D 73682

(Pages : 2)

Name...................................

Reg. No.................................

FIRST SEMESTER B.TECH. (ENGINEERING) [2019 SCHEME] DEGREE EXAMINATION, NOVEMBER 2019

MA 19 100—CALCULUS AND LINEAR ALGEBRA

Time : Three Hours

Maximum : 100 Marks

Part A

Answer any ten questions.
Each question carries 5 marks.

1. Evaluate $\lim_{x \to \pi/2} (\sin x)^{\tan x}$.

2. Test the convergence of the following series :

   (i) $\sum_{k=2}^{\infty} \left(\frac{4k-5}{2k+1} \right)^k$; (ii) $\sum_{k=1}^{\infty} \frac{k^k}{k!}$.

3. Test the convergence of the series $\sum_{k=1}^{\infty} (-1)^{k+1} \frac{k+3}{k(k+1)}$. Is the series absolutely convergent.

4. Expand $\log x$ in powers of $x - 1$.

5. Find the Maclaurin series expansion of $x \sin x$.

6. Find the nth derivative of $\cos x \cos 2x \cos 3x$ using Leibnitz formula.

7. If $u = \cos^{-1} \left(\frac{x+y}{\sqrt{x} + \sqrt{y}} \right)$, prove that $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = -\frac{1}{2} \cot u$.

8. Investigate the maximum and minimum values of $z = xy (3x + 2y + 1)$.

9. Find the radius of curvature of $4ay^2 = (2a - x)^3$ at $(a, a/2)$.

10. Find the rank of the matrix $A = \begin{bmatrix} 2 & -1 & 3 & 4 \\ 0 & 3 & 4 & 1 \\ 2 & 3 & 7 & 5 \\ 2 & 5 & 11 & 6 \end{bmatrix}$.

11. Test for consistency and solve $2x + 3y + 4z = 11$, $x + 5y + 7z = 15$, $3x + 11y + 13z = 25$.

12. Using Cayley-Hamilton theorem find the inverse of the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & -1 & 4 \\ 3 & 1 & -1 \end{bmatrix}$.

Turn over

13. Find the half range cosine series expansion of $f(x) = 2x - 1$ in $0 < x < 1$.

14. Find the half range sine series expansion of $f(x) = \cos x$ in $0 < x < \pi$.

15. Obtain the Fourier series for the function $f(x) = |x|$ in $-\pi < x < \pi$.

                                                                     $(10 \times 5 = 50$ marks$)$

Part B

Answer **all** *questions.*
Each question carries 10 *marks.*

16. (a) Test the series for convergence $\sum\limits_{n=1}^{\infty} \dfrac{1}{\sqrt{n+1}-1}$.

Or

(b) Test the convergence of the series :

$$x + \frac{2^2 x^2}{2!} + \frac{3^3 x^3}{3!} + \frac{4^4 x^4}{4!} + \ldots \infty.$$

17. (a) Obtain the expansion of $e^{\sin x}$ in ascending powers of x as far as the term in x^4.

Or

(b) If $y = a \cos (\log x) + b \sin (\log x)$ prove that $x^2 y_{n+2} + (2n+1)xy_{n+1} + (n^2 + 1) y_n = 0$.

18. (a) Find the circle of curvature of the curve $\sqrt{x} + \sqrt{y} = \sqrt{a}$ at the point $\left(\dfrac{a}{4}, \dfrac{a}{4}\right)$.

Or

(b) Find the evolute of the parabola $y^2 = 4ax$.

19. (a) Find the Fourier series of period $2l$ for the function $f(x) = \begin{cases} l - x, & 0 \le x \le l \\ 0, & l \le x \le 2l. \end{cases}$

Or

(b) Find the Fourier series expansion of the periodic function of period 2π, $f(x) = x^2, -\pi < x < \pi$.

Hence deduce that $\dfrac{\pi^2}{6} = \dfrac{1}{1^2} + \dfrac{1}{2^2} + \dfrac{1}{3^2} + \ldots$

20. (a) Reduce the matrix $A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$ to the diagonal form.

Or

(b) Reduce $8x_1^2 + 7x_2^2 + 3x_3^2 - 12x_1x_2 - 8x_2x_3 + 4x_1x_3$ into canonical form by orthogonal reduction.

                                                                     $(5 \times 10 = 50$ marks$)$

FIRST SEMESTER B.TECH. (ENGINEERING) DEGREE [2019 SCHEME] EXAMINATION, NOVEMBER 2019

CH 19 100—ENGINEERING CHEMISTRY

Time : Three Hours

Maximum : 100 Marks

Part A

Answer any **ten** *questions.*
Each question carries 5 marks.

1. Write a note on primary treatment of municipal water purification.

2. Distinguish between addition and condensation polymerisation.

3. Mention any five uses of conducting polymers.

4. Explain the following terms : (i) Cloud and Pour point ; (ii) Aniline point.

5. Distinguish between Gross and Net calorific value of a fuel.

6. Write a note on Cetane number.

7. Discuss the important properties of nano tubes.

8. Write short notes on : (i) Fullerenes (ii) Dendrimers.

9. Write briefly about : (i) safer solvents (ii) Energy efficiency by design.

10. What is standard hydrogen electrode ? Write the electrode reactions.

11. Derive an expression for EMF of concentration cells.

12. Give the principle of glass electrode. How is it constructed ?

13. Why metal under water drop undergoes accelerated corrosion ?

14. Give the pilling Bedworth rule in corrosion with example.

15. Differentiate Galvanising and Tinning.

$(10 \times 5 = 50 \text{ marks})$

Part B

Answer any **one** *full section from each question.*
Each question carries 10 marks.

16. (a) Explain how demineralisation of water can be done by ion exchange with a neat diagram.

Or

(b) Explain different types of conducting polymers and the mechanism involved in the conduction.

Turn over

17. (a) Explain the mechanism of lubrication with neat diagrams.

Or

  (b) Describe the experimental determination of calorific value of a solid fuel.

18. (a) Write notes on : (i) Engineering applications of nanomaterials ; (ii) Synthesis of nanomaterials by hydrolysis.

Or

  (b) (i) What is green chemistry and how is it important ?

    (ii) Write briefly about one engineering application of green chemistry.

19. (a) What are accumulators ? Explain lead acid accumulator with equations.

Or

  (b) State and explain Nernst equation. What are its applications ?

20. (a) Explain the electrochemical mechanism of rusting of iron in humid atmosphere. Mention any four factors that affect rate of corrosion.

Or

  (b) Define electroplating. Explain the process with neat diagram and give the role of the following factors on the nature of the electrodeposit, (i) Current density (ii) pH.

$(5 \times 10 = 50 \text{ marks})$

FIRST SEMESTER B.TECH. (ENGINEERING) DEGREE [2019 SCHEME] EXAMINATION, NOVEMBER 2019

PH 19 100—ENGINEERING PHYSICS

Time : Three Hours

Maximum : 100 Marks

Part A

Answer any **ten** *questions.*
Each question carries 5 marks.

1. What are non-reflecting films ? Give its applications.

2. A plane grating just resolves two lines in the second order. Calculate the grating element if $d\lambda = 1$ Å, $\lambda = 6000$Å and which of the rule surface is 2 cm.

3. Discuss the various types of polarized light.

4. With suitable example explain linear operators in quantum mechanics.

5. Explain the phenomenon of tunneling and give its importance in physics.

6. With suitable example explain bosons and fermions.

7. Discuss the solution of one dimensional wave equation.

8. Explain the concept of opposite phase and in phase with suitable example.

9. The intensity of sound is increased to 100 times. Express the change in decibels.

10. A fiber has a core diameter of 6 μm and core refractive index 1.45. Refractive index of the cladding is 1.448. Determine the maximum number of modes allowed to propagate through the fiber, if the wavelength of light used is 1 μm.

