

Code: 1GC14

B.Tech. I Year Supplementary Examinations May 2018

Mathematics-I

(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

Answer any **five** questionsAll Questions carry equal marks (**14 Marks** each)

1. a) Solve $(y^4 + 2y)dx + (xy^3 + 2y^4 - 4x)dy = 0$ 7M
 b) The number N of bacteria in a culture grew at a rate Proportional to N. The value of N was initially 100 and increased to 332 in one hour. What would be the value of N after $1\frac{1}{2}$ hours? 7M
2. a) Solve $\frac{d^3y}{dx^3} - 6\frac{d^2y}{dx^2} + 11\frac{dy}{dx} - 6y = e^{-2x} + e^{-3x}$ 7M
 b) Solve $\frac{d^2y}{dx^2} + 4y = \tan 2x$ by the Method of variation of Parameter 7M
3. a) If $x = r \sin \theta \cos \phi$, $y = r \sin \theta \sin \phi$ and $z = r \cos \theta$ then find $\frac{\partial(x, y, z)}{\partial(r, \theta, \phi)}$ 7M
 b) Find the minimum value of $x^2 + y^2 + z^2$, given that $ax + by + cz = P$ 7M
4. a) Trace the curve $x^3 + y^3 = 3axy$ 7M
 b) Find the surface area of solid generated by the revolution of an arc of the catenary $y = c \cosh \frac{x}{c}$ about the x - axis. 7M
5. a) By changing the order of integration to evaluate $\int_0^1 \int_0^{\sqrt{1-x^2}} y^2 dy dx$ 7M
 b) Evaluate $\int_0^a \int_0^x \int_0^{x+y} e^{x+y+z} dx \cdot dy \cdot dz$ 7M
6. a) Evaluate $L\left\{e^t \left(\cos 2t + \frac{\sinh 2t}{2}\right)\right\}$ 7M ii) Find $L^{-1}\left\{\frac{s+3}{s^2-10s+29}\right\}$
 b) Using convolution theorem find $L^{-1}\left\{\frac{s}{(s^2+1)(s^2+4)}\right\}$ 7M
7. a) Find $L\left\{\int_0^t e^t \cos 2t dt\right\}$ 4M
 b) Solve the differential equation $\frac{d^2x}{dt^2} - 4\frac{dx}{dt} - 12x = e^{3t}$ given that $x(0) = 1$ and $x'(0) = -2$ by using Laplace transform 10M
8. a) If $\vec{F} = \text{grad}(x^3 + y^3 + z^3 - 3xyz)$ then find $\text{div}\vec{F}$ and $\text{curl}\vec{F}$ 7M
 b) Evaluate $\int_C [(3x^2 - 8y^2)dx + (4y - 6xy)dy]$ where C is the region bounded by $x=0$, $y=0$ and $x+y=1$ by Green's Theorem 7M

Hall Ticket Number :										
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R-11 / R-13

Code: 1G112

B.Tech. I Year Supplementary Examinations May 2018

C Programming and Introduction to Data Structures

(Common to CE, EEE, ME and ECE)

Max. Marks: 70

Time: 3 Hours

Answer any **five** questions
All Questions carry equal marks (**14 Marks** each)

1. a) Define Electronic computer system? 2M
b) Create a flowchart for greatest of three numbers 12M

2. a) Explain Control Statements? Write a c Program on exchange of two numbers? 12M
b) What is a datatype? 2M

3. Write a C program to perform addition of two matrices 14M

4. a) Define recursive Function? 2M
b) Write a C program to find the factorial of a given integer using recursive function 12M

5. Write a C program to display Employee information using structures with in structures 14M

6. a) Define File modes 4M
b) Write a C program to copy the contents of one file to another 10M

7. Write a C program to implement Stack using Arrays 14M

8. Write a C program to implement Bubble sort technique 14M

Code: 1G512

I Year B.Tech. Supplementary Examinations May 2018

Engineering Graphics

(Common to CE & ME)

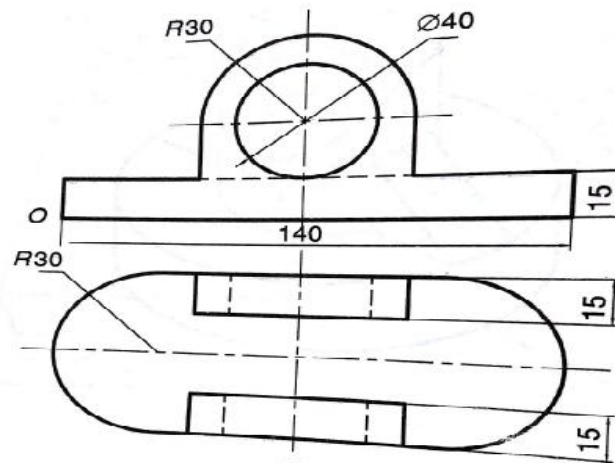
Max. Marks: 70

Time: 3 Hours

Answer any **five** questionsAll Questions carry equal marks (**14 Marks** each)

