working principle of clamshell with neat sketch.
(b) What are the types and applications of Bull dozer?
7. (a) Differentiate between Belt Conveyor and Screw Conveyor.
(b) Write the working principle of Fork lift truck?
8. (a) Explain the working principle of a Reciprocating Air Compressor.
(b) Why Concrete vibrator is required? Explain.
9. (a) Explain the function of a Crusher's Jaw & Roll Crusher?
(b) Write the advantages and disadvantages of Aerial ropeway and Scraper?
10. Write short notes on:
 - (a) Bucket elevator.
 - (b) Concrete mixer
 - (c) Tractor.

FACULTY OF ENGINEERING
B.E. II / IV (EEE) II - Semester (NON-CBCS) (Backlog) Examination,
March / April 2022
Subject: Electrical Machines - I

Time: 3 Hours

Max. Marks: 75

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.

(25 Marks)

1. Define field energy and co-energy.
2. Mention various causes for the failure of the dc generator to build up voltage.
3. Write generated emf equation for DC generator.
4. What is the Significance of back emf in D.C. motor?
5. Why can't a DC series generator run under a no load condition?
6. Draw T vs I_a , T vs N , characteristics of DC series motor?
7. Write basic principle of operation of transformer.
8. What is efficiency of transformer and write condition to get maximum efficiency.
9. Write the advantage of Swinburne's Test.
10. Draw the equivalent circuit of transformer.

PART- B

Note: Answer any five questions.

(5 x 10 = 50 Marks)

11. Draw schematic diagram of a doubly excited magnetic system and derive expression for the magnetic force and torque developed in doubly excited systems.
12. (a) Explain effect of armature reaction in D.C. machines.
(b) A 230 v DC shunt motor has an armature circuit resistance of 0.3Ω and field resistance of 110Ω . This motor drives a constant torque load and takes an armature current of 20A at 800 rpm. If motor speed is to be raised from 700 to 1000 rpm, find the resistance that must be inserted in the shunt field circuit. Assume magnetization curve to be a straight line.
13. (a) Derive EMF equation of DC Generator
(b) Explain types of DC motors with neat diagrams.
14. (a) Explain Constructional features of DC machine.
(b) A 100 kW DC generator driven by a belt from an engine runs at 750 rpm and is connected to 230 V dc mains. When the belt breaks, it continues to run as a motor drawing 9kW from the mains. At what speed would it run?
Given: Armature resistance = 0.018Ω and field resistance = 115Ω .
15. (a) Explain the Hopkinson test with neat circuit diagram.
(b) Explain the principle of operation of a transformer. Draw the vector diagram to Represent a load at UPF, lagging and leading power factor.

- 16.(a) A 100 kVA, single phase transformer has an iron loss of 500 W and a copper loss of 1000 W at full load current. Calculate the efficiency at 100 kVA output at p.f. lag.
- (b) Explain OC and SC tests of Transformer.
17. Explain the following.
- (a) Inter poles in DC machine
 - (b) Torque equation of DC motor
 - (c) Field energy and mechanical force

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FACULTY OF ENGINEERING
B.E. II / IV (EIE) II - Semester (NON-CBCS) (Backlog) Examination,
March / April 2022
Subject: Electrical Machines

Time: 3 Hours

Max. Marks: 75

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.

(25 Marks)

1. What is armature reaction
2. What is back EMF?
3. What are the different loss in transformer
4. Draw the diagram of 3 phase to two phase scott connection
5. What is the principle of synchronous motor
6. Define regulation of synchronous generator and its equations.
7. If Iron and copper losses at half load are 100W and 200W respectively, the full load iron and copper losses are _____.
8. Explain the different types of rotor in three phase induction motor (i) Squirrel cage rotor (ii) Phase wound rotor.
9. Draw the diagram of a single phase induction motor and also mention its main parts.
10. Why single phase induction motor is not a self starting motor.

PART- B

Note: Answer any five questions.

(5 x 10 = 50 Marks)

11. a. A 250 V Shunt motor takes the total current of 20 A. The shunt field and armature resistances of 200 ohm and 0.3 ohm respectively. Determine.
(i) Value of back emf (ii) Gross mechanical power in armature.
b. Explain the different techniques used for the speed control of DC Series Motor.
12. a. Explain the Advantage and Disadvantage of Auto Transformer
b. A 10KVA, 200/400V, 50HZ, single phase transformer the following test result:
OC Test : 200V, 1.3A, 120W on LV side
SC Test : 22V, 30A, 200W on HV side
Calculate: i) Magnetizing and Core Loss component at 50HZ and rated voltage.
ii) Magnetizing Branch Impedance.
iii) Regulation at full load at 0.8 pf leading.
13. a. What are the principle advantages of rotating field type of construction of synchronous machines? 4
b. A 3-phase 16- pole alternator has star connected winding with 144 slots and 10 conductors per slot. The flux per pole is 0.04 wb and is distributed sinusoidal. The speed is 375 rpm. Find the frequency, phase emf and line emf. The coil span is 1200 electrical

- 14 a. 20HP, 440 V, 50Hz, 4 - pole, 3 – phase induction motor runs at 1460rpm on full load. The stator loss is 300 W and full load efficiency is 88%, Calculate full load slip and rotor copper losses.
- b. Explain how the rotating magnetic field is developed in a 3 – ϕ induction Motor.
- 15 a. Explain the operation of a Capacitor Start Induction Motor.
- b. Explain in brief about stepper motor.
- 16.a. Obtain the mathematical EMF Equation of a transformer and explain each Terms.
- b. Obtain the mathematical expression for the Generated EMF of a Generator.
- 17 Write short notes on following.
- a. Variation of current and power factor with excitation in synchronous motor.
- b. Various starting method in 3 phase induction motor.