11. Give qualitative ideas of semiconductor laser.

12. Distinguish between d.c. Josephson effect and a.c. Josephson effect.

13. A He-Ne laser emits light at a wavelength of 632.8 nm and has an output power of 2.3mW. How many photons are emitted in each minute by this laser when operating ?

14. Discuss the type of pumping method used in ruby laser. Also draw the energy level diagram of a ruby laser.

15. Give a qualitative account of SQUID.

(10 × 5 = 50 marks)

Turn over

Part B

Answer section (a) **or** *section (b) of each question.*
Each question carries 10 marks.

16. (a) Explain how Newton's rings are formed. Obtain an expression for the radii of bright and dark rings in a reflected system.

Or

    (b) Explain the action of plane transmission grating. How it is produced ? What is the effect of increasing the number of lines on grating ?

17. (a) (i) Calculate the first four energy values of an electron in a one dimensional box of width $L = 1$ Å in eV. Also compute the probability for finding the particle in between 0 and $L/4$ in the ground state.

       (ii) Deduce Schrodinger time dependent equation from the operators for position and momentum.

Or

    (b) Explain the following :

       (i) Postulates of BE statistics.

       (ii) Conditions under which a quantum distribution approaches classical one.

18. (a) Discuss in details the various factors affecting acoustics of a building.

Or

    (b) Explain the thermal method of detection of ultrasonic waves. Describe one method of non destructive testing using ultrasonic waves. Mention four medical application of ultrasonic waves.

19. (a) With block diagram explain the different stages of fibre optic communication system.

Or

    (b) Explain the following :

       (i) Solar cells and its VI characteristics.

       (ii) Photovoltaic cells.

20. (a) What is the principle of holography ? With diagram explain how is a hologram recorded and reconstructed ? List its applications.

Or

    (b) What is Meissonier effect ? Explain high temperature superconductors. Distinguish between Type 1 and Type 11 superconductors.

                                           $(5 \times 10 = 50 \text{ marks})$

FIRST SEMESTER B.TECH. (ENGINEERING) DEGREE
[2019 SCHEME] EXAMINATION, NOVEMBER 2019

GS 19 100—ENGINEERING GRAPHICS

Time : Three Hours   Maximum : 100 Marks

Answer **three** *questions from Part A and any* **two** *questions from Part B.*
All questions carry equal marks.

Part A

1. (a) The end A of an 80 mm. long line AB is 20 mm. above H.P. and B is 15 mm. in front of the V.P. The line is inclined at 30° to the H.P. and its top view makes 60° with the V.P. Draw its projection and finds its inclination with the V.P.

Or

   (b) A Hexagonal plane with a 30 mm. side has its corner A in the H.P. The surface of the plane is inclined at 45° to the H.P and the diagonal containing the corner A is inclined at 30° to the V.P. Draw its projection.

2. (a) A cone, having a base with a 50 mm. diameter and a 65 mm. long axis, has one of its generators in the V.P. and is inclined at 30° to the H.P. Draw its projections, when its apex being 10 mm. above the H.P.

Or

   (b) A square pyramid side of base 50 mm. and axis height 70 mm. is kept with its base on H.P. It is cut by a section plane perpendicular to VP which contains one of the base corners and is perpendicular to the slant edge opposite to this base corner. Draw the sectional plan, elevation and true shape of the section.

3. (a) A largest rhombus is made in a thin rectangular plate with 190 mm. sides and 90 mm. sides. The plate is then wrapped to form a cylinder. Draw the projection of the cylinder with the rhombus marked on it.

Or

   (b) A hexagonal prism having base with a 30 mm. side and 40 mm. height is surmounted by a hemisphere such that the hemisphere is touching all the edges of the top face. Draw the isometric projection of the arrangement.

(3 × 20 = 60 marks)

Turn over

Part B

*Answer any **two** questions.*
Each question carries 20 marks.

4. (a) Draw the perspective projection of a pentagonal prism of side 20 mm. and length 40 mm, lying on one of its rectangular faces on the ground plane and one pentagonal face touching the picture plane. The station point is 40 mm. in front of the picture plane and lies in the central plane which is 45 mm. right to the centre of the prism. Station point is 45 mm. above the ground plane.

   (b) Draw three views of a hexagonal nut for M 30 bolt. Insert all the dimensions of the nut.

   (c) A cone, with a 60 mm. base diameter and a 70 mm. long axis, is resting on its base on the H.P. It is cut by an A.I.P, making 45° with the H.P. and passing through a point on the axis, 20 mm. above the base. Draw its sectional top view and obtain true shape of the section.

                                                              (2 × 20 = 40 marks)

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FIRST SEMESTER B.TECH. (ENGINEERING) [2019 SCHEME] DEGREE EXAMINATION, NOVEMBER 2019

EM 19 100—ENGINEERING MECHANICS

Time : Three Hours   Maximum : 100 Marks

Part A

Answer any **ten** *questions.*
Each question carries 5 marks.

1. Explain position vector and unit vector with suitable examples. What is the condition for a position vector to be a unit vector ? Specify the vector using a Cartesian system.

2. Define Parallelogram law of vector analysis using suitable example.

3. State the conditions of equilibrium for coplanar concurrent and non-concurrent systems.

4. Comment on the statement, "Friction a necessary evil". Justify with suitable examples.

5. Define friction and the cause for it using a diagram. State the concept of coefficient of friction.

6. Determine the minimum normal force required to place a block of mass 10 kg. on wall surface. Consider the coefficient of friction between the wall and block to be 'μ'.

7. With the help of suitable figures, briefly explain the theorem of Pappu's-Guldinus.

8. What is the moment of inertia of a simple 'L' section? Derive a generalised equation for the same.

9. Briefly explain the concept of Polar moment of Inertia with suitable diagram.

10. Define the concept of Instantaneous centre. What is instantaneous centre of zero velocity. Use necessary diagrams.

11. Define Newton's law of translator motion. Derive the equation for force using the law then relate it to momentum.

12. With the help of mathematical relations define D' Alembert's principle.

13. With necessary diagram represent spring mass model of series and parallel connection.

14. A body is vibrating with simple harmonic motion of amplitude 150 mm and frequency 3 cps. Calculate maximum velocity and acceleration of the body.

15. What are the conditions to be satisfied for a periodic motion to be in SHM ? Using a diagram briefly describe the SHM of a particle moving along the circumference of a circle of radius 'r' and with uniform angular velocity.

