Q.P. Code: 19HS0830

R19

Reg. No: | | | | | | | | | | |

B.Tech I Year I Semester Supplementary Examinations Feb/Mar 2021

ALGEBRA AND CALCULUS

(Common to all)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit **(5 x 12 = 60 Marks)**

UNIT-I

1 a) Solve the system following linear system $3x+y+2z=3;\ 2x-3y-z=-3;\ x+2y+z=4$. 6M

b) Use Cayley-Hamilton theorem to find the inverse of $\begin{bmatrix} 5 & 3 \\ 3 & 2 \end{bmatrix}$. 6M

OR

2 a) Find the Eigen values of the matrix $\begin{bmatrix} 2 & 2 & 1 \\ 1 & 3 & 1 \\ 1 & 2 & 2 \end{bmatrix}$. 6M

b) Describe the nature of the quadratic form $x^2+5y^2+z^2+2xy+2yz+6zx$. 6M

UNIT-II

3 a) Verify the validity of mean value theorem for $f(x)=x+\frac{1}{x}$ on $\left[\frac{1}{2},1\right]$ and find the constant $c\in\left(\frac{1}{2},1\right)$. 6M

b) Find the Taylor series of $f(x)=\sin\left(\frac{\pi x}{2}\right)$ about $x=1$. 6M

OR

4 a) Find the value(s) in (0, 4) where the functions $f(x)=x^3-4x^2+3$ and $g(x)=2x^2$ satisfy the Cauchy's mean value theorem on the interval $[0, 4]$. 6M

b) Find the first three non-zero terms in the Meclaurin's series of $e^{\sin x}$ 6M

UNIT-III

5 a) Let $u=x^2+y^2$, and $v=x-2y$ here $x=e^{-t}\cos\theta$ and $y=e^{t}\sin\theta$, then compute $\frac{\partial(u,v)}{\partial(t,\theta)}$. 6M

b) Use Lagrange's multiplier method to find the maximum value of $(x+1)(y+2)$ such that $x+2y=50,\ x,\ y\geq 0$. 6M

OR

6 a) If $u=\log(x^2+y^2+z^2)$, prove that 6M

$$\left(x^2+y^2+z^2\right)\left(\frac{\partial^2 u}{\partial^2 x}+\frac{\partial^2 u}{\partial^2 y}+\frac{\partial^2 u}{\partial^2 z}\right)=2\cdot$$

b) Find the maximum and minimum values of the function $f(x,y)=2(x^2-y^2)-x^4+y^4$ 6M

UNIT-IV

7 a) Evaluate the integral $\int_0^{\pi}\frac{x}{1+\sin(x)}dx$. 6M

b) Evaluate the integral $\int_{y=0}^{1}\int_{x=\sqrt{y}}^{2-y} xydxdy$ by changing the order of integration. 6M

OR

8 a) Evaluate the integral $\iint_A x^2 dA$ where A is the domain bounded by $x-$axis, ordinate $x=2$ and the curve $x^2=4y$. 6M

b) Evaluate the integral $\int_{x=0}^{1}\int_{y=0}^{\sqrt{1-x^2}} ydydx$. 6M

UNIT-V

9 a) Using beta and gamma functions, evaluate $\int_0^1\frac{x^6}{\sqrt{1-x^2}}dx$. 6M

b) Express the integral $\int_0^1\sqrt{\tan\theta}d\theta$ in gamma function. 6M

OR

10 a) Prove that $\int_0^{\frac{\pi}{2}}\sqrt{\sin\theta}d\theta\times\int_0^{\frac{\pi}{2}}\frac{1}{\sqrt{\sin\theta}}d\theta=\pi$. 6M

b) Express the integral in $\int_0^1\frac{x^2dx}{\sqrt{1+x^4}}$ gamma function. 6M

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B.Tech I Year I Semester Supplementary Examinations Feb / Mar 2021

Engineering Physics

(CIVIL)

Time: 3 Hours Max. Marks: 60

Answer one question from each unit **(5 x 12 = 60 Marks)**

UNIT-I

1	a)	Define gradient of a scalar field.	6M
	b)	Show that F = -grad V.	6M
		OR	
2	a)	State and explain Newton's laws of motion.	6M
	b)	Derive Newton's first law and third law from second law of motion.	6M