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FACULTY OF ENGINEERING
B.E. II / IV (ECE) II - Semester (NON-CBCS) (Backlog) Examination,
March / April 2022
Subject: Signal Analysis and Transform Techniques

Time: 3 Hours

Max. Marks: 75

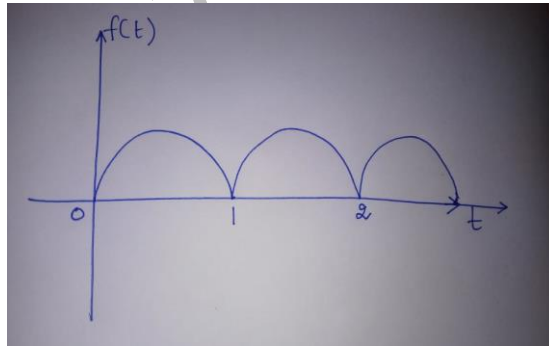
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PART – A**Note: Answer all questions.****(25 Marks)**

- 1 State convergence of Fourier series.
- 2 Examine whether the signal are periodic or not (i) $x(t) = 3 \sin 3t$ (ii) $x(t) = \cos(t)$.
- 3 State properties of Power spectral density (PSD).
- 4 Find the Fourier transform of $u(t)$.
- 5 State region of convergence ROC for Laplace transform.
- 6 State properties of PSD.
- 7 State and prove discrete convolution theorem.
- 8 Find the Fourier transform for gate signal.
- 9 Find the Laplace transform of $tu(t)$.
- 10 Find the average power of the signal $x(t) = \exp(-5t)u(t)$.

PART – B**Note: Answer any five questions.****(5 x 10 = 50 Marks)**

- 11 (a) Find the Trigonometric Fourier series of full wave rectifier.



- (b) What are orthogonal signals?
- 12 (a) Write five properties of Fourier transform.
 (b) Find the magnitude and phase spectrum of Fourier transform of $e^{-at} u(t)$.
- 13 (a) Find the convolution of any two signals using graphical interpretation.
 (b) Write the properties of the autocorrelation function.
- 14 (a) State and prove five properties of z transform.
 (b) Find initial value and final value of z transform $X(Z) = Z / (Z-1)$.
- 15 (a) Find the Laplace transform of $\sin \omega t u(t)$.
 (b) State and prove time shift, time integration and time differentiation properties of Laplace transform.

- 16 (a) State sampling the z transform.
(b) Find the frequency response and impulse response of the discrete system for the difference equation $y(n) - 3y(n-1) = x(n)$.
- 17 (a) Prove that $\cos n\omega_0 t$ and $\cos m\omega_0 t$ are orthogonal.
(b) Distinguish between a discrete time system and a discrete time signal.

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FACULTY OF ENGINEERING
BE II / IV (MECH/PROD/AE) II - Semester (NON-CBCS) (Backlog) Examination,
March / April 2022
Subject: Kinematics of Machines

Time: 3 Hours

Max. Marks: 75

(Missing data, if any, may be suitably assumed)

PART – A**Note: Answer all questions.****(25 Marks)**

1. Classify kinematic pairs and give their examples
2. Differentiate Davis and Ackerman's steering mechanisms
3. Derive an expression for Coriolis component of acceleration
4. Define instantaneous centre
5. Define friction circle and friction axis
6. Explain the phenomena slip and creep in belt drives
7. Draw the displacement diagram of follower with SHM
8. What is undercutting in gears
9. Compare involute and cycloidal tooth profile
10. Classify cams based on their shape

PART - B**Note: Answers any five questions.****(5 x 10 = 50 Marks)**

11. Explain versions of double – slider crank mechanism.
12. For the mechanism shown in fig.1, determine the angular velocity of link AB.

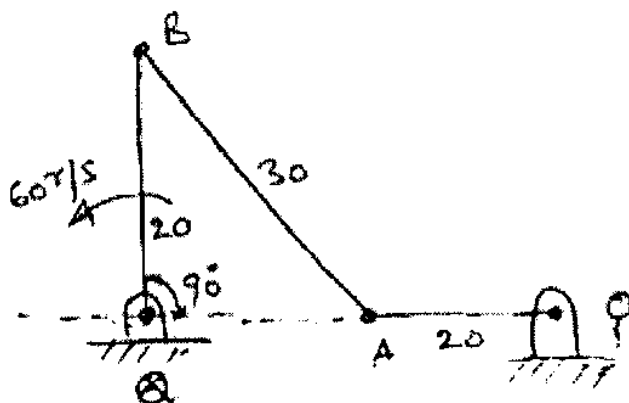


Fig.1 (All dimensions are in mm)

13. A pulley is driven by a flat belt, the angle of lap being 120° . The belt is 100mm wide and 6 mm thick and density of material of the belt is 1000 kg/m^3 . If the coefficient of friction is 0.3 and the maximum stress in the belt is not to exceed 2MPa. Find the maximum power which the belt can transmit when the speed of the belt is 6m/s.

14. A cam is to be designed for a knife edge follower with the following data
- 90° of cam rotation the follower Simple Harmonic Motion.
 - Dwell for the next 30°
 - During the next 60° of cam rotation, the follower returns to its original position with SHM.
 - Dwell during the remaining 180°
- Draw the profile of the cam when the line of the stroke is offset 20mm from the axis of the cam shaft. The radius of the base circle of the cam is 40mm. and cam lift is 40mm.
15. Two 20° involute spur gears having velocity ratio of 2.5 mesh externally. Module is 4mm and addendum is equal to 1.23 module. Pinion rotates as 150 r.p.m. Find
- The minimum number of teeth on each wheel to avoid interference.
 - The number of pairs of teeth in contact.
16. Determine the axial force required to engage a conical clutch transmitting 25kW of power at 750 r.p.m. Average friction diameter of the cone is 400 mm and average pressure intensity is 60 kN/m², Semi cone angle is 10° and coefficient of friction is 0.25. Also find the width of the clutch.
17. Write short notes on:
- Rope brake dynamometer
 - Epicyclic gear train
 - Self-locking of screws

FACULTY OF ENGINEERING

**B.E. II / IV (CSE) II - Semester (NON-CBCS) (Backlog) Examination,
March / April 2022**

Subject: Principles of Programming Languages

Time: 3 Hours

Max. Marks: 75

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.

(25 Marks)

1. Distinguish between hybrid and pure interpretation.
2. Draw a diagram of Von Neumann architecture.
3. What is a referencing environment of a statement?
4. Differentiate static binding and dynamic binding.
5. Discuss the differences between logically controlled & counter controlled loops?
6. What are guarded commands?
7. Explain the scope and the life time of a variable.
8. Define task and synchronization. What are the two kinds of task and synchronization?
9. What is higher order function?
10. List the scoping rule used in LISP and scheme.

PART – B

Note: Answer any five questions.