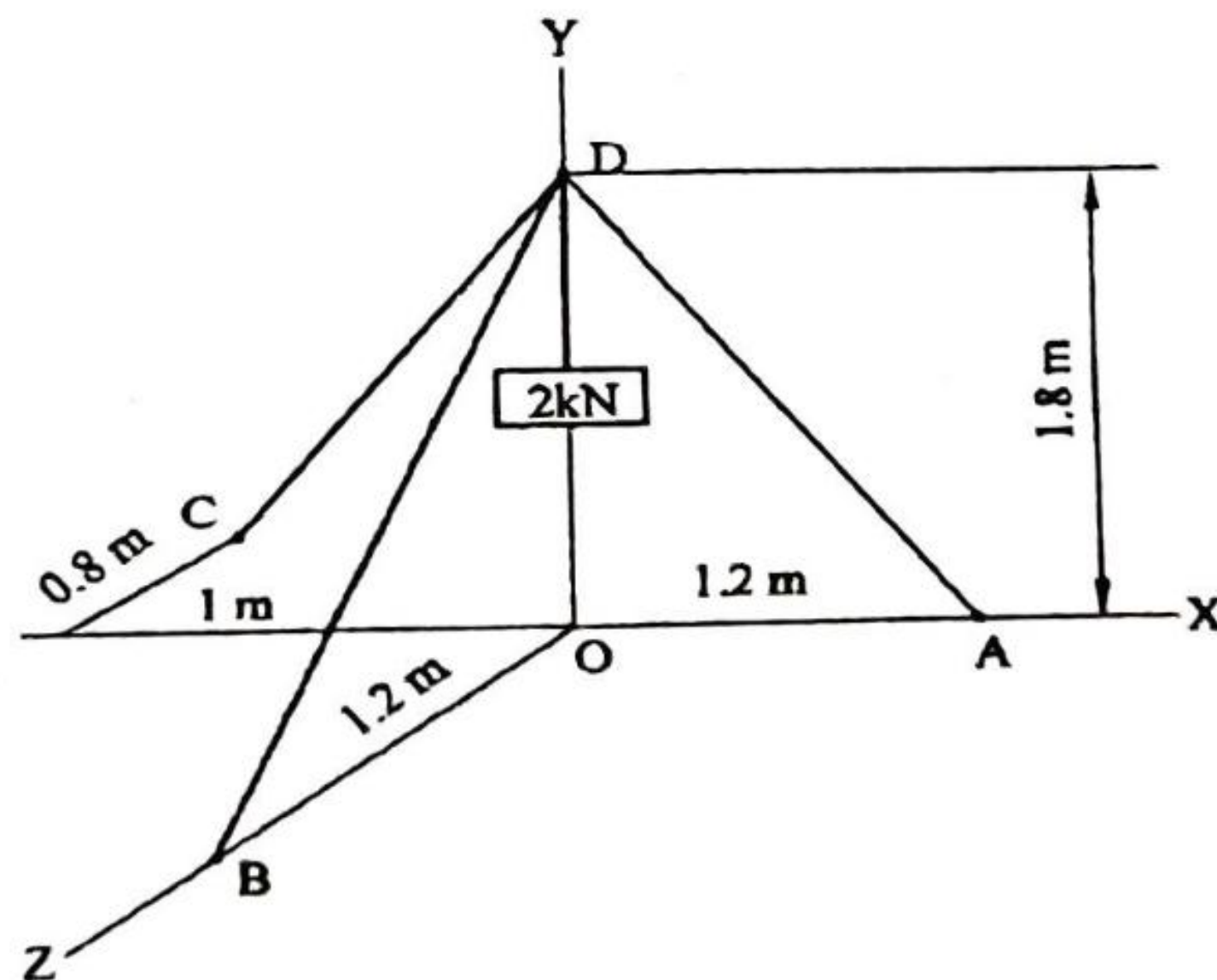$(10 \times 5 = 50 \text{ marks})$

Turn over

Part B

Answer on full section from each question.
Each question carries 10 marks.

16. (a) A rope 9 m. long is connected at A and B, two points on the same level, 8 m. apart. A weight of 30 kg. is suspended from a point C on the rope, 3 m. from A. What weight should be connected to a point D, on the rope 2 m. from B to keep portion CD parallel to AB. Draw necessary diagram to explain the problem.
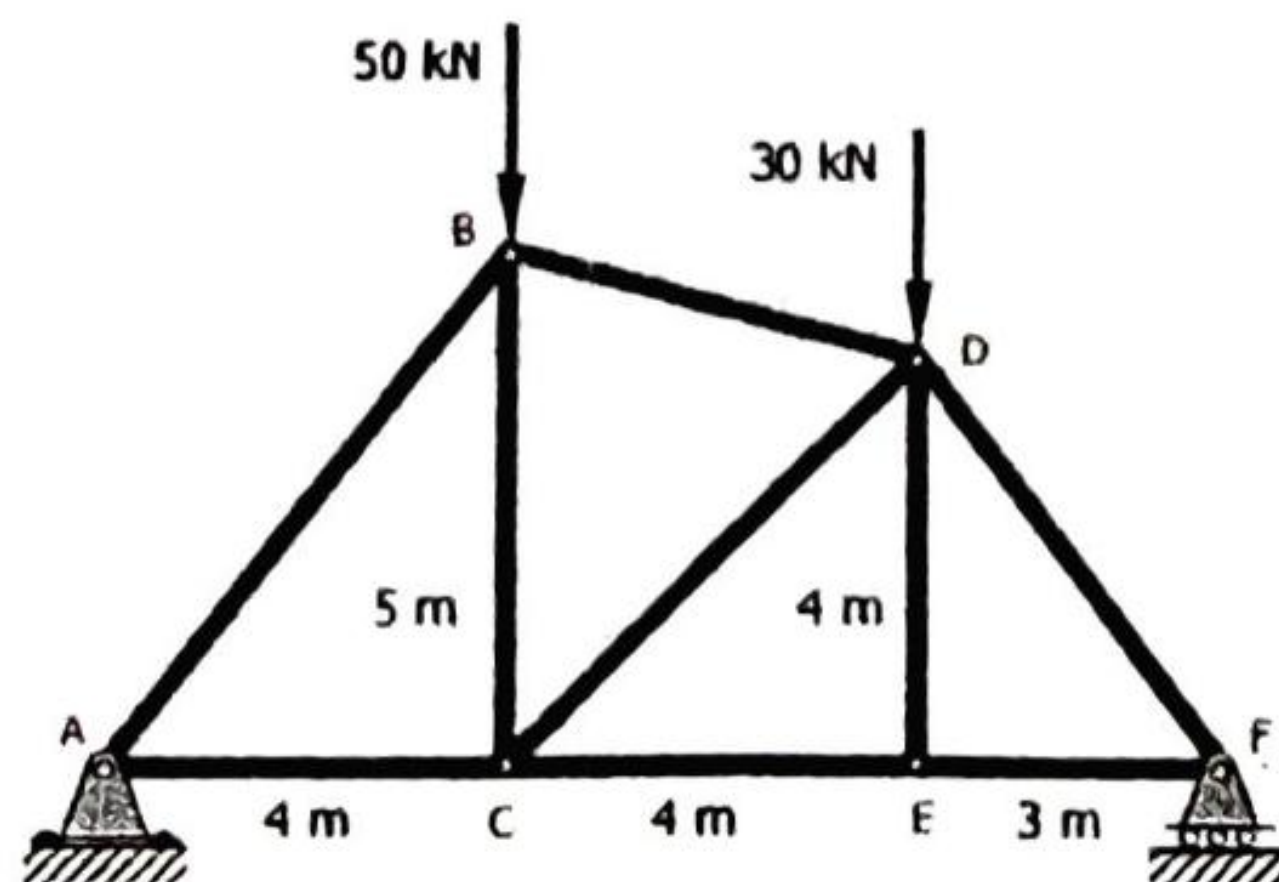
Or