UNIT-II

3	a)	Define the three elastic moduli.	6M
	b)	Derive the relation between them.	6M
		OR	
4	a)	Define Young's modulus and rigidity modulus	6M
	b)	Obtain the relation between rigidity modulus and Young's modulus.	6M

UNIT-III

5	a)	Define reverberation and reverberation time.	6M
	b)	Explain the factors affecting the reverberation time.	6M
		OR	
6	a)	Give any four of methods for the detection of ultrasonics.	6M
	b)	Write the applications of ultrasonics.	6M

UNIT-IV

7	a)	What is a simple harmonic oscillator? Derive the equation of motion of simple harmonic oscillator.	6M
	b)	A particle executes SHM with a period of 0.002 sec and amplitude of 10 cm. Find its acceleration when it is 4 cm away from its mean position and also obtain its maximum velocity.	6M
		OR	
8	a)	Define damped harmonic motion. Give two examples.	6M
	b)	Derive and solve differential equation of damped harmonic oscillator.	6M

UNIT-V

9	a)	What are nanomaterials? Explain their classification.	6M
	b)	Explain in detail the quantum confinement effect and how it affects the optical properties of nanomaterials.	6M
		OR	
10	a)	Explain the synthesis of nanomaterials by ball milling method.	6M
	b)	Discuss in detail the applications of nanomaterials in various fields.	6M

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B.Tech I Year I Semester Supplementary Examinations Feb / Mar 2021

Applied Chemistry

(EEE & ECE)

Time: 3 Hours Max. Marks: 60

Answer one question from each unit (**5 x 12 = 60 Marks**)

UNIT-I

1		Define Electrode Potential. Derive the Nernst equation for a single electrode potential and write its applications.	12M
		OR	
2	a)	Write a brief note on potentiometric sensor	8M
	b)	Write short note on Glucose Potentiometric Sensor	4M

UNIT-II

3	a)	Write De-Broglie's equation.	6M
	b)	Explain Heisenberg Uncertainty principle.	6M
		OR	
4		What is Crystal field theory? Explain the crystal field splitting in octahedral and tetrahedral Complexes.	12M

UNIT-III

5		Explain the mechanism of Addition polymerization	12M
		OR	
6		Write the preparation, properties and application of Buna-S rubber and Buna-N rubber	12M

UNIT-IV

7		Explain principle and instrumentation of UV-visible spectroscopy with neat diagr	12M
		OR	
8		What are the methods do you follow to separate from the Liquid Mixtures ?	12M

UNIT-V

9	a)	Write a note on Liquid Insulating Materials	6M
	b)	Write the Properties of Nanomaterials.	6M
		OR	
10	a)	Write an account on Carbon Nano Tubes.	6M
	b)	Write a note on Fullerenes	6M

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B.Tech I Year I Semester Supplementary Examinations Feb / Mar 2021

Semiconductor Physics

(CSE)

Time: 3 Hours Max. Marks: 60

Answer one question from each unit **(5 x 12 = 60 Marks)**

UNIT-I

1	a)	Write advantages quantum free electron theory over classical free electron theory.	6M
	b)	Describe the electrical conductivity in a metal using quantum free electronic theory.	6M
		OR	
2	a)	Write brief note on Fermi Dirac distribution?	6M
	b)	What is the effect of temperature onFermi Dirac distribution function?	6M

UNIT-II

3	a)	Distinguishes between intrinsic and extrinsic semiconductors?	6M
	b)	Explain effect of temperature on Fermi energy level of an extrinsic semiconductor?	6M
		OR	
4	a)	Describe the Hall Effect in a semiconductors.	6M
	b)	Write the applications of Hall Effect.	6M

UNIT-III

5	a)	Derive Schrödinger's time dependent wave equation.	6M
	b)	An electron is moving under a potential field of 15kv. Calculate the wavelength of electron wave.	6M
		OR	
6	a)	Write the significance of Divergence and Curl of Electromagnetic fields	6M
	b)	Explain the propagation of electromagnetic wave in non-conducting media	6M

UNIT-IV

7	a)	Derive the relation between the various Einstein's coefficients of absorption and emission of radiation.	6M
	b)	Explain population inversion?	6M
		OR	
8	a)	What is the numerical aperture of an optical fibre and derive an expression for it.	6M
	b)	An optical fibre has a numerical aperture of 0.20 and cladding refractive index of 1.59. Determine the refractive index of core and the acceptance angle for the fibre in water has a refractive index of 1.33.	6M

