Hall Ticket Number :										

R-15

Code: 5G121

I B.Tech. II Semester Supplementary Examinations May/June 2019

C Programming and Data Structures

(Common to All Branches)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) What is meant by a pointer? Write a program to swap the values of two variables using pointers. 7M

   b) Write a program to show the usage of pointer to structure. 7M

OR

2. a) Demonstrate the use of &(address of) and *(value at address) operators 7M

   b) Write a program to show a function returning pointer. 7M

UNIT–II

3. a) What is a structure? Explain the syntax of Structure declaration with example 7M

   b) How Selection sort is different from bubble sort? 7M

OR

4. a) Define Union. Explain its general syntax with one example. 7M

   b) Arrange the following integers in ascending order using Merge sort procedure. 39,48,62,18,23,34,58,12. 7M

UNIT–III

5. a) Explain stack with basic Operations (push and pop). 7M

   b) Design the procedure to count number of parenthesis in an expression using Stack. 7M

OR

6. Compare Linear Queue and Circular Queue. Write a program to insert and delete from a circular queue. 14M

UNIT–IV

7. Implement Insertion, Deletion and search operations at any position in a singly linked list. 14M

OR

8. a) Write insertion and deletion functions for the doubly linked list. 7M

   b) Summarize Circular Linked List 7M

UNIT–V

9. a) Construct a Binary tree T by using the following in order and post order traversals of T.

   In order: D K I B A E G H J F C

   Post Order: K D I E A G B F C J H. 7M

   b) Explain various methods of representing graphs in memory. 7M

OR

10. What is Binary Search Tree (BST)? How do we do search in BST? Write a procedure for insertion and deletion operations on BST. 14M

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Hall Ticket Number :										

R-15

Code: 5G522

I B.Tech. II Semester Supplementary Examinations May/June 2019

Engineering Graphics –II

(Common to CE and ME)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. Draw the projections of a cone, base 75mm diameter and axis 100mm long, lying on the HP on one of its generators with the axis parallel to the VP. 14M

OR

2. A pentagonal pyramid 30 mm side of base and axis 75mm long is resting on one of its base corner on H.P. Draw its projections, when its axis is inclined at 45^0 to H.P and 30^0 to V.P. 14M

UNIT–II

3. A hexagonal prism of base side 30 mm and axis length 60 mm is resting on HP on one of its bases with two of the vertical faces perpendicular to VP. It is cut by a plane inclined at 60^0 to HP and perpendicular to VP and passing through a point at a distance 12 mm from the top base. Draw its front view, sectional top view and true shape of section. 14M

OR

4. A cone, diameter of base 40 mm and axis 55 mm is resting on its base on the HP. It is cut by a section plane perpendicular to the VP and inclined at 75^0 to the HP. The section plane passes through the apex. Draw the sectional top view and also obtain the true shape of the cut section. 14M

UNIT–III

5. A hexagonal prism of side of base 30 mm and axis 70 mm long is resting on its base on HP. such that a rectangular face is parallel to V.P. It is cut by a section plane perpendicular to V.P. and inclined at 30^0 to HP. The section plane is passing through the top end of an extreme lateral edge of the prism. Draw the development of the lateral surface of the cut prism. 14M

OR

6. Draw the development of the lateral surface of the frustum of the square pyramid of side of base 30 mm and axis 40 mm, resting on HP with one of the base edges parallel to V.P. It is cut by a horizontal cutting plane at a height of 20 mm. 14M

UNIT–IV

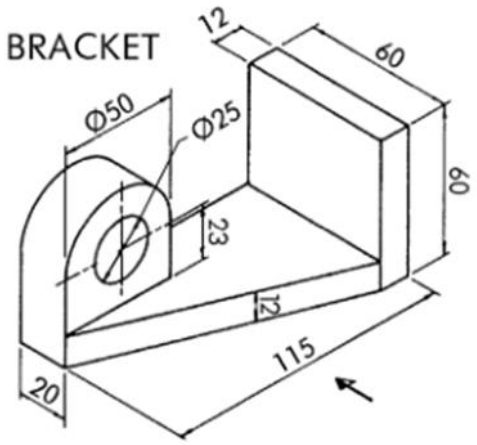
7. Draw the isometric view of a pentagonal prism of base 60mm side, axis 100 mm long and resting on its base with a vertical face perpendicular to V.P. 14M

OR

8. Draw the isometric view of a square prism with the side of the base 40mm and length of the axis 70mm. when its axis is i) vertical ii) horizontal. 14M