(b) A tripod supports a load of 2 kN as shown in figure. The ends A, B and C are in the X-Z plane. Find the force in the three legs of the tripod.
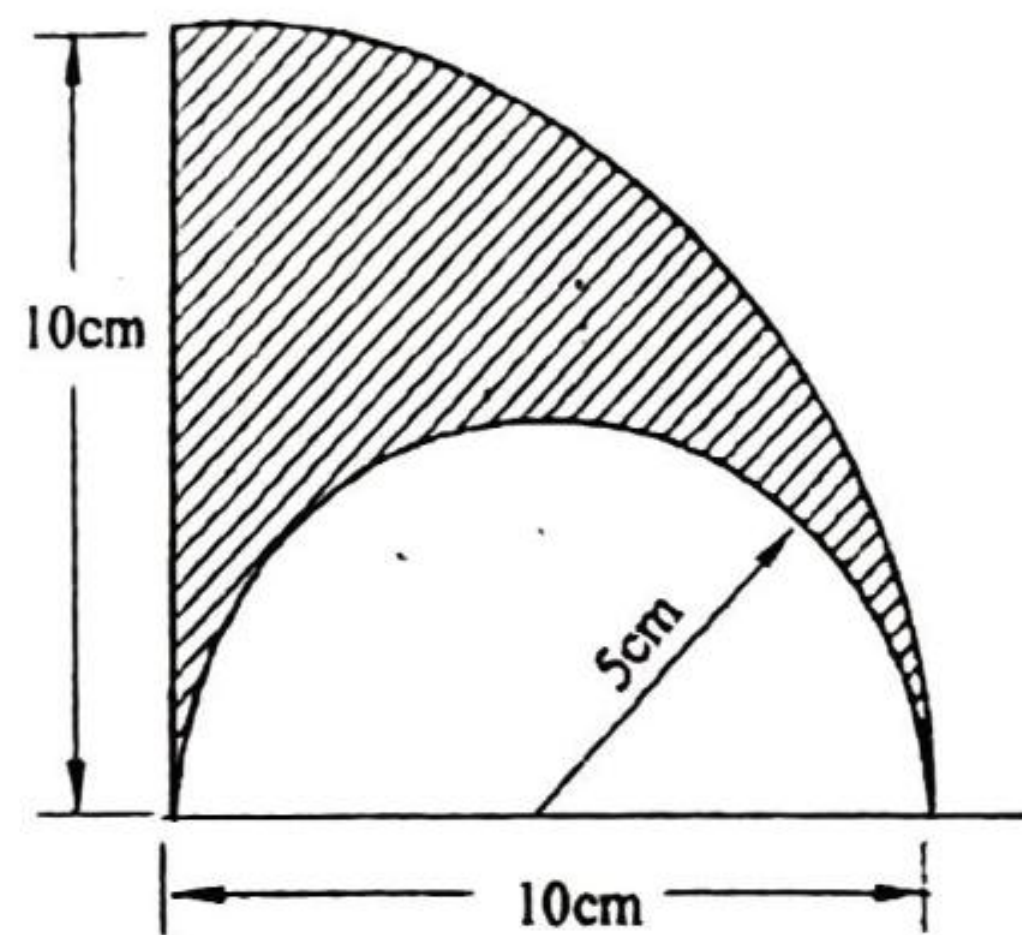

17. (a) A body resting on a rough horizontal plane required a pull of 180 N inclined 30° to the plane just to move it. It was found that a push of 220 N inclined at 30° to the plane just moved the body. Determine the weight of the body and the coefficient of friction.

Or

(b) Compute the force in all members of the truss as shown in figure using method of joints.
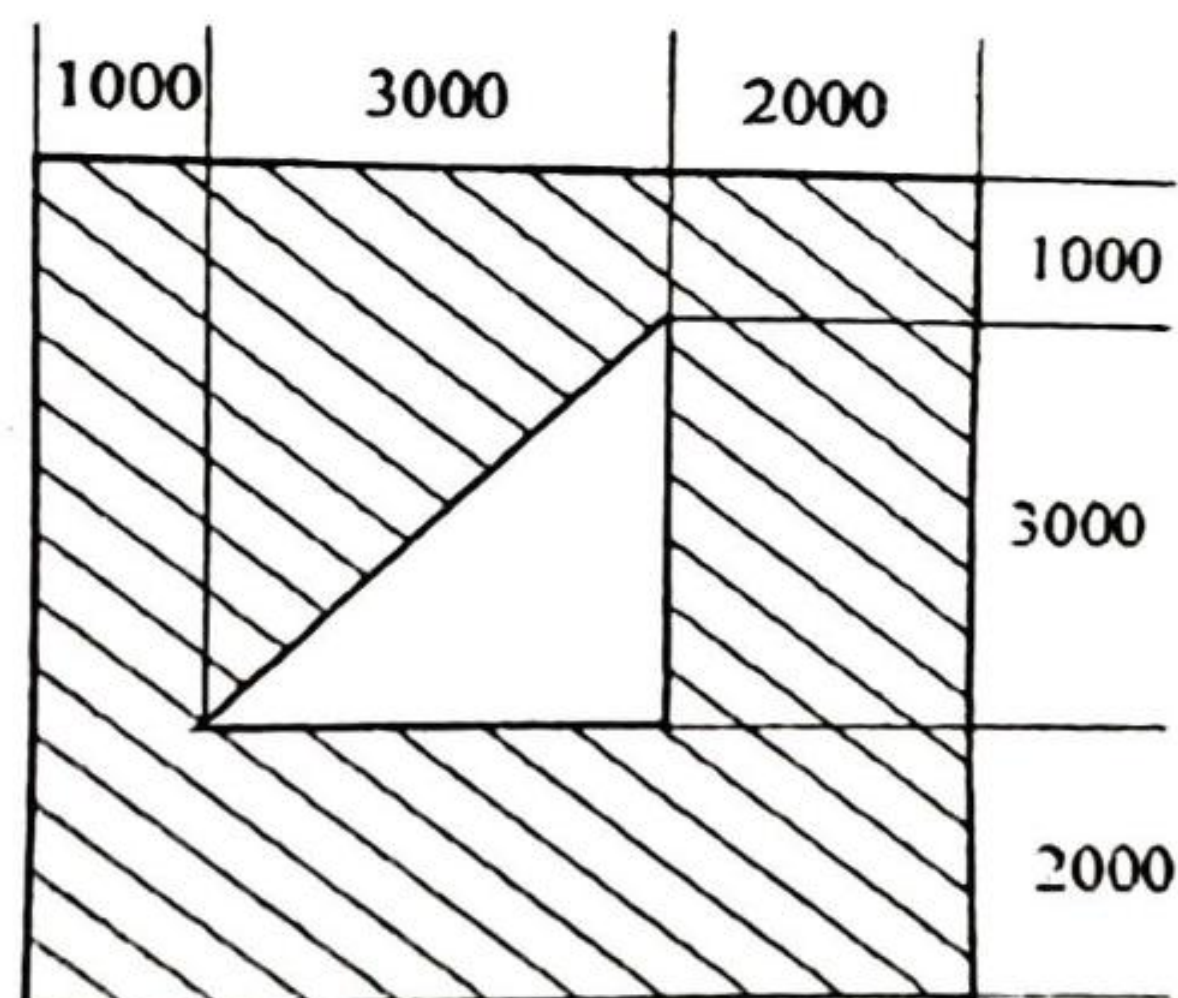
18. (a) Determine the centroid of the shaded area obtained by cutting a semi-circular section of diameter 10 cm. from the quadrant of a circle of radius 10 cm. as shown in figure.
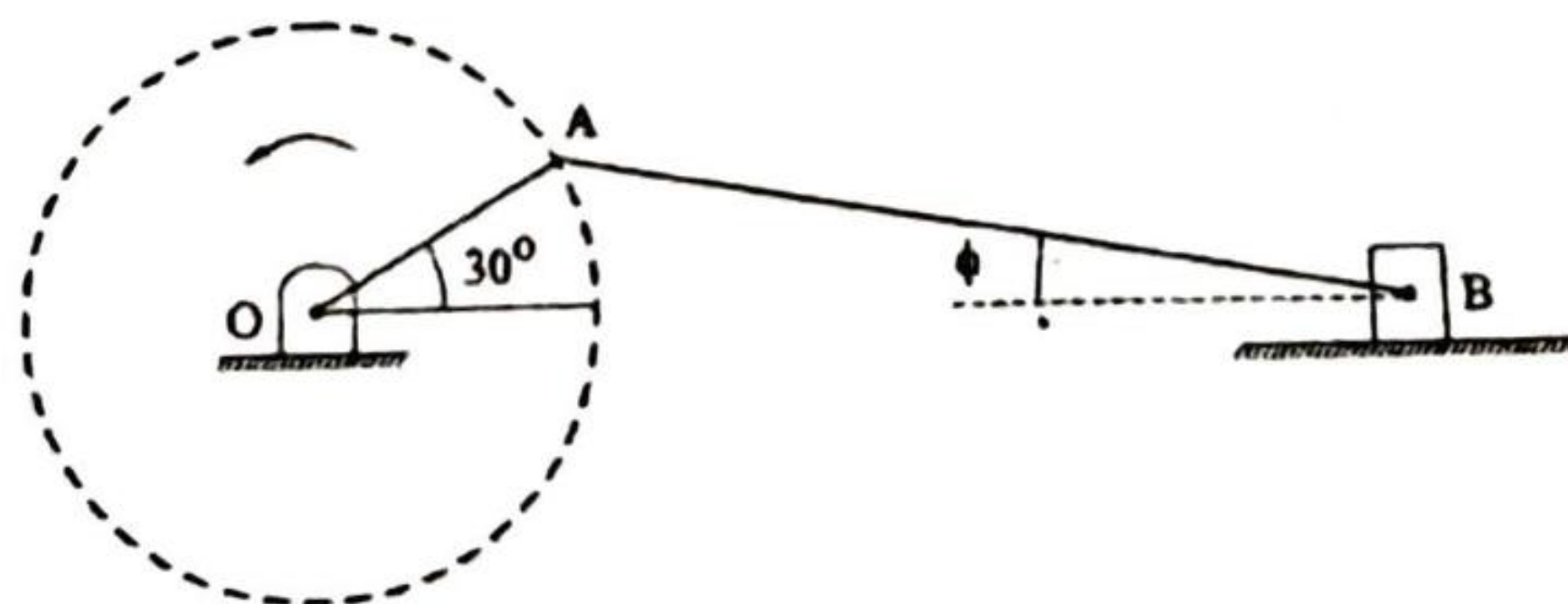

