Hall Ticket Number :										

R-11 / R-13

Code: 1G237

II B.Tech. I Semester Supplementary Examinations November 2019

Electrical Engineering and Electronics Engineering

(Mechanical Engineering)

Max. Marks: 70 Time: 3 Hours

Answer any **five** questions

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

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1. a) Define ohm's law and Kirchhoff's laws 4M

   b) Calculate total resistance between ab terminals of fig 1 using star-delta and delta-star transformations.

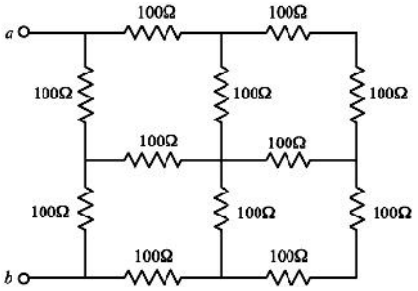

Fig 1 10M

2. a) Derive emf equation for DC Generator. 8M

   b) An 8 Pole, Lap Wound armature rotated at 350 rpm is required to generate 260V.The useful magnetic flux per pole is 0.05Wb.if the armature has 120 slots. Calculate the number of conductors per slot. 6M

3. Explain Principle of operation of single phase transformers & define the voltage regulation of transformer 14M

4. a) Explain the Principle of operation of Alternator. 7M

   b) Explain the principle of operation of Three phase Induction Motor. 7M

5. Explain half wave, full wave and bridge rectifier along with input & output waveforms 14M

6. a) Explain working of PNP & NPN transistors 8M

   b) Explain SCR Characteristics and its applications. 6M

7. Explain the concept of Induction Heating and also discuss about various Industrial Applications of Induction Heating. 14M

8. Explain the working and function of each block of CRO with the help of neat diagram 14M

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Hall Ticket Number :										

R-11 / R-13

Code: 1G534

II B.Tech. I Semester Supplementary Examinations November 2019

Machine Drawing

(Mechanical Engineering)

Max. Marks: 70 Time: 4 Hours

Section-I

Answer any Two of the following **2X4=8M**

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1 Sketch the conventional representation of the following materials

(a) Spur Gear

(b) Concrete

2 Sketch the following thread profiles for a nominal diameter of 25mm and pitch 3mm.

(a) Whitworth thread

(b) Square thread

3 With a suitable example, Sketch the following

(a) Revolved Section

(b) Half section

Section-II

Answer any two of the following **2X10=20M**

4. Draw the three views of a hexagonal headed bolt of nominal diameter 25mm and length 100mm with a hexagonal nut and washer?

5. Draw sectional view from the front and the view from above of Single riveted lap joint riveted joints to join plates of thickness 10mm?

6. Draw