UNIT–V

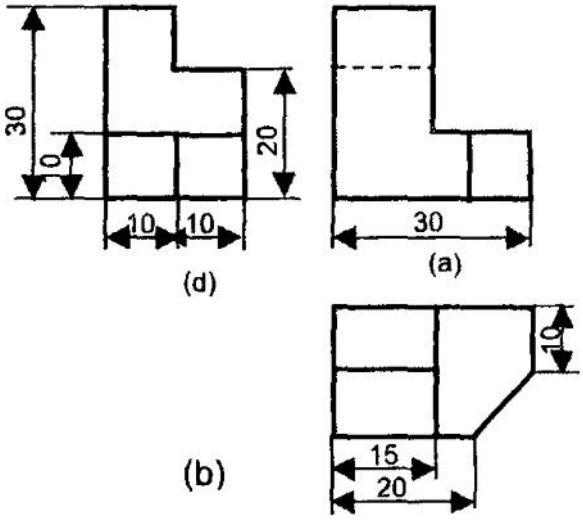
9. Draw the front view, top view and left side view for the following figure



14M

OR

10. Draw the isometric view for the following figure



14M

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Hall Ticket Number :										

R-15

Code: 5G521

I B.Tech. II Semester Supplementary Examinations May/June 2019

Engineering Mechanics - Dynamics

(Common to CE and ME)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. A particle moves along a horizontal path with a velocity of v = ($3t^2$ - 6t) mis, where t is the time in seconds. If it is initially located at the origin 0, determine the distance traveled in 3.5 s, and the particle's average velocity and average speed during the time interval.

OR

2. The pitching machine is adjusted so that the baseball is launched with a speed of v_A = 30 m/s. If the ball strikes the ground at B (Fig.1), determine the two possible angles θ_A at which it was launched.

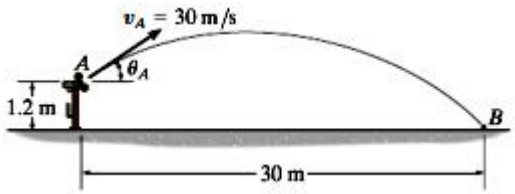

Fig.1

UNIT–II

3. a) Discuss the rigid body translation.

   b) A boy drops a stone from the top of well vertically downwards into it. The splash is heard by him after 6 seconds. Find the well depth by taking sound velocity as 400 m/s.

OR

4. The angular position of the rod OA (Fig.2) varies with time as $\theta = -4t^2+24t-10$, where θ is in radians and t is in seconds. Determine

   (a) the angular velocity and the angular acceleration of the rod at t = 4 s; and

   (b) the total angle turned through by the rod between t = 0 and t = 4 s.

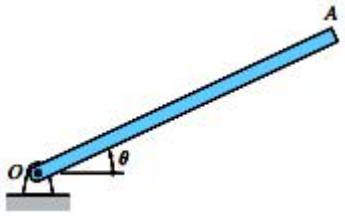

Fig.2

UNIT–III

5. The 12-kg mass A in Fig. 3 slides with negligible friction in a semicircular trough of radius R = 2 m. The mass is launched at $\theta = 30^0$ with the velocity v_0 = 4 m/s toward the bottom of the trough. Derive the following as functions of θ: (1) the speed of the mass; and (2) the contact force between the mass and the trough.

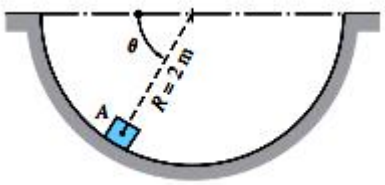

Fig.3

OR

6. A force of F = 15 kg is applied to the cord as shown in Fig.4. Determine how high the 30 kg block A rises in 2 s starting from rest. Neglect the weight of the pulleys and cord.

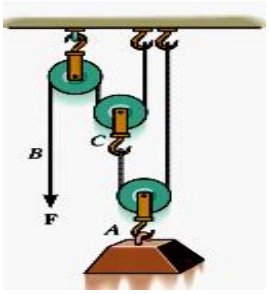

Fig.4

UNIT-IV

7. In Fig.5, if the coefficient of kinetic friction between the 100-kg crate and the plane μ_k=0.25, determine the compression x of the spring required to bring the crate momentarily to rest. Initially the spring is un-stretched and the crate is at rest.

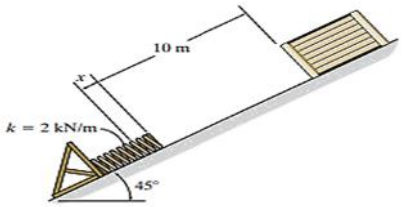

Fig.5

OR

8. a) Discuss conservation of momentum

   b) Explain impact of jet on vane

UNIT-V

9. The 100 kg wheel has a radius of gyration about its center 0 of k_o = 500 mm (Fig.6). If the wheel starts from rest, determine its angular velocity in t = 3 s.