(5 x 10 = 50 Marks)

11. (a) Give some reason why computer scientists and professional software developers study general concepts of language design and evaluation.
(b) Explain the process of computation
12. (a) Explain the usage and implementation of union types in Ada.
(b) Explain about short circuit evaluation with an example.
13. (a) Define the coercion, type error, type checking and strong typing
(b) Define function side effect. consider the

following program and evaluate what is value of x after assignment statement in

main method assuming when

I) Operations are evaluated left to right

II) Operations are evaluated right to left

```
int fun (int){ *i+ = 9;
              return 10;
}
```

```
Void Main (){
int x = 8 ;
x = x + fun (&x);
}
```

14. Explain how exceptions are handled in Ada with example.
15. (a) Explain the importance of exception handling? How it is done?
(b) Explain how message passing helps in concurrency control with an example.
16. Explain about ADT representation in Ada and C++ with example.
17. Write notes on
 - (a) Selection statements
 - (b) Java threads

FACULTY OF ENGINEERING
B.E. II / IV (IT) II - Semester (NON-CBCS) (Backlog) Examination,
March / April 2022
Subject: DATA COMMUNICATIONS

Time: 3 Hours

Max. Marks: 75

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.

(25 Marks)

- 1 What is Synchronous transmission?
- 2 Define Flow Control.
- 3 Briefly describe about Packet Switching.
- 4 Illustrate the function of MAC sub Layer of Fast Ethernet.
- 5 What is Error Control?
- 6 List the functions of Wireless LAN Technology.
- 7 List the different topologies.
- 8 What are the ATM cell?
- 9 Define Interfacing.
- 10 Difference between Analog and Digital Transmission

PART – B

Note: Answer any five questions.

(5 x 10 = 50 Marks)

11. Explain in detail about the Data Communication networking.
12. Describe in detail about the Data Encoding.
13. Discuss in detail about the Data Communication Interface.
14. Describe in detail Frequency Division Multiplexing and Wavelength Division Multiplexing.
15. (a) Illustrate in detail the LAN protocol architecture.
(b) Explain CSMA/CD.
16. Draw and explain with neat diagram the IEEE 802.11 Architecture and Services.
17. Write short notes on:
 - (a) Bluetooth & Zigbee
 - (b) Analog Data Digital Signals

FACULTY OF ENGINEERING**BE (Civil) IV - Semester (CBCS) (Backlog) Examination, March / April 2022****Subject: Hydrology and Water Management****Time: 3 Hours****Max marks: 70****(Missing data, if any may be suitably assumed)****PART – A****Note: Answer all questions.****(10 x 2 = 20 Marks)**

1. Define the terms runoff and precipitation.
2. List out various types of rain gauges
3. State the factors affecting precipitation
4. A catchment which has 390 sq. km. area has 6-hour unit hydrograph of a storm which can be approximately by a triangle. If its time base is 70 hours and peak value of 60 cumecs. Compute the effective rainfall for the storm.
5. What is meant by Skewness?
6. Define Aquifer, Aquiclude and Aquifuge.
7. State the concept of yield of open wells.
8. What do you understand by Crop period and Base period?
9. Determine the radius of influence when draw is restricted to 5m and coefficient of permeability is 0.018m/sec.
10. Define duty and crop factor.

PART - B**Note: Answers any five questions.****(5 x 10 = 50 Marks)**

11. a) The table below corresponds to a catchment. Find the average depth of annual precipitation over a basin using Arithmetic Method and Isohyetal method.

Isohyets	55-65	65-75	75-85	85-105	105-135
Area enclosed Sq. Km.	85	120	1100	1800	2300

- b) Write in detail about Float type rain gauge with a neat sketch.
12. a) Find the ordinates of a flood hydrograph resulting from a storm with rainfall of 2.5, 6.85 and 3.75cm each during successive 3 hours. Assume an intail loss of 5mm, infiltration index $\phi = 2.5$ mm per hour and base flow of 12 cumecs. The ordinates are given below:

Time (hrs)	03	06	09	12	15	18	21
Ordinates of unit hydrograph (cumec)	0	115	370	510	395	315	252

- b) Discuss in detail about various factors that affect runoff.

13. a) Derive Gumbel's extreme value method of estimating flood.
b) Explain concept of Darcy's law with the help of a sketch. Derive the expression for steady state radial flow discharge into a confined aquifer
14. a) The annual runoff of a stream is found to follow Normal Distribution with mean 3400 cumecs and Standard deviation of 1200 cumecs. Determine the probability that its value in any year is more than 7600 cumecs. Also determine the range symmetrical about the mean with which its value of probability is exactly 0.5.
b) Enumerate the different methods of flood estimation. Explain in detail flood frequency analysis
15. a) Design a tube well to provide a yield of 14 cumecs of water with a coefficient of Permeability 90 meters per day. The draw down is limited to 6 meters in the area. The thickness of aquifer is 42 meters and the radius of influence is 320 meters.
b) Explain the constant level pumping test importance and derive expression for safe yield based on this test.
16. a) Define Irrigation Mention necessity of irrigation along with its advantages and disadvantages.
b) Estimate after how many days irrigation is necessary to ensure healthy growth of crop with the following data. (i) Field capacity of crop = 36% (ii) Permanent Wilting Point = 14% (iii) Density of soil = 1200 kg/m³ (iv) Effective Root depth=740mm (v) Daily consumptive use of water = 12 mm. Assume for health growth of crop moisture should not fall below 25% of water holding capacity.
17. Write notes on any two of the following
a) Evaporation and Transpiration
b) Perched Aquifer
c) Recuperation test
d) Crop rotation

FACULTY OF ENGINEERING

B.E. (EEE) IV – Semester (CBCS) (Backlog) Examination, March / April 2022

Subject: Electrical Circuits - II

Time: 3 Hours

Max marks: 70

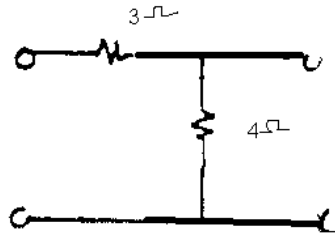
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PART – A

Note: Answer all questions.

(10 x 2 = 20 Marks)

1. What do you mean by even symmetry and odd symmetry functions?
2. Discuss briefly about Fourier integrals.
3. Find Laplace transform of $f(t) = \cos 2t + e^{-3t}$, $t > 0$
4. Write final value theorem in Laplace transform
5. Give the expressions for symmetry and reciprocity in case of transmission Parameters.
6. Find the impedance parameters for the network shown below



7. Write the properties of tie-set matrix.
8. Check whether $Z(s)$ is a positive real or not $z(s) = \frac{(4s+1)}{(s+2)}$
9. Write the properties LC immittance function.
10. What are the necessary conditions for transfer function?