Or

(b) Calculate the moment of inertia of the shaded region as shown in figure with respect to the centroidal axes.

19. (a) In the reciprocating engine mechanism as shown in figure, the crank OA rotates at a uniform speed of 300 r.p.m. The lengths of crank and connecting rod are 12 cm. and 50 cm. respectively. Find (i) The angular velocity of the connecting rod AB ; (ii) The velocity of piston when the crank makes an angle of 30° with horizontal.
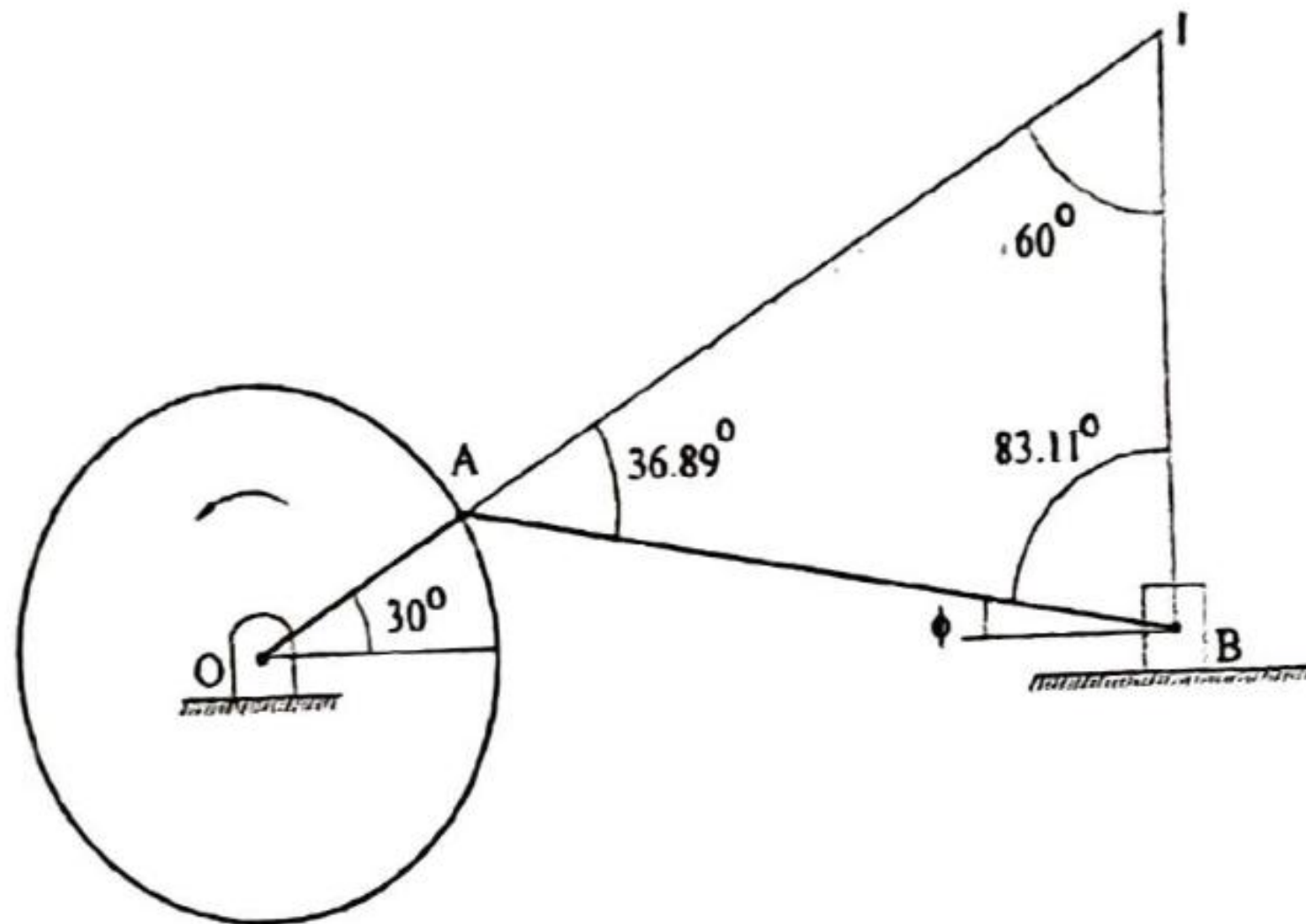

Or

Turn over

(b) In the reciprocating engine mechanism as shown in figure, the crank OA rotates at a uniform speed of 300 r.p.m. The lengths of crank and connecting rod are 12 cm. and 50 cm. respectively. Find (i) The angular velocity of the connecting rod AB ; and (ii) The velocity of piston when the crank makes an angle of 30° with horizontal. Use instantaneous centre approach.

20. (a) A body moving with SHM has velocities of 10 m/s and 4 m/s at 2 and 4 m. distance from the mean position. Find the amplitude and time period of the body.

Or

(b) Find the time period of oscillation of a simple pendulum of length 1.5 m. Also find the time period when this pendulum hangs from an elevator moving with (i) Upward acceleration of 3 m/s^2 ; and (ii) Downward acceleration of 3 m/s^2.