UNIT-V

9	a)	Explain the concept of Quantum Confinement in nano materials.	6M
	b)	Write the applications of nanomaterial in industries and information technology.	6M
		OR	
10	a)	What are carbon nanotubes? Mention its structures?	6M
	b)	Write brief note on applications of Carbon nanotubes?	6M

Q.P. Code: 19CS0501 R19

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B.Tech I Year I Semester Supplementary Examinations Feb / Mar 2021

PYTHON PROGRAMMING

(ECE & CSE)

Time: 3 Hours Max. Marks: 60

Answer one question from each unit (**5 x 12 = 60 Marks**)

UNIT-I

1	a)	What is an algorithm? Explain characteristics of an algorithm	6M
	b)	What are the features and applications of Python?	6M
		OR	
2	a)	Explain about the Single-Valued data types in python	6M
	b)	What is Indentation? Explain with example	6M

UNIT-II

3	a)	Write a python program to find the given number is odd or even	6M
	b)	Explain break and continue statement with the help of for loop with an example.	6M
		OR	
4	a)	Write a python program to print factorial of a given number	6M
	b)	Implement Python program to find sum of natural numbers	6M

UNIT-III

5	a)	Differentiate keyword and default arguments	6M
	b)	Differentiate global and local variables	6M
		OR	
6	a)	What is constructor? Explain with example	6M
	b)	Write about class and object.	6M

UNIT-IV

7	a)	What is user defined exception and explain with example program	6M
	b)	Explain user defined exception with example program	6M
		OR	
8	a)	What is name space in python	6M
	b)	Explain name space with example program	6M

UNIT-V

9	a)	Write an example for drawing a obtuse triangle using Turtle Graphics	6M
	b)	Describe file reading with example	6M
		OR	
10	a)	What is turtle graphics in Python? How do you fill a turtle in Python with colour	6M
	b)	Write python program to display equilateral triangle using turtle graphics.	6M

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B.Tech I Year I Semester Supplementary Examinations Feb /Mar 2021

ENGINEERING GRAPHICS

(ECE & CSE)

Time: 3 Hours Max. Marks: 60

Answer one question from each unit (**5 x 12 = 60 Marks**)

UNIT-I

1 a) Construct a parabola with base 60 mm and length of the axis 40 mm. Draw a tangent to the curve at point 20 mm from the base using rectangular method. 6M

b) Draw an involute of a hexagon 20 mm side. Also, draw a normal and a tangent at a point 100 mm from the centre of the hexagon. 6M

OR

2 a) Draw a parabola having a distance of 50 mm between the focus and directrix. Draw a tangent to the parabola at a point 35 mm from the focus. 6M

b) Draw a hypo cycloid of circle of 40 mm diameter which rolls inside another circle of 160 mm diameters for one revolution counter clock wise. 6M

UNIT-II

3 a) A line AB of 70 mm long, as its end A at 10 mm above H.P and 15 mm in front of V.P. Its front view and top view measures 50 mm and 60 mm. Draw the projections of the line and determine its inclination with H.P and V.P. 6M

b) Draw the projections of the following points, keeping the distance between the projectors as 25mm on the same reference lines. 6M
E – On HP and 30mm in front of VP
F – On VP and 20 mm above HP
G – Lying on both HP and VP

OR

4 a) A regular pentagon of 30 mm side is resting on one of its edges on H.P, which is inclined at 45 to V.P. Its surface is inclined at 30^0 to H.P. Draw its projections. 6M

b) A Thin 30^0-60^0 set- square has its longest edge (diagonal) on H.P and inclined at 30^0 to V.P. Its surface makes an angle of 45^0 with H.P. Draw the projections, choosing suitable size for the set -square. 6M

UNIT-III

5 A hexagonal prism of side of base 25 mm and axis 60 mm long, is resting on its base on H.P such that ,an edge of the base parallel to V.P. It is cut by a section plane, inclined at 45^0 to V.P and 10 mm away from the axis. Draw its Sectional Front View, Sectional Top View, Truncated Section. 12M