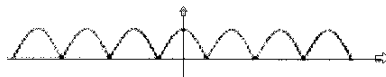
PART - B

Note: Answers any five questions.

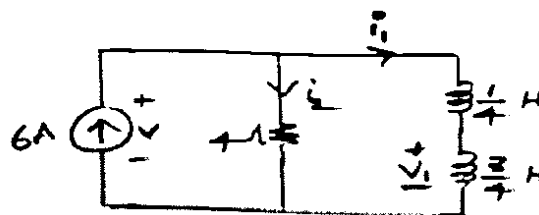
(5 x 10 = 50 Marks)

- 11 Find the Fourier series expansion for the given signal.

Full-wave rectified cosine



12. Determine the $i(1)$, $i(2)$, V and $V(1)$ for the circuit shown below by using Laplace Transform.



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13. Two 2-port networks A and B are connected in parallel. Each of these networks has their own y-parameters. Show that resultant y-parameters of the combined parallel network is sum y-parameters of the individual networks A and B.

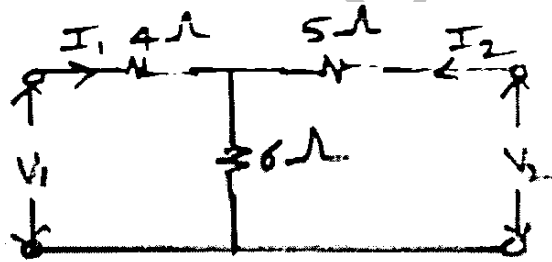
14. Determine the range of 'a' so that $P(s) = s^4 + 3s^3 + as^2 + 5s + 9$ is positive real.

15. Determine the Cauer from I and Cauer form II network for the RL impedance

$$\text{function given } Z(s) = \frac{3(s+2)(s+5)}{(s+3)(s+6)}$$

16. Find $f(0)$ and $f(\infty)$ if they exist, when $F(s) = \frac{8(s+3)(s+1)}{s(s+2)(s+4)}$

17. Obtain the h-parameters of the network shown in.



FACULTY OF ENGINEERING

B.E. (EIE) IV - Semester (CBCS) (Backlog) Examination, March / April 2022

SUBJECT: Electrical Machines

Time: 3 Hours

Max marks: 70

(Missing data, if any may be suitably assumed)

PART – A

Note: Answer all questions.

(10 x 2 = 20 Marks)

1. Distinguish between a motor and a generator.
2. What are the functions of commutator in DC machines?
3. Name the losses in a transformer
4. Why transformer ratings are in KVA
5. Give constructional details of salient pole synchronous machine.
6. Justify whether Synchronous impedance method gives a poorer voltage regulation
7. Why is it necessary to improve PF
8. Why 3 phase Induction Motor motors are self-starting?
9. List the applications of Stepper motor
10. List the applications of Shaded pole motor

PART - B

Note: Answers any five questions.

(5 x 10 = 50 Marks)

11. a) Explain the Armature reaction in DC machines.
b) Explain the speed control methods of DC shunt motor.
12. a) Derive the EMF equation of a transformer. Hence derive the voltage ratio.
b) Explain the principle of operation of an auto transformer. Mention the advantages of it over conventional two winding transformer.
13. a) Explain how the regulation of a synchronous generator can be determined using synchronous impedance method.
b) Derive the EMF equation for an alternator.
14. a) Explain the principle of operation of three phase induction motor.
b) Explain any one speed control method of three phase induction motor.
15. Write short notes on the following (i) Capacitor Motor.
(ii) Torque speed characteristics of one phase induction motor.
16. With a neat diagram explain the various parts of DC generator and also explain its working principle.
17. a) With a neat sketch explain the principle of operation of shaded pole induction motor.
b) Explain the method of obtaining equivalent circuit of single – phase transformer from open and short circuit tests.

FACULTY OF ENGINEERING

B.E. (ECE) IV - Semester (CBCS) (Backlog) Examination, March / April 2022
Subject: Electromagnetic Theory and Transmission Lines

Time: 3 Hours

Max. Marks: 70

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.

(10 x 2 = 20 Marks)

- 1 Convert a point P (1,3,5) from Cartesian to cylindrical coordinates.
- 2 In a certain region the electric potential is given by $V = x^2 + 3y^2 + 9z$. Find the electric field intensity at a point P(1,-2,3).
- 3 Explain the significance of vector magnetic potential.
- 4 Write the Maxwell's equations for time varying fields in free space.
- 5 State Poynting theorem. What is its significance?
- 6 Define Brewster's angle and critical angle.
- 7 Draw equivalent circuit of a low frequency transmission line and define the primary constants.
- 8 What is loading of a line? Why it is needed?
- 9 What is the characteristic of $\lambda/2$ line?
- 10 Mention the disadvantages of single stub matching.

PART – B

Note: Answer any five questions.

(5 x 10 = 50 Marks)

- 11 (a) State Gauss's law and obtain the expression of Gauss's law in point form.
(b) A uniform line charge with linear charge density $\rho_1 = 25 \text{ n C / m}$ lies on the line $x = -3, z = 4$ in free space. Find the electric intensity at a point (2,15,3).
- 12 (a) Discuss the electro-static boundary conditions between two dielectric media.
(b) A circuit carrying a direct current of 5Ampere forms a regular hexagon inscribed in a circle of radius 1m. Calculate the magnetic flux density at the centre for the current hexagon. Assume the medium to be free space.
- 13 (a) Starting with Maxwell's equations, derive the wave equation for E and H in a conducting medium.
(b) Write a brief note on EM Wave polarization.
- 14 (a) Describe the distortions that occur in a transmission line. Derive the condition for distortion less line.
(b) A 15 Km open wire line is terminated in its characteristic impedance. At a certain frequency, the signal voltage at a distance of 1Km from the sending end is 20% below that at the sending end voltage. Determine voltage at the receiving end in terms of the percentage of sending end voltage.
- 15 (a) Define the terms voltage standing wave ratio and reflection coefficient. Obtain the relation between them and specify their values for open circuit, short circuit and matched load.
(b) Design a quarter wave transformer to match 100Ω line to 50Ω load at 100 MHz.