(5 × 10 = 50 marks)

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Name..................................

Reg. No..............................

FIRST SEMESTER B.TECH. (ENGINEERING) [2019 SCHEME] DEGREE EXAMINATION, NOVEMBER 2019

EC 19 101—BASICS OF ELECTRONICS ENGINEERING

Time : Three Hours

Maximum : 100 Marks

Part A

Answer any **ten** *questions.*
Each question carries 5 marks.

1. Discuss the colour code for ceramic capacitors. What is the colour band of $5\,\Omega \pm 1\,\%$.

2. Two resistors of $100\,\Omega$. 1W are connected in series and parallel. Find total resistance and wattage in both cases.

3. Define temperature co-efficient of resistance. Derive an expression for the same.

4. Draw the energy band diagram of conductors, insulators and semiconductors.

5. Give the principle of operation of PN junction diode.

6. Draw the VI characteristics of Zener diode and explain its working.

7. Explain the significance of the truth table of a logic gate with suitable example.

8. State and explain De-Morgan's law and give its application.

9. Draw the block diagram of dc power supply and explain.

10. Draw the frequency response of an amplifier and indicate the bandwidth.

11. Briefly explain the working principles of oscillators.

12. Draw the block diagram of operational amplifier and explain its function.

13. Explain few needs for modulation.

14. Give the basic principle for cellular communication.

15. With help of block diagram explain the principle of optical communication.

$(10 \times 5 = 50\ \text{marks})$

Part B

Answer section (a) **or** *section (b) of each question.*
Each question carries 10 marks.

16. (a) Compare the characteristics, rating and field of applications of various types of capacitors.

Or

(b) How inductors are classified. Explain in detail with its applications.

Turn over

17. (a) Draw the structure of LED and explain the mechanism of its operation. State the uses of LED.

Or

(b) Draw the circuit of an *n-p-n* BJT in CE configuration and sketch the output characteristics. Show the load line and maximum power dissipation curve on the same characteristics.

18. (a) Define a voltage regulator. Classify it. Draw the circuit of a simple zener diode dc voltage stabilizer. Mention its merits and demerits.

Or

(b) Draw the block diagram and explain the working of a 4-bit binary adder.

19. (a) With help of circuit diagram explain the principle and working of RC phase shift oscillator.

Or

(b) Draw the block diagram of OPAMP and list its characteristics. Explain its use as an inverting and non inverting amplifier.

20. (a) Define AM. Draw an AM wave and derive an expression for total power of an AM signal.

Or

(b) With help of block diagram explain the working of FM transmitter. Distinguish between AM and FM.

$(5 \times 10 = 50 \text{ marks})$

FIRST SEMESTER B.TECH. (ENGINEERING) DEGREE [2019 SCHEME] EXAMINATION, NOVEMBER 2019

EE 19 101—BASICS OF ELECTRICAL ENGINEERING

Time : Three Hours   Maximum : 100 Marks

Part A

Answer any **ten** *questions.*
Each question carries 5 marks.

1. Explain how circuit elements are classified ? Draw a basic electric circuit.

2. A resistor of $5\,\Omega$ is connected in series witha parallel combination of $6\,\Omega$ and $3\,\Omega$. Find the supply current taken from a 35 V d.c. source.

3. A 40 W, 100 V lamp is connected to a 230 V. Calculate the value of resistance required to connect the bulb in series to safety of the bulb.

4. A circuit has inductance $1/\pi$ Henry and resistance $200\,\Omega$. A supply of 50 cycles per second A.C is applied to it. Calculate the reactance and impedance offered by the circuit.

5. With suitable example illustrate the phenomenon of electromagnetic induction.

6. Discuss the application of magnetic circuits.

7. With necessary sketch briefly explain the generation of ac.

8. Define co-efficient of coupling. Obtain an expression.

9. What do you meant by Q factor of LCR circuit ? Explain.

10. Briefly explain the constructional details of dc machine.

11. Give the principle of operation of a single phase transformer.

12. A transformer has 100 turns of wire on its primary winding and 20 turns of wire on its secondary winding. If the supply voltage is 200 V, calculate the secondary voltage.

13. Distinguish between squirrel cage and slip ring induction motor.

14. Draw a labeled block diagram of solar power plant.

15. What are the advantages of tidal power system ?

$(10 \times 5 = 50 \text{ marks})$

Turn over

Part B

Answer section (a) or section (b) of each question.
Each question carries 10 marks.

16. (a) Draw the characteristics of an ideal and practical voltage source. With a diagram explain how a practical current source can be converted to ideal current source.

    Or

    (b) Explain with suitable example the methods formation of network equations by mesh current and node voltage.

17. (a) List the similarities and dissimilarities between magnetic and electric circuits.

    Or

    (b) The magnetic flux density inside a toroid having 3200 turns with inner and outer radii 10 cm and 11 cm is 2.5 T. for a current of 0.8 A. Calculate the relative permeability of the core.

18. (a) Explain the concept of active power, reactive power and apparent power Draw power triangle to represent these three.

    Or

    (b) What is meant by phase sequence in 3-phase system ? Discuss the main advantage of two wattmeter method in measuring three phase power.

19. (a) An 8 pole dc generator has 650 armature conductors. The flux per pole is 20 milli webers. Find the value of e.m.f. generated when the armature is wave wound and is rotating at a speed of 1200 r.p.m. At what speed the armature should be driven to generate the same e.m.f., if the armature is lap wound.

    Or

    (b) A d.c. shunt generator has a terminal voltage of 220 V, field current of 0.5 A and load current of 12 A. Find the induced voltage in the armature resistance is 0.2 Ω.

20. (a) Explain the various advantages and disadvantages of three phase induction motors.

    Or

    (b) With help of block diagram of hydroelectric generating station explain the various parts and discuss its working.

                                                      (5 × 10 = 50 marks)

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FIRST SEMESTER B.TECH. (ENGINEERING) DEGREE [2019 SCHEME] EXAMINATION, NOVEMBER 2019

ME 19 101—BASICS OF MECHANICAL ENGINEERING

Time : Three Hours

Maximum : 100 Marks

Part A

*Answer any **ten** questions.*
Each question carries 5 marks.

1. What is the effect of compression ratio on the thermal efficiency of Otto cycle ?

2. With help of p-V and T-S diagram explain the various processes involved in a Carnot cycle.

3. Derive an equation for the air standard efficiency of Otto cycle in terms of the engine compression ratio.

4. What is the concept of MPFI ?

5. Differentiate between SI and CI engine.

6. What are the advantages of belt drive over other drive ? What are the disadvantages ?

7. Why do we require CFC free refrigerants for refrigeration ? What are the ecological problems in using CFC refrigerats ?

8. Differentiate between impulse and reaction turbine.

9. What is function of air vessel in reciprocating pump ?

10. What is the difference between conventional and non conventional energy sources ?

11. What are the advantages and disadvantages of hydel power plant ?

12. List the nuclear power plants in India.

13. Explain closed die forging process with the help of neat sketch.

14. Discuss the effect of alloying elements to steel.

15. Define grinding. What are the practical applications of grinding ?

(10 × 5 = 50 marks)

Part B

*Answer any **one** full section from each question.*
Each question carries 10 marks.

16. (a) 1 kg of air having an initial volume of 0.3 m^3 is heated at constant pressure of 3.2 bar until the volume is doubled. Find : (a) heat added , and (b) work done. Take c_p = 1.005kJ/kg.K, c_v = 0.718 kJ/kg.K.