1. a) The major and minor axes of an ellipse are 100 mm long and 60 mm long respectively. Locate the foci and draw the ellipse by arcs of circles method. Draw a tangent and normal to the ellipse at a point on it 20mm above the major axis. 7M
- b) Draw the curve traced by a point on the circumference of a rolling circle of diameter 40mm, rolling over a circle of diameter 120mm. Draw the tangent and normal to the curve at a point on the curve 85mm from the center of the base circle. 7M
2. a) The midpoint of a line AB is 75 mm above the HP and 60 mm in front of VP. The line measures 80 mm and is inclined at 30° to HP and 45° to VP. Draw its projections. 7M
- b) A line measures 75mm long has one of its ends 50mm in front of V.P and 15 mm above the H.P. the top view of the line is 50mm long. Draw and measure the front view. The other end is 15mm in front of V.P and is above the H.P. 7M
3. a) A hexagonal plate of side 35 mm rests on the H.P on one of its sides perpendicular to V.P. Draw its projections when its surface is inclined at 50° to the H.P. 7M
- b) A circular lamina of diameter 60mm is held vertical with its surface inclined at 45° to the V.P. Its center is 40 mm above the H.P and 30 mm in front of V.P. draw its top and front views and also its traces. 7M
4. a) A pentagonal prism of base side 40 mm and axis length 60 mm lies in the H.P on one of its longer edges with its axis parallel to both the H.P and the V.P. One of the rectangular faces containing the resting edge is inclined at 30° to the H.P. Draw its plan and elevation. 7M
- b) Draw the projections of a square pyramid of base of side 30 mm and axis 50mm when it is resting on the H.P on one of its base corners with a base side containing the corner making 35° with the H.P. The axis is inclined at 30° to the V.P and is parallel to the H.P and the vertex is away from the V.P. 7M
5. A cone of base diameter 60 mm and altitude 70 mm rests vertically on its base on the ground. A slot of shape of an equilateral triangle of side 30 mm is cut through the cone so that its axis is perpendicular to the V.P and meets the axis of the cone at right angle. The base of the slot is at a distance of 10 mm above the base of the cone. Draw the development of the lateral surface of the cone with the slot. 14M

6. Two views of an object is shown below, draw its isometric view.



14M

7. A cone of base diameter 60 mm and axis 70 mm long, rests with its base on H.P. It is completely penetrated by a horizontal cylinder of 30 mm diameter such that both the axes intersect each other at right angles. The axis of the cylinder is parallel to V.P and 20 mm above the base of the cone. Draw the projections of the solids showing the curves of intersection.

14M

8. A hexagonal lamina of 25 mm side stands vertically on the ground plane and inclined at 50° to the P.P. The corner nearest to P.P is 20 mm behind it. The station point is 45 mm in front of P.P, 50 mm above the ground plane and lies in a central plane which passes through the centre of the lamina. Draw the perspective view.

14M

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R-11 / R-13

Code: 1GC12

B.Tech. I Year Supplementary Examinations May/June 2018

Engineering Physics

(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

Answer any **five** questions

All Questions carry equal marks (**14 Marks** each)

1. a) Discuss various methods by which polarized light can be produced. 6M
b) What are Quarter and Half wave plates? Explain 5M
c) Calculate the thickness of half wave plate of Quartz for a wavelength 500nm. Here $\mu_e = 1.553$ and $\mu_o = 1.544$. 3M
2. a) Derive the expression for Interplanar Spacing in terms of Miller Indices and lattice constant. 6M
b) Explain Bragg's law of X-ray diffraction. 5M
c) The Bragg's angle for reflection from (1 1 1) plane in a FCC crystal 19.2° for an X-ray of wave length 1.54\AA . Compute the cube edge of the unit cell. 3M
3. a) Explain the De Broglie hypothesis of matter waves. 4M
b) Assuming the Schrodinger's time independent wave equation, discuss the behaviour of a particle in one-dimensional potential well of infinite height. 10M
4. a) Describe the Drift and Diffusion currents in a Semiconductor. 7M
b) Mention some applications of Hall effect. 3M
c) The R_H of a specimen is $3.66 \times 10^{-4} \text{ m}^3 \text{ c}^{-1}$. Its resistivity is $8.93 \times 10^{-3} \text{ m}$. Find the mobility and charge carrier concentration 4M
5. a) Explain the classification of magnetic materials in detail with its properties. 10M
b) A magnetic material has a magnetization of 3300A/m and flux density of 0.0044 Wb/m^2 . Calculate magnetizing force and relative permeability of the material. 4M
6. a) Explain the characteristics of Lasers. 4M
b) With necessary theory and energy level diagram, explain the working of a He-Ne Laser. Write its applications 10M
7. a) Derive the expressions for Critical angle and Acceptance angle in an optical fiber? 5M
b) Describe the function of Multimode Step Index optical fiber along with its refractive index profile. 5M
c) Calculate the Fractional refractive index change and Numerical aperture of an optical fiber with refractive indices of core and cladding as 1.563 and 1.498 respectively. 4M
8. a) Why nanomaterials exhibit different properties? Explain 6M
b) How the physical and chemical properties of nano-particles vary with their size? Explain 5M
c) Mention the important applications of nanomaterials in medicine 3M