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- 16 (a) A load of $(26 - j 16) \Omega$ is connected across a 100Ω line. Design a short circuit stub in order to provide impedance matching between the two at a signal frequency of 100 MHz.
(b) Derive Poisson's and Laplace's equation from Gauss's law.
- 17 (a) Obtain the expressions for reflection coefficient and transmission coefficient for a wave reflected from a dielectric medium in case of normal incidence.
(b) State and explain Ampere's law.

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FACULTY OF ENGINEERING
B.E. (MECH/PROD/AE) IV - Semester (CBCS) (Backlog) Examination,
March / April 2022
Subject: Kinematics of Machines

Time: 3 Hours

Max. Marks: 70

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.

(10 x 2 = 20 Marks)

- 1 Explain the term kinematic link. Give the classification of kinematic links.
- 2 Define the term (a) Body centrode (b) Space centrode.
- 3 What is the fundamental equation of steering?
- 4 Draw the displacement diagram for the follower moving with Simple Harmonic Motion.
- 5 Discuss the various types of brakes.
- 6 Classify different types of cams.
- 7 Sketch and explain reverted gear trains.
- 8 Explain Prony Brake Dynamometer.
- 9 Differentiate cycloidal and involute profile gear teeth.
- 10 What is coriolis component of acceleration?

PART – B

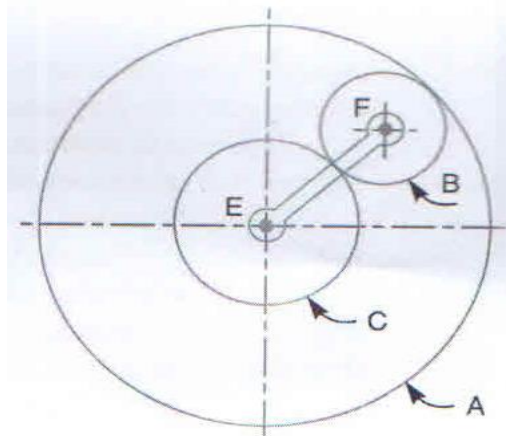
Note: Answer any five questions.

(5 x 10 = 50 Marks)

- 11 Explain with the help of neat sketch
(a) Whitworth Quick Return Mechanism.
(b) Scotch Yoke Mechanism.
- 12 The crank of a slider crank mechanism is 480mm and connecting rod is 1600mm long. The crank rotates at a uniform velocity of 20 rad/s clockwise. When the crank has turned 60° from the Inner Dead Centre position determine. (i) The acceleration of connecting rod (ii) The acceleration of the slider.
- 13 (a) A belt of density 1 gm/cm^3 has a permissible stress of 350 N/cm^2 . Determine the maximum power that can be transmitted by a belt of $20\text{cm} \times 1.2\text{cm}$ if the ratio of tight side to slack side tension is 2.
(b) Find the power lost in friction assuming (i) uniform pressure and (ii) uniform wear when a vertical shaft of 100mm diameter rotating at 200 r.p.m rests on flat end foot step bearing. The coefficient of friction is equal to 0.05 and a shaft carries a vertical load of 15KN.
- 14 A cam with 30mm as a minimum diameter is rotating clockwise at a uniform speed of 1300 r.p.m and has to give the following motions to the roller follower 12mm in diameter.
(a) Follower to complete outstroke of 25mm during 120° of cam rotation with equal uniform acceleration and retardation. (b) Follower to dwell for 60° of cam rotation.
(c) Follower to return to its initial position during 90° of cam rotation with equal uniform acceleration and retardation. (d) Follower to dwell for the remaining 90° of cam rotation. Draw the cam profile if the axis of roller follower passes through the axis of the cam. Determine maximum velocity and acceleration of the follower during outstroke and return stroke.

..2..

- 15 (a) Derive the formula for the minimum number of teeth on pinion in order to avoid interference.
- (b) A pair of 20° involute have a module of 4mm. The minimum number of teeth on pinion and gear are 24 and 33 respectively. Each gear has a standard addendum of one module. Find the length of arc of contact and the maximum velocity of sliding if the pinion rotates at 120 r.p.m.
- 16 An epicyclic gear train consist of three gears A,B and C as shown in Figure 1. The Gear A has 72 internal teeth and the Gear C has 32 external teeth. The Gear B meshes with both Gears A and C and is carried on an arm EF which rotates about the centre of A at 20 r.p.m if the gear A is fixed, determine the speed of Gears B and C.



- 17 Explain any two of the following with neat sketches:
- Reverted gear trains
 - Prone Brake Dynamometer
 - Hooke's Joint.

FACULTY OF ENGINEERING
B.E. (IT) IV - Semester (CBCS) (Backlog) Examination, March / April 2022
Subject: Data Communications

Time: 3 Hours

Max. Marks: 70

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.

(10 x 2 = 20 Marks)

- 1 Distinguish between Analog and Digital transmissions.
- 2 Define Amplitude Modulation with an example.
- 3 Write the differences between Synchronous and Asynchronous transmission.
- 4 What is Stop-n-wait ARQ protocol?
- 5 Write the differences between Circuit switching and packet switching.
- 6 Write short notes on HDLC.
- 7 What are different Error detection techniques?
- 8 What are traditional Ethernet topologies?
- 9 Write short notes on Wireless LAN technology.
- 10 Give the architecture of Bluetooth.

PART – B

Note: Answer any five questions.

(5 x 10 = 50 Marks)

- 11 (a) Explain the components of Data Communicational model.
(b) Explain about different transmission impairments.
- 12 Describe Error control techniques.
- 13 Write notes on the following:
(a) Synchronous Time Division Multiplexing
(b) Statistical Time Division Multiplexing.
- 14 (a) Write notes on Circuit Switching.
(b) Discuss about Packet switching.
- 15 Explain the architecture of ATM.
- 16 Distinguish Bridged, Switched and Full Duplex Ethernets.
- 17 Write notes on the following:
(a) IEEE 802.11 Medium Access control.
(b) Architecture of Bluetooth.

FACULTY OF ENGINEERING

B.E. (CSE) IV - Semester (CBCS) (Backlog) Examination, March / April 2022

Subject: Programming Languages

Time: 3 hours

Max. Marks: 70

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.

(10 x 2 = 20 Marks)

- 1 List the design principles of imperative languages.
- 2 What is an alias?
- 3 Define syntax and semantics of a languages.
- 4 List the design issues of subprograms.
- 5 What are multiprogramming languages?
- 6 What mixed mode assignments are allowed in C and Java?
- 7 Give the features of schema.
- 8 Differentiate union and enumeration.
- 9 Define an exception.
- 10 Define logic-programming language.

