Hall Ticket Number :										

R-15

Code: 7G245

II B.Tech. II Semester Supplementary Examinations February 2022

Electrical and Electronics Engineering

(Mechanical Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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Marks

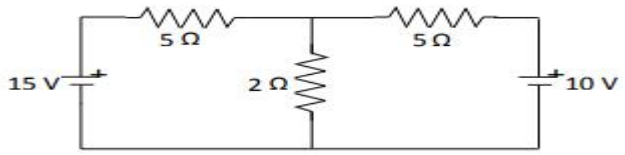
UNIT–I

1. a) State ohm's law and its limitations. 7M

   b) Define (i) Unilateral & Bilateral elements (ii) Active & Passive elements with examples. 7M

OR

2. a) Find the current through 2Ω resistance in the below circuit by using Kirchhoff's Laws.



6M

   b) Define the following terms 1. Voltage 2. Current 3. Power 4. Energy 8M

UNIT–II

3. a) Write shorts notes on the types of dc Generators. 8M

   b) A separately excited dc generator running at 1500 rpm supplies 250 A at 125 V to a circuit of constant resistance. What will be the current when the speed is dropped to 1200 rpm with the field current unaltered? The armature resistance is 0.05Ω and the total drop at the brushes is 1.5 V. Ignore armature reaction 6M

OR

4. a) Explain the different types of dc motors with neat sketch. 4M

   b) Derive the torque equation of DC motor 10M

UNIT–III

5. a) Explain torque slip characteristics of a three phase induction motor 7M

   b) A 250 KVA, single phase transformer has 98.135% efficiency at full load and 0.8 lagging p.f. The efficiency at half load and 0.8 lagging p.f. is 97.751%. Calculate the iron loss and full load copper loss. 7M

OR

6. a) Define voltage regulation of transformer 4M

   b) Explain in detail about of Brake Test on 3- φ induction motor. 10M

UNIT–IV

7. a) Define ripple factor and Voltage regulation. 4M

   b) Explain the operation of full wave rectifiers with relevant waveforms 10M

OR

8. a) Explain how you will obtain the static characteristics of common emitter configuration 7M

   b) Explain the working of CE configuration of a BJT and draw its input, output characteristics. 7M

UNIT–V

9. a) What is induction heating 7M

   b) Enumerate the applications of induction heating. 7M

OR

10. Explain how Voltage, Frequency and Phase difference is measured using CRO with wave forms. 14M

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Hall Ticket Number :										

R-15

Code: 5G543

II B.Tech. II Semester Supplementary Examinations February 2022

Kinematics of Machinery

(Mechanical Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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		Marks	CO	Blooms Level

UNIT–I

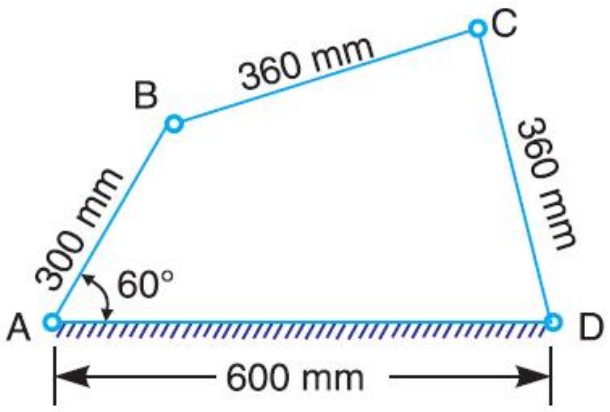
1. What do you mean by inversion of mechanism? Explain with sketches all inversions of quadric cycle chain. 14M

OR

2. Sketch and describe the four bar chain mechanism. Why it is considered to be the basic chain? 14M

UNIT–II

3. In a pin jointed four bar mechanism, as shown in Fig, AB = 300 mm, BC = CD = 360 mm, and AD = 600 mm. The angle BAD = 60°. The crank AB rotates uniformly at 100 r.p.m. Locate all the instantaneous centres and find the angular velocity of the link BC.



14M

OR

4. An engine mechanism is shown in Fig. The crank CB = 100 mm and the connecting rod BA = 300 mm with centre of gravity G, 100 mm from B. In the position shown, the crankshaft has a speed of 75 rad/s and an angular acceleration of 1200 rad/s^2. Find:1. velocity of G and angular velocity of AB, and 2. acceleration of G and angular acceleration of AB.