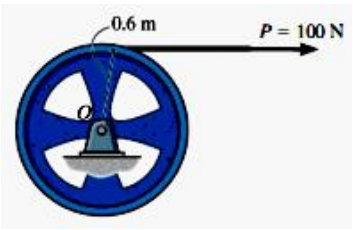

Fig.6

OR

10. Discuss equations of motion for rotational motion of a rigid body.

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Hall Ticket Number :										

R-15

Code: 5GC24

I B.Tech. II Semester Supplementary Examinations May 2019

Engineering Mathematics-II

(Common to All Branches)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. Change the order of integration in $\int_0^{\infty}\int_{x^2}^{2-x} xy\, dy\, dx$ and hence evaluate the same. 14M

OR

2. a) Find the area of a plane in the form of a quadrant of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$. 7M

   b) Evaluate $\int_0^{\frac{\pi}{2}}\int_0^{a\sin\theta}\int_0^{\frac{a^2-r^2}{a}} r\, dz\, dr\, d\theta$. 7M

UNIT–II

3. a) Evaluate $\int_0^{\infty} e^{-t}\left(\frac{\cos at-\cos bt}{t}\right) dt$. 7M

   b) Find the Laplace transform $\int_0^t \frac{e^t \sin nt}{t}\, dt$. 7M

OR

4. a) Find $L^{-1}\left\{\frac{s^2}{(s^2+a^2)(s^2+b^2)}\right\}$ by convolution theorem. 7M

   b) Find $L^{-1}\left\{\frac{(s^2+a^2)^2}{s^5}\right\}$ 7M

   $L^{-1}\left\{\frac{}{(s^2+b^2)}\right\}$

   $L^{-1}\left\{\frac{}{s^4+4a^4}\right\}$.

UNIT–III

5. Solve $(D^2+9)x=\cos 2t$ using Laplace transform given that $x(0)=1, x\left(\frac{\pi}{2}\right)=-1$. 14M

OR

6. Solve $y''-3y'+2y=4t+e^{3t}, y(0)=1, y'(0)=1$. 14M

UNIT–IV

7. a) Find a unit vector normal to the surface $xy^3z^2=4$ at the point $(-1,-1,2)$. 7M

   b) If **A** and **B** are irrotational, prove that $\vec{A}\times\vec{B}$ is solenoidal. 7M

OR

8. Evaluate the line integral $\int_c (xy+x^2)dx+(x^2+y^2)dy$, where c is the square formed by the lines $y=\pm 1$ and $x=\pm 1$. 14M

UNIT–V

9. Verify Green's theorem for $\int_c[(3x^2-8y^2)dx+(4y-6xy)dy]$, where C is bounded by the region $x=0, y=0$ and $x+y=1$. 14M

OR

10. Verify Stoke's theorem for $\vec{f}=(x^2+y^2)\vec{i}-2xy\vec{j}$ taken around the rectangle bounded by the lines $x=\pm a, y=0, y=b$. 14M

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Hall Ticket Number :										

R-15

Code: 5GC23

I B.Tech. II Semester Supplementary Examinations May/June 2019

Engineering Physics

(Common to CE, ME, CSE and IT)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Explain the process of induced absorption, spontaneous emission and stimulated emission. Obtain an expression for energy density of radiation under equilibrium conditions in terms of Einstein A & B Coefficients. 8M

   b) In a Newton's rings experiment the diameter of the 15 ring was found to be 0.59cm and that of the 5th ring is 0.336 cm. If the radius of curvature of the lens is100 cm, find the wave length of the light. 6M

OR

2. a) Explain the construction and working of semiconductor laser 7M

   b) Describe the principle on which optical fiber works and obtain an expression for numerical aperture. 7M

UNIT–II

3. a) What are Miller Indices? Obtain an expression for inter planar spacing in terms of Miller indices 8M

   b) Describe in detail how a flaw in solid material is detected by non destructive method using ultrasonics. 6M

OR

4. a) Define Packing factor. Calculate the packing factor of BCC and FCC 8M

   b) Draw the following planes in a cubic unit cell (0 1 1), (1 0 2) and (1 3 2) 6M

UNIT–III

5. a) State Heisenberg uncertainty principle. Based on the principle, prove that free electrons cannot exist inside the nucleus of an atom 7M

   b) Mention the assumptions of classical free electron theory. Based on classical free electron theory derive the expression for electrical conductivity of a metal. 7M

OR

6. a) Assuming the time independent Schrodinger wave equation in one dimension, discuss the solution of a particle in one dimensional potential well of infinite height. Hence obtain the normalized wave function. 10M

   b) Find the temperature at which there is 1% probability that a state with an energy 0.5eV above Fermi energy is occupied. 4M

UNIT–IV

7. a) What is Hall effect? Obtain an expression for the Hall coefficients. 8M

   b) Discuss Magnetic vehicles and SQUIDS. 6M

OR

8. a) What is Meissner effect? Discuss type I and type II superconductor with examples. 7M

   b) Discuss how Cooper pairs are formed? What is the importance of Cooper pairs in superconductivity? 7M

UNIT–V

9. a) What are ferromagnetic materials? Discuss the hysteresis of a ferromagnetic material 7M

   b) Explain the synthesis of nanomaterials using chemical vapour deposition. 7M

OR

10. a) What are Hard and Soft magnetic materials? Compare them on the basis of hysteresis curves. Give three examples of each type. 8M

    b) What are nano materials? Explain the structure and properties of carbon nonotubes. 6M

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