PART – B

Note: Answer any five questions.

(5 x 10 = 50 Marks)

- 11 List and explain three general methods of implementing a programming language.
- 12 (a) Explain BNF and EBNF.
(b) What are the different categories into which we can divide the various programming languages?
- 13 Define array and record. Classify arrays based on storage allocation. What are the advantages and disadvantages of allocation memory during compilation time and run time?
- 14 (a) Explain the basic primitives of LISP. Give suitable examples.
(b) Explain about concurrency in Ada.
- 15 (a) Compare Functional and Imperative Languages.
(b) List the basic elements of prolog.
- 16 Explain the various approaches for expression evaluation in functional programming languages.
- 17 Write notes on:
 - (a) Pointers
 - (b) Polymorphism.

FACULTY OF ENGINEERING**B.E. (Civil) IV - Semester (AICTE) (Backlog) Examination, March / April 2022****Subject: Mechanics of Materials and Structures**

Time: 3 hours

Max. Marks: 70

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.

(10 x 2 = 20 Marks)

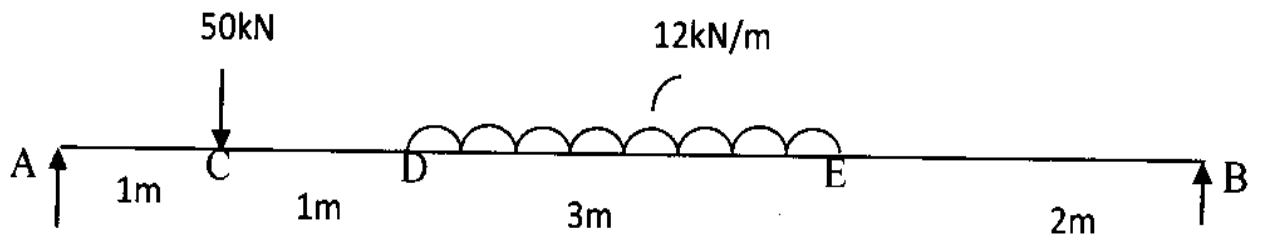
- 1 What are the limitations of Double integration method?
- 2 Define Conjugate beam.
- 3 Write the equivalent lengths for the four standard cases of columns.
- 4 What are the assumptions made in Euler's theory for long columns?
- 5 What do you mean by propped cantilever beams? What is the use of propping the beam?
- 6 What are the fixed end moments of a fixed beam AB when support B sinks by 'o'?
- 7 State Castigliano's first theorem,
- 8 What are perfect, deficient and redundant frames?
- 9 Differentiate between an arch and a cable.
- 10 Explain Eddy's theorem.

PART – B

Note: Answer any five questions.

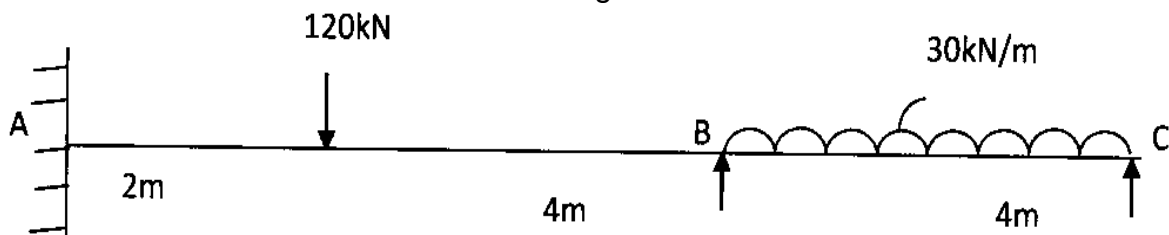
(5 x 10 = 50 Marks)

- 11 Find the maximum deflection for the beam as shown below. EI is constant.



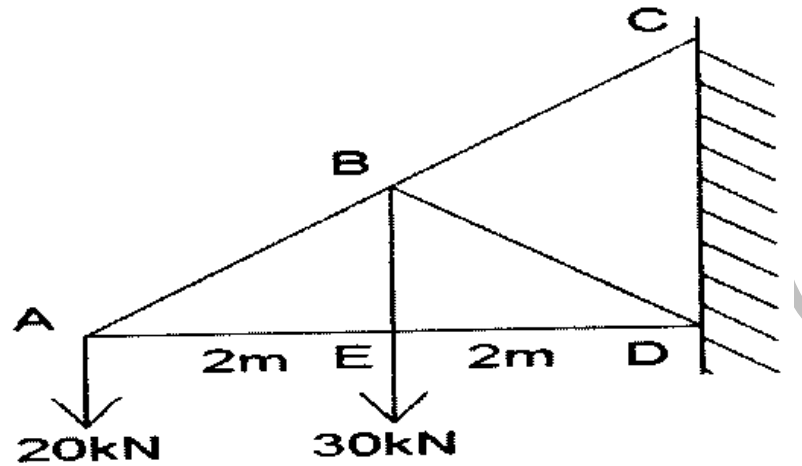
- 12 Determine the Euler's critical load for a hollow cylindrical cast iron column of external and internal diameters of 120mm and 90mm, if it is 5m long with both ends fixed. Compare this result with Rankine's formula. Further for what length of column would these two formulae give the same critical load? Take $E = 1 \times 10^5$ MPa, $f_c = 500$ MPa and $a = 1/1600$.

- 13 Draw the SFD and BMD for the following continuous beam. Take EI as constant.

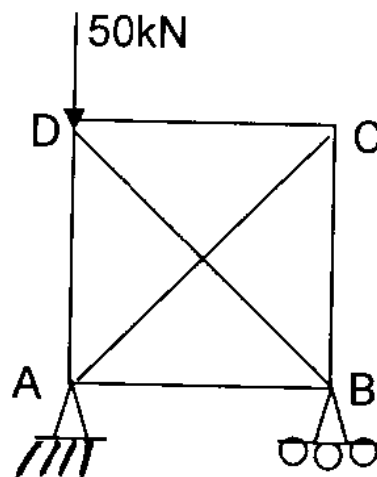


..2..

- 14 Find the vertical deflection of joint 'A' for the truss shown in the figure. The sectional areas of each member are 1500 mm^2 . Take $E = 200 \text{ GPa}$. and $CD=2\text{m}$.s-:



- 15 A cable supported at its ends 40m apart at the same level carries 200kN, 100kN and 150kN at 10m, 20m, 30m from left end respectively. If the point where 100 kN is acting is 10m below the level of supports, find the tension in the different segments and total length of the cable.
- 16 (a) Starting from secant formula, derive Prof. Perry's formula for long eccentric Column.
 (b) A propped cantilever beam of length 4m carries a UDL of 6kN/m run over the entire length. Draw SFD and BMD.
- 17 (a) Find the forces in members of the truss of square of side 4m shown in figure below. All the members have same cross sectional areas.



- (b) A two hinged parabolic arch of span 30m and rise 4m carries a point load of 90kN at a distance of 10 from left end. Determine horizontal thrust and bending moment under the load.

FACULTY OF ENGINEERING
B.E. (EEE) IV – Semester (AICTE) (Backlog) Examination,
March / April 2022
Subject: Electrical Machines – I

Time: 3 hours

Max. Marks: 70

(Missing data, if any, may be suitably assumed)

PART – A**Note: Answer all questions.****(10 x 2 = 20 Marks)**

- 1 State Ampere's law.
- 2 State and explain Lenz's law
- 3 Define Back emf and explain its importance.
- 4 Explain working of commutator.
- 5 Explain Internal and external characteristics of shunt generator.
- 6 What are the applications of D.C generators?
- 7 What are the various losses of D.C machine?
- 8 Explain why series motor should never be started at no load.
- 9 Explain how to minimize core losses.
- 10 Explain on-load tap changing of transformer.

PART – B**Note: Answer any five questions.****(5 x 10 = 50 Marks)**

- 11 Self and mutual inductances in henry of two coupled coils are $L_1=3+1/(2x)$, $L_2=2+1/(2x)$, $M_{12}=M_{21}=1/(2x)$ over a certain displacement x in meters. The coil resistances are negligible. For constant current of $I_1=10$ A and $I_2 = -5$ A
 - a) Compute mechanical work done in increasing x from 0.5 m to 1 m.
 - b) Verify that sum of energies associated with mechanical work done and field energy is equal to energy supplied by both sources during motion from $x=0.5$ to $x=1$ m.
- 12 Explain construction and working of d.c machine with neat diagram.
- 13 a) Explain speed control methods of D.C shunt motor.
b) Draw and explain characteristics of D.C series motor.
- 14 a) A short shunt compound wound d.c generator delivers 100 A to a load at 250 V. the generator has shunt field, series field and armature resistances of 130Ω , 0.15Ω and 0.1Ω respectively. Calculate voltage generated in the armature. Assume 1 V drop per brush.
b) What are the applications of d.c motor.
- 15 a) Derive condition for maximum efficiency of d.c machine.
b) Draw phasor diagram of transformer at lagging load.
- 16 A 20 kVA, 2500/250 V, 50 Hz single phase transformer gave following test results:
O.C test (1.v): 250 V, 1.4 A, 105 Watts
S.C test (h.v) 104 V, 8 A, 320 Watts.
Find efficiency at half full load of upf and calculate equivalent circuit parameters.
- 17 a) Explain swinburne's test.
b) A 400 V d.c shunt motor takes 5 A at no load. Its armature resistance is 0.5Ω and shunt field resistance is 200Ω . Estimate kW output and efficiency when motor takes 50 A on full load.

FACULTY OF ENGINEERING

B. E. (EIE) IV – Semester (AICTE) (Backlog) Examination, March / April 2022

Subject: Transducer Engineering

Time: 3 hours

Max. Marks: 70

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.

(10 x 2 = 20 Marks)

1. A Pressure measurement instrument is calibrated between 10 bar and 250 bar then what is the scale span?
2. Define Hysteresis.
3. In a Strain Gauge the gauge factor of semiconductor gauge is much higher than metallic strain gauge why?
4. Write the application of Strain Gauge.
5. What is a Capacitive Hygrometer?
6. Describe the function of RTD.
7. Explain about Standards for calibration of Temperature.
8. Explain the function of Pyrometers.
9. Write a short note on Force balance Transducer.
10. What is a Ktuden Gauge?

PART – B

Note: Answer any five questions.

(5 x 10 = 50 Marks)

11. a) Describe in detail about the classification of Performance Characteristics of an Instrument.
b) Obtain the expression for Ramp response of first order system of an Instrument.
12. a) With a neat diagram explain the working of Bounded Wire type Strain Gauge.
b) Explain about Variable Resistance Transducer.
13. a) With a neat diagram explain the Capacitive Transducer used for measurement of Linear Displacement.
b) With a neat diagram explain the operation and working Principle of RVDT.
14. a) With a neat diagram explain the operation and working of Thermocouple.
b) Explain the operation of Liquid in glass filled Thermometer.
15. a) With a neat diagram explain the operation of Diaphragm.
b) Explain the operation of LVDT type transducer used for measurement of Pressure.

16. a) With a neat diagram explain the operation of MC Leod Gauge.
b) Explain about the classification of Transducers.
17. Write short notes on the following
a) Capacitive Proximity Transducer.
b) IC Temperature sensor.
c) Manometers.

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FACULTY OF ENGINEERING
B.E. (ECE) IV - Semester (AICTE) (Backlog) Examination,
March / April 2022

Subject: Computer Organization and Architecture

Time: 3 Hours

Max. Marks: 70

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.

(10 x 2 = 20 Marks)

- 1 How super computers differ from Microcomputer?
- 2 Give differences between I/O and Memory Bus.
- 3 Briefly explain about Memory hierarchy.
- 4 Give any 2's Complement Multiplier algorithm.
- 5 Explain what is Computer Architecture?
- 6 What are the different addressing modes?
- 7 What is instruction level parallelism?
- 8 Explain about Direct memory access and indirect memory access.
- 9 List out the types of interrupts.
- 10 Define an Instruction Pipeline.

PART – B

Note: Answer any five questions.

(5 x 10 = 50 Marks)

- 11 (a) Explain fixed point representation with examples.
(b) Explain Booth's Algorithm with an example and draw flow chart.
- 12 Explain in detail about the RISC and CISC.
- 13 (a) Explain Instruction Cycle with flow chart and example.
(b) Write a short notes on Direct memory access and Indirect memory access.
- 14 (a) Describe in detail the Micro programmed Control organization and address sequencing.
(b) Explain CPU performance and its factors.
- 15 With a neat sketch explain the working principle of DMA.
- 16 Explain in detail the Virtual memory and address mapping using pages and Memory management.
- 17 Write a short notes on:
 - (a) Modes of transfers
 - (b) Daisy chaining priority
 - (c) Timing and control.

FACULTY OF ENGINEERING
B.E. (MECH/PROD/AE) IV - Semester (AICTE) (Backlog) Examination,
March / April 2022
Subject: Mechanics of Materials

Time: 3 hours

Max. Marks: 70

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions

(10 x 2 = 20 Marks)

- 1 Define the terms Modulus of rigidity and young's modulus.
- 2 Find the minimum diameter of steel wire which is used to raise a load of 5000 N if the stress in the rod is not to exceed 100MN/m^2 .
- 3 Write short note on Mohr's circle of stresses.
- 4 Draw the S.F and B.M diagram for cantilever beam of length L carrying UDL of w per meter over its entire length.
- 5 Define Hoop stress and longitudinal stress in thin cylinder.
- 6 What are the assumptions made in the theory of simple bending?
- 7 Define Helical spring. Name two important type of helical springs.
- 8 Write the expression for strain energy stored in a body due to Torsion.
- 9 A beam of 3m long simply supported at its ends, is carrying a point load W at the center. If the slope at the ends off the beam should not exceed 1° . Find the deflection at the center of beam.
- 10 Explain briefly bending of beam under impact loads.

PART – B

Note: Answer any five questions

(5x10 = 50 Marks)

- 11 A bar of steel is 60mmx60mm in section and 180 mm long. It is subjected to a tensile load of 300 KN along the longitudinal axis and tensile loads of 750KN and 600KN on the lateral faces. Find the changes in dimensions of the bar and change in the volume. Take $E=200\text{GN/mm}^2$ and $1/m=0.3$.
- 12 a) A cantilever beam of length 2m carries the point loads 300N,500N and 800M, acts from the fixed point at 0.5m,1.2m and 2m respectively. Draw SF and BM diagram for cantilever beam.
b) A cylinder of internal diameter 0.5 m contains air at a pressure of 7N/mm^2 . If the maximum stress induced in the material is 80N/mm^2 . Find the thickness of the cylinder.
- 13 A cast iron beam is of I-section with following dimensions top flange 80mmx20mm, web 20mmx200mm and bottom flange 160mmx20mm. It is simply supported on a span of 5 meters. If the tensile stress is not to exceed 20 N/mm^2 . Find the safe uniform load beam can carry. Find also maximum compressive stress.
- 14 a) Hollow circular shaft of 25mm thick transmits 298KW at 300r.p.m. Determine the diameter of the shaft if shear strain due to torsion is not to exceed 8.6×10^{-4} . Take $C=80\text{GN/m}^2$.
b) A Closely coiled helical spring made 10mm diameter steel wire has 15 coils of 100mm mean diameter it is subjected to an axial load of 100N. Calculate the maximum Shear stress induced.

..2..

- 15 A beam of length 5m and of uniform rectangular section is supported at its ends and carries uniformly distributed load over the entire length. Calculate the depth of the section if the maximum permissible bending stress is 8 N/mm^2 and central deflection is not to exceed 10mm.
- 16 A weight of 10KN falls by 30mm on a collar rigidly attached to a vertical bar 4m long and 1000mm^2 in section. Find the instantaneous expansion of a bar. Take $E=210\text{GPa}$.
- 17 a) Derive the Expression for Bending stress at a layer in a beam.
b) Find the maximum shear stress induced in solid circular shaft of diameter 15cm when the shaft transmits 150kW power at 180 r.p.m.

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FACULTY OF ENGINEERING
B.E. (CSE/CME) IV - Semester (CBCS) (Backlog) Examination,
March / April 2022
Subject: OOP Using JAVA

Time: 3 hours

Max. Marks: 70

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions

(10 x 2 = 20 Marks)

- 1 What is the difference between class and object?
- 2 What is the need of constructor overloading?
- 3 Differentiate between method overloading and method overriding.
- 4 What is an interface? Give an example.
- 5 List the advantages of using exception handling.
- 6 Draw the thread life cycle.
- 7 What is the difference between character streams and byte streams?
- 8 Write about String tokenizer.
- 9 List the UI components in AWT.
- 10 Write about JApplet.

PART – B

Note: Answer any five questions

(5 x 10 = 50 Marks)

- 11 a) Design a class to represent a bank account. Include the following members:

Data Members:	Methods
--Name of the depositor	-- To assign initial values
--Account Number	-- To deposit an amount
--Type of account	-- To withdraw an amount after checking balance
--Balance amount in the account	--To display the name and balance

b) List the mostly used string methods. Explain any 3 of them.
- 12 a) Explain about multiple inheritance using a java program.
b) List and explain any two of the packages available in java.
- 13 a) Explain about the 5 keywords used in java for exception handling
b) Differentiate between checked and unchecked exceptions.
- 14 a) What is a Stream class? How the stream classes are classified?
b) Explain about Serialization.
- 15 a) Explain about adapter classes. With an example program.
b) Write the various stages of JApplet.
- 16 a) Write a simple java program to read contents from one file and write to another using Character stream classes.
b) Explain about Delegation Event model.
- 17 a) Explain about Synchronizing threads.
b) Differentiate between abstract class and interface.

FACULTY OF ENGINEERING
B.E. (IT) IV – Semester (AICTE) (Backlog) Examination, March / April 2022

Subject: JAVA PROGRAMMING

Time: 3 Hours

Max. Marks: 70

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.

(10 x 2 = 20 Marks)

- 1 Define JDK, JRE and JVM.
- 2 Write about synchronization.
- 3 Discuss various methods used to create threads.
- 4 What are the differences between interface and abstract class?
- 5 What is “finally” block? When and how it is used?
- 6 What is event handling? Give different event handling classes.
- 7 What is the difference between Array List and vector?
- 8 List most common constructors of File Input Stream and File output stream.
- 9 List the types of Layouts.
- 10 Define an Applet. Write the structure of simple Applet code.

PART – B

Note: Answer any five questions.

(5 x 10 = 50 Marks)

11. What is encapsulation? Explain with the help of example program.
12. What is polymorphism? Differentiate between compile time and runtime polymorphism with the help of complete program.
13. Write short notes on the following:
(a) Legacy classes (b) Iterators
14. What is the difference between Stream and Byte classes?
15. What is AWT? Write AWT classes with suitable examples.
16. What are the Java I/O's? Explain about each with an example program.
17. (a) Write a program to copy one file content into another file.
(b) Explain the different iterators used for accessing the elements with example.