OR

6 A hexagonal pyramid side of base 25 mm and axis 50 mm long rest with one of its edges of base on H.P and its axis is inclined at 30^0 to H.P and parallel to V.P. Draw the projections 12M

UNIT-IV

7 A cylinder 50mm diameter and 70mm axis is completely penetrated by a square prism of side 25mm and axis 70 mm horizontally. Both the axis intersect and bisect each other. All faces of the prism are equally inclined to HP.Draw the projections showing the curves of intersection. 12M

OR

8 A pentagonal pyramid of side of base 30 mm and 60 mm long, is resting on its base on H.P, with an edge of the base parallel to V.P. draw the development of the lateral surface of the pyramid. 12M

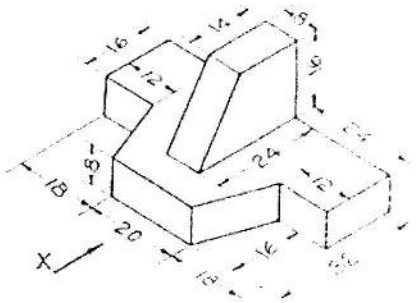
UNIT-V

9 a) Draw the isometric view of a pentagonal prism of base side 30 mm and axis 60 mm. The prism rests on its base on the HP with a vertical face perpendicular VP. 6M

b) Draw the isometric view of a hexagonal prism, with side of base 25 mm and axis 60 mm long .The prism is resting on its base on H.P, with an edge of the base parallel to V.P. Use box method. 6M

OR

10 Draw three views of the blocks shown pictorially in figure according to first angle projection. All Dimensions are in mm. 12M



Code: 19CE0101 **R19**

B.Tech I Year I Semester Supplementary Examinations Feb/Mar 2021

Engineering Mechanics

(Common to CE & MECH)

Time: 3 hours Max. Marks: 60

(Answer all five units, 5 x 12 =60 Marks)

UNIT - I

1. State and prove Varignon's theorem. 12M

OR

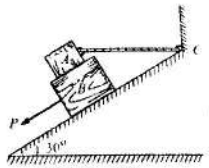
2. (a) Explain free body diagram with example. 6M
   (b) State and prove Lami's theorem. 6M

UNIT - II

3. Find the least force required to drag a body of weight 'W' placed on a rough inclined plane having inclination 'α' to the horizontal. The force is applied to the body in such a way that it makes an angle 'Θ' to the inclined plane and the body is on the point of motion up the plane. 12M

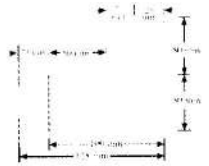
OR

4. Block A of mass 30 kg rests on block B of mass 40 kg as shown in Fig.10. Block A is restrained from moving by a horizontal rope tied at point C, what force P applied to the plane inclined at 30o with horizontal is necessary to start block B down the plane. Take coefficient of friction for all surfaces as 0.35. 12M



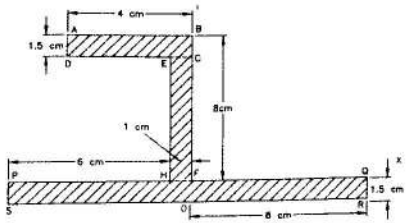
UNIT - III

5. A uniform lamina shown in Fig. 12 consists of a rectangle, a circle and a triangle. Determine the centre of gravity of the lamina. All dimensions are in mm 12M



OR

6. Find the centre of gravity of the shaded area shown in below Fig.20 with reference to X-Y co-ordinate system 12M

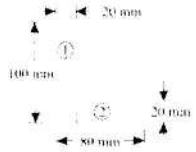


UNIT - IV

7. Derive an equation for moment of inertia of the following sections about centroidal axis: 12M
   a) A rectangular section
   b) A triangular section from its base

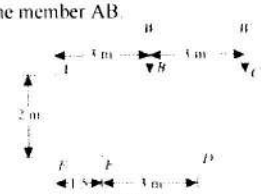
OR

8. Find the moment of inertia about the centroidal X-X and Y-Y axes of the angle section shown in Fig 12M



UNIT - V

9. A cantilever truss is loaded as shown in Fig.30. Find the value W, which would produce the force of magnitude 15 kN in the member AB. 12M



OR

10. Explain the procedure to find forces in members of truss by using method of sections. 12M