Code: 1G511

B.Tech. I Year Supplementary Examinations May 2018

Engineering Mechanics

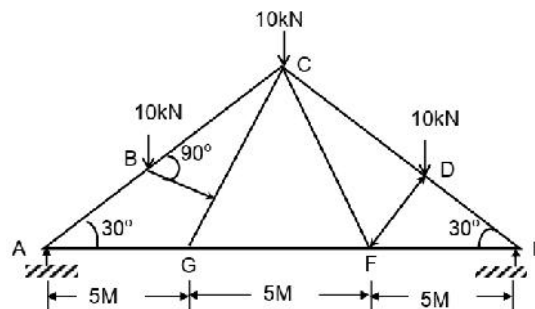
(Common to CE & ME)

Max. Marks: 70

Time: 3 Hours

Answer any **five** questionsAll Questions carry equal marks (**14 Marks** each)

1. a) State and prove Lamis theorem
b) The greatest and least resultants of two forces P and Q are 17 and $\sqrt{149}^3\text{N}$ respectively. Determine the angle between them when their resultant is $\sqrt{149}^3\text{N}$
2. a) Prove that two couples whose moments are equal and opposite, balance each other
b) A uniform beam 4.8M long and weighing 15kN rests on two supports. The maximum weight which can be hung of one end without upsetting the beam is 25kN. Find the position of the support nearest to the weight
3. Use method of joints to determine stresses in all the members of the truss shown in figure below



4. a) State the laws of rolling friction.
b) A body weighing 100N is lying on a rough horizontal plane. What push applied to the body at an angle of 30° to the horizontal will be able to just move the body.
5. a) Determine the centroid of a semicircle.
b) The sides of a uniform triangular lamina are 8cm, 6cm and 10cm long determine the distance of C.G. from the greatest give.
6. a) State the theorem of parallel axes and prove the theorem.
b) A girder of I-shape cross section has equal flanges each 12cmX2cm connected by a web 20cmX20cmX2cm. Determine the moment of inertia about its centroidal axis which is parallel to the flanges.
7. a) Establish with usual notations the formula $V=4+ft$.
b) The speed of an electric train is reduced from 60kM an hour to 50kM an hour while travelling a distance of 100kM. Find how you much further it will travel before coming to rest.
8. a) What do you mean by Kinetic energy and Potential energy?
b) Find the work done is pulling over another nine bricks originally lying flat on the ground. If the mass of each brick is 5Kg and thickness of each brick is 80mm.

Hall Ticket Number :

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R-11 / R-13

Code: 1GC13

B.Tech. I Year Supplementary Examinations May/June 2018

Engineering Chemistry

(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

Answer any **five** questions

All Questions carry equal marks (**14 Marks** each)

1. a) Describe conversion of hard water into soft water by ion exchange method along with neat diagram. 7M
b) An sample of water on analysis containing the following salts in mg/lit, $MgSO_4$: 6.0, $Mg(HCO_3)_2$: 2.0, $Ca(HCO_3)_2$: 12.2, $CaCl_2$: 8.0. Calculate carbonate and noncarbonated hardness in ppm units. 7M
2. Write the following in detail
(a) Conductometric titrations (b) $H_2 - O_2$ fuel cell 14M
3. a) What is corrosion? Explain electrochemical corrosion in detail. 7M
b) Write the factors influencing corrosion reaction in detail 7M
4. a) What are plastics how they are classified? Write the difference between Thermoplastics and thermosetting plastics. 8M
b) Explain preparation properties and application of Silicone rubber. 6M
5. a) Define explosives? How they are classified? What are the precautions to be taken during storage? 8M
b) What are lubricants? Write the functions of lubricants 6M
6. a) For one component system, the triple point is an invariant system? Discuss 7M
b) Discuss the number of phases, components and degree of freedom in the two component (Lead - Silver) System. 7M
7. a) Explain analysis of flue gas by Orsat's apparatus with neat diagram. 9M
b) Define fuel? Write the characteristics of good fuel. 5M
8. a) Explain setting and hardening of cement with suitable reactions? 7M
b) Define Refractories? How they are classified give suitable examples. 7M