Or

Turn over

(b) 0.5 kg of air is compressed reversibly and adiabatically from 80 kPa, 60° C to 0.4 MPa, and is then expanded at constant pressure to the original volume. Calculate the heat transfer and work transfer for the whole path. Take R = 0.287 kJ/kg.K, c_p = 1.005 kJ/kg. K and c_v = 0.718 kJ/kg.K

17. (a) Explain the working principle of 4 stroke petrol engine with the help of neat sketch.

Or

(b) What is meant by gear train ? Explain epicyclic gear train.

18. (a) Explain the working principle of centrifugal pump.

Or

(b) What is the principle of working of vapour compression refrigeration system ?

19. (a) Draw the layout of a Diesel power plant and explain.

Or

(b) Explain the various types of renewable energy sources.

20. (a) What factors influence the selection of a material for an engineering application ?

Or

(b) What are the various operations that can be performed in a lathe ? Explain any two of them.

(5 × 10 = 50 marks)

FIRST SEMESTER B.TECH. (ENGINEERING) [2019 SCHEME] DEGREE EXAMINATION, NOVEMBER 2019

CE 19 101—BASICS OF CIVIL ENGINEERING

Time : Three Hours

Maximum : 100 Marks

Part A

Answer any **ten** *questions.*
Each question carries 5 marks.

1. List out the structural components of a residential building.

2. Explain transportation and water resource engineering.

3. List out the factors to be considered in the selection of site for a building.

4. List out the open space requirements for a building.

5. Write short note on site plan of a building.

6. Define plot area, plinth area, floor area and carpet area.

7. Explain the method of reciprocal levelling. When do you need it ?

8. List the various uses of contour maps.

9. Draw a neat sketch of Dumpy level and mark the salient features.

10. What are the properties of cement mortar ?

11. List out the advantages of RCC over PCC.

12. What is meant by curing of concrete ? Why it is necessary ?

13. List out the advantages of brick masonry over stone masonry.

14. Define safe bearing capacity of soil, and explain its importance in foundation design.

15. What are the functions of good foundation in buildings ?

(10 × 5 = 50 marks)

Part B

Answer any **one** *full section from each question.*
Each question carries 10 marks.

16. (a) Explain in detail the different types of building according to NBC.

Or

(b) Describe in detail the contribution of civil engineering to the welfare of the society.

Turn over

17. (a) Draw a rough sketch of the section of a simple storied building and mark the basic building components.

Or

(b) Explain the points to be considered while selecting the position of doors and windows in a building.

18. (a) What are the fundamental principles of surveying ? Explain briefly.

Or

(b) Write short notes on : (a) Remote sensing ; and (b) Geographical Information System.

19. (a) State the important properties and uses of cement mortar.

Or

(b) What is R.C.C.? Briefly write on desirable properties and uses of concrete.

20. (a) Explain different types of bonds used in brick masonry with sketches.

Or

(b) Explain the functional features of road, bridges and dam.

(5 × 10 = 50 marks)

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FIRST SEMESTER B.TECH. (ENGINEERING) [2019 SCHEME] DEGREE EXAMINATION, NOVEMBER 2019

EC 19 100—CONCEPTS OF ELECTRONIC ENGINEERING

Time : Three Hours   Maximum : 100 Marks

Part A

*Answer any **ten** questions.*
Each question carries 5 marks.

1. Briefly explain the structure and advantages of electrolytic capacitors.

2. Distinguish between metal film resistors and wire wound resistors.

3. Give a short account of relays and contractors. Mention its applications.

4. With help of energy band diagram explain the basic concepts of semiconductors.

5. Derive the diode current equation of PN junction diode.

6. Differentiate between Zener and Avalanche breakdown mechanisms .

7. Draw the VI characteristics of CE configuration. Mark all regions give its importance.

8. Discuss two methods for biasing a transistor.

9. Explain the function of a transistor as a switch.

10. Explain FET operation.

11. Discuss the advantages of MOSFET.

12. Explain the principle of operation of Photo transistor.

13. What is Lissajous patterns ?

14. Compare the properties of analog and digital computer.

15. Explain the principle of function generator and give its important application.

                                  (10 × 5 = 50 marks)

Part B

*Answer section (a) **or** section (b) of each question.*
Each question carries 10 marks.

16. (a) With necessary diagram, explain the construction, working, rating and applications carbon composition type resistors.

                                  Or

  (b) Explain the principle of low power transformers. Distinguish between multilayer and variable inductors.

                                             Turn over

17. (a) Explain the working of capacitor input filter and choke input filter.

Or

(b) Draw the structure of LED and explain the mechanism of its operation. Give its applications.

18. (a) Explain in detail an experiment to study the input and output characteristics of common emitter configuration of transistor.

Or

(b) Explain the working of an RC coupled amplifier. Draw the d.c and a.c load line.

19. (a) With a neat diagram explain the structure of UJT and its electrical equivalent. Explain its characteristics and its important applications.

Or

(b) What is SCR ? What do you mean by holding current of an SCR ? Explain the action of gate on the triggering of an SCR.

20. (a) What are the generalized parameters of electronic instruments. Explain in detail.

Or

(b) Draw the labeled block diagram of CRO and give its working.

$(5 \times 10 = 50 \text{ marks})$

FIRST SEMESTER B.TECH. (ENGINEERING) [2019 SCHEME] DEGREE EXAMINATION, NOVEMBER 2019

EE 19 100—CONCEPTS OF ELECTRICAL ENGINEERING

Time : Three Hours   Maximum : 100 Marks

Part A

Answer any **ten** *questions.*
Each question carries 5 marks.

1. Explain how circuit elements are classified ? Draw a basic electric circuit.

2. A resistor of 50 Ω is connected in series with a parallel combination of 60 Ω and 30 Ω. Find the supply current taken from a 35 V d.c. source.

3. A 40 W, 100 V lamp is connected to a 230 V. Calculate the value of resistance required to connect the bulb in series to safety of the bulb.

4. Derive an expression for sinusoidal voltage and current.

5. Derive the equation for r.m.s. value of an AC.

6. An alternating current is given by $I = 14.14 \sin 377t$. Find (a) r.m.s. value of current ; (b) Frequency ; (c) Average value of current ; and (d) Form factor.

7. A circuit has inductance $1/\pi$ Henry and resistance 200 Ω. A supply of 50 cycles per second A.C. is applied to it. Calculate the reactance and impedance offered by the circuit.

8. What do you mean by Q factor of LCR circuit ? Explain.

9. An A.C. series circuit has L = 10 mH, C = 10 μF, R = 10 Ω. Calculate (i) Natural frequency ; and (ii) Resonant frequency ; and (iii) Impedance of the circuit at resonance.

10. A lamp connected in parallel with a large inductor glows brilliantly when the current is switched off. Explain.

11. Compare electric and magnetic circuit.

12. Derive an expression for energy stored in a magnetic field.

13. What is meant by coupling coefficient of a magnetic circuit ?

14. A transformer has 100 turns of wire on its primary winding and 20 turns of wire on its secondary winding. If the supply voltage is 200 V, calculate the secondary voltage.

15. Derive an expression for energy stored in a capacitor.

$(10 \times 5 = 50 \text{ marks})$

Turn over

Part B

Answer section (a) **Or** *section (b) of each question.*
Each question carries 10 marks.

16. (a) Draw the characteristics of an ideal and practical voltage source. With a diagram explain how a practical current source can be converted to ideal current source.

Or

(b) State and prove Superposition theorem.

17. (a) Obtain an expression for current and voltage in an alternating current circuit consisting of resistance R and inductance L in series. Show that current lags behind voltage.