14M

UNIT–III

5. Sketch the Hart's straight line motion mechanism and prove that the tracing point 'P' describes a straight line path. 14M

OR

6. Show with sketch how pantograph is used to trace the path to a larger or smaller scale of a given path. 14M

UNIT–IV

7. Calculate (i) length of path of contact, (ii) arc of contact and (iii) the contact ratio when a pinion having 23 teeth drives a gear having teeth 57. The profile of the gears is involute with pressure angle 20^o, module 8 mm and addendum equal to one module. 14M

OR

8. Two mating gears with 6 mm module have 30 teeth and 75 teeth. The addendum is standard one module. Pressure angle is 20^o. Find: i) pitch diameters, ii) center distance iii) length of path of contact, iv) length of arc of contact and v) contact ratio. 14M

UNIT–V

9. Draw the displacement, velocity and acceleration diagrams for a follower when it moves with simple harmonic motion. Derive the expression for velocity and acceleration during outstroke and return stroke of the follower. 14M

OR

10. Draw the displacement, velocity and acceleration diagrams for a follower when it moves with uniform acceleration and retardation. Derive the expression for velocity and acceleration during outstroke and return stroke of the follower. 14M

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Hall Ticket Number :										

R-15

Code: 5GC42

II B.Tech. II Semester Supplementary Examinations February 2022

Probability and Statistics

(Common to CE, ME & CSE)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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UNIT–I

1. a) If $P(A)=\frac{1}{4}$, $P(B)=\frac{1}{3}$ and $P(A\cup B)=\frac{1}{2}$ then evaluate $P(A/B)$, $P(B/A)$, $P(A\cap B')$ and $P(A/B')$ 8M

   b) State and prove Addition theorem on probability for three events. 6M

OR

2. a) State and prove Baye's theorem. 8M

   b) A card is drawn from a well shuffled deck of 52 playing cards. What is the probability of drawing a red king (ii) 3, 4, 5 or 6 (iii) black card. 6M

UNIT–II

3. a) Find the continuous probability function $f(x)=k\,x^2\,e^{-x}$ when $x\geq 0$ find (i) k (ii) mean (iii) variance 7M

   b) A hospital switch board receives an average of 4 emergency calls in a 10 minute interval. What is the probability that
   (i) There are at most 2 emergency calls in a 10 minute interval
   (ii) There are exactly 3 emergency calls in a 10 minute interval 7M

OR

4. a) If a random variable has a poisson distribution such that P (1) = P(2) find (i) Mean of the distribution,(ii) P(4),(iii) $P(x\geq 1)$,(iv) $P(1<x<4)$ 7M

   b) In a normal distribution, 7% are under 35 and 89% are under 63. Find the mean and the standard deviation of the distribution. 7M

UNIT–III

5. A random sample of size 81 taken whose variance is 20.25 and mean is 32, construct 98% confidence interval 14M

OR

6. A population consists of the five numbers 2, 3, 6, 8, 11. Consider all possible samples of size 2 which can be drawn with replacement from this population. Find the population mean and standard deviation, and mean and standard deviation of the sampling distribution of means. 14M

UNIT–IV

7. An ambulance services claims that it takes on the average less than 10min to reach its destination in emergency calls. A sample of 36 calls has a mean of 11 min and the variance of 16 min. test the significance 0.05 level. 14M

OR

8. A die is thrown 9000 times and of these 3220 yielded a die is thrown 9000 times and of these 3220 yielded a or 4. i.e., this is consistence with the hypothesis is that die was unbiased. 14M

UNIT–V

9. The number of automobile accidents per week in a certain community are as follows 12, 8, 20, 2, 14, 10, 15, 6, 9, and 4. Are these frequencies in agreement with the belief that accident conditions were the same during this 10 week period 14M

OR

10. 200 digits were choose at random from a set of tables. The frequencies of the digits are shown below

Digit	0	1	2	3	4	5	6	7	8	9
Frequency	18	19	23	21	16	25	22	20	21	15

Use the chi-square test to assess the correctness of the hypothesis that the digits were distributed in equal number in the tables from which these were chosen. 14M

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