Or

(b) Define and explain reactance and impedance of an alternating current circuit. Explain rectangular and polar representation of phasors.

18. (a) Explain the concept of active power, reactive power and apparent power. Draw power triangle to represent these three.

Or

(b) A resistive load takes 10 A at 100 V. Calculate the inductance of the reactor to be connected in series with this load in order that the same current is supplied from 220 V, 50 Hz main.

19. (a) Using Biot and Savart law derive an expression for the magnetic field due to an infinite straight wire carrying current. Give the concept of solenoid and toroid.

Or

(b) Derive an expression for the force on a current carrying conductor in a magnetic field.

20. (a) Explain in detail the construction, theory and uses of a transformer. What are energy losses and how are they minimized ?

Or

(b) What is rotating magnetic field ? Explain how a rotating magnetic field is established ? Describe how it is used in the working of a single-phase motor.

(5 × 10 = 50 marks)

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FIRST SEMESTER B.TECH. (ENGINEERING) DEGREE [2019 SCHEME] EXAMINATION, NOVEMBER 2019

ME 19 100—CONCEPTS OF MECHANICAL ENGINEERING

Time : Three Hours

Maximum : 100 Marks

Part A

*Answer any **ten** questions.*
Each question carries 5 marks.

1. What is meant by ideal cycle or air standard cycle ? What is its use ?

2. Draw the p-V and T-S diagram for diesel cycle.

3. 'Carnot cycle engine cannot be realized in practice'. Justify the statement.

4. Describe the various parts of IC engine.

5. Explain the creep and slip in belt drive.

6. What are the different types of brakes and its application ?

7. What is meant by eco-friendly refrigerant ? Why do we need it ?

8. What is the function of volute casing in centrifugal pump ?

9. Why priming is required in pump ?

10. What is geo thermal energy ?

11. What is a chain reaction ?

12. List out the advantages and disadvantages of thermal power plant.

13. What are the various applications of alloy steel ?

14. List out the merits and demerits of CNC machines over conventional machines.

15. Distinguish between direct and indirect extrusion.

(10 × 5 = 50 marks)

Part B

*Answer any **one** full section from each question.*
Each question carries 10 marks.

16. (a) 5 m³ of gas at 8 bar and 180° C is heated keeping the pressure same throughout till the volume is doubled. Find the heat added, external work done and the change in internal energy during the process. Take c_p = 1.005 kJ/kg.K, c_v = 0.718 kJ/kg.K.

Or

Turn over

(b) 0.5 kg of air is compressed reversibly and adiabatically from 80 kPa, 60° C to 0.4 MPa, and is then expanded at constant pressure to the original volume. Calculate the heat transfer and work transfer for the whole path. Take R = 0.287 kJ/kg.K, c_p = 1.005 kJ/kg.K and c_v = 0.718 kJ/kg.K

17. (a) Compare SI engines with Cl engines.

Or

(b) With the help of neat sketch explain the working of single plate clutch.

18. (a) Explain the working principle of reciprocating pump.

Or

(b) What are the important properties that are required for an ideal refrigerant ?

19. (a) Explain the working principle of Hydel power plant with the help of neat sketch.

Or

(b) Explain the various types of non renewable energy sources.

20. (a) Describe the various milling operations.

Or

(b) What are the various operations that can be performed on a shaper machine ? Explain any four of them.

(5 × 10 = 50 marks)

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FIRST SEMESTER B.TECH. (ENGINEERING) DEGREE [2019 SCHEME] EXAMINATION, NOVEMBER 2019

IT 19 100—INTRODUCTION TO COMPUTING AND PROBLEM SOLVING

Time : Three Hours　　　　　　　　　　　　　　　　　　　Maximum : 100 Marks

Part A

*Answer any **ten** questions.*
Each question carries 5 marks.

1. How to express algorithms ?

2. Differentiate between a microcomputer and a microprocessor.

3. List the characteristics of a computer.

4. Explain what do you mean by memory hierarchy ?

5. List the different type of storage devices.

6. What is the purpose of the main memory in a computer ?

7. Name and explain the various data type used in Python language.

8. Give the result of the following Python expressions :

　　(i)　273.　　　　　　　　　　　　(ii)　I = 2.

　　(iii)　3 in [2, 7, 5.3, 4, 12].

9. Differentiate between input{} and raw input{} functions in Python.

10. With suitable example discuss any two integer oriented function.

11. Illustrate fseek and ftell function.

12. What are the common uses of rewind and ftell function ?

13. Describe the use and limitations of the functions getc and putc.

14. What do you mean by dictionaries ? Give its operations.

15. Give a brief idea of classes and objects.

(10 × 5 = 50 marks)

Part B

Answer section (a) or section (b) of each question.
Each question carries 10 marks.

16. (a) What are the essential components of a computer ? With help of block diagram discuss the function of each component.

Or

(b) What is the various computer generations ? Discuss main features of each generation with example.

Turn over

17. (a) Write an algorithm to insert n element from a linked queue depending upon users choice. Why do we have variety of memories in a computer system ?

Or

(b) Define and explain with suitable example the term Macro. List the properties of application software.

18. (a) Write a Python program to add an element 5 to a list $x = [1, 2, 3]$ and to print that element.

Or

(b) Write a program in Python to swap two numbers.

19. (a) Given any three numbers. Write a program to write their values in an ascending order.

Or

(b) Write a program to illustrate the use of objects as arguments to member, and nonmember functions using Call By Value mechanism.

20. (a) Explain the four attributes of classes. Write down the general form of class definition.

Or

(b) Write a program using a class to store price list of 50 items and to print the largest price as well as the sum of all prices.

(5 × 10 = 50 marks)

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FIRST SEMESTER B.TECH. (ENGINEERING) DEGREE [2019 SCHEME] EXAMINATION, NOVEMBER 2019

PT 19 100—CONCEPTS OF PRINTING TECHNOLOGY

Time : Three Hours   Maximum : 100 Marks

Part A

Answer any **ten** *questions.*
Each question carries 5 marks.

1. Discuss various substrates used before the invention of paper.

2. Write notes on commercial printing shops.

3. Compare die-cutting, perforation and punching operations with its applications.

4. Describe book and different stages of book making.

5. Explain various parts of book required for publishing.

6. Compare traditional publishing and digital publishing.

7. What is the application of internet in printing industry ? Brief.

8. What are the functions of an operating system ?

9. Write notes on wireless networks.

10. Discuss the features required by images used for printing.

11. What are the advantages of image editing ?

12. How does light affect color ?

13. Compare warm and cool colors.

14. Write notes on hue, value and saturation.

15. What are the advantages and disadvantages of offset printing ?

(10 × 5 = 50 marks)

Part B

Answer one full question from each section.
Each question carries 10 marks.

16. a) i) Discuss the development of phonetic symbols.

(5 marks)

    ii) Explain various stages of printing cycle.

(5 marks)

Or

    b) Discuss the evolution of printing.

Turn over

17. a) Explain different types of print media.

Or

   b) Compare book printing and book publishing.

18. a) Describe computer network and explain its types.

Or

   b) Explain the working principle of various types of digital printing technologies.

19. a) Describe scanner, its purpose and types.

Or

   b) Discuss the features of various image file formats.

20. a) i) Compare Sheet-fed offset and web offset printing. (5 marks)

   ii) Discuss the principle and application of offset printing. (5 marks)

Or

   b) i) Explain color printing process. (5 marks)

   ii) Write notes on neutral colors, additive colors and subtractive colors. (5 marks)

[5 × 10 = 50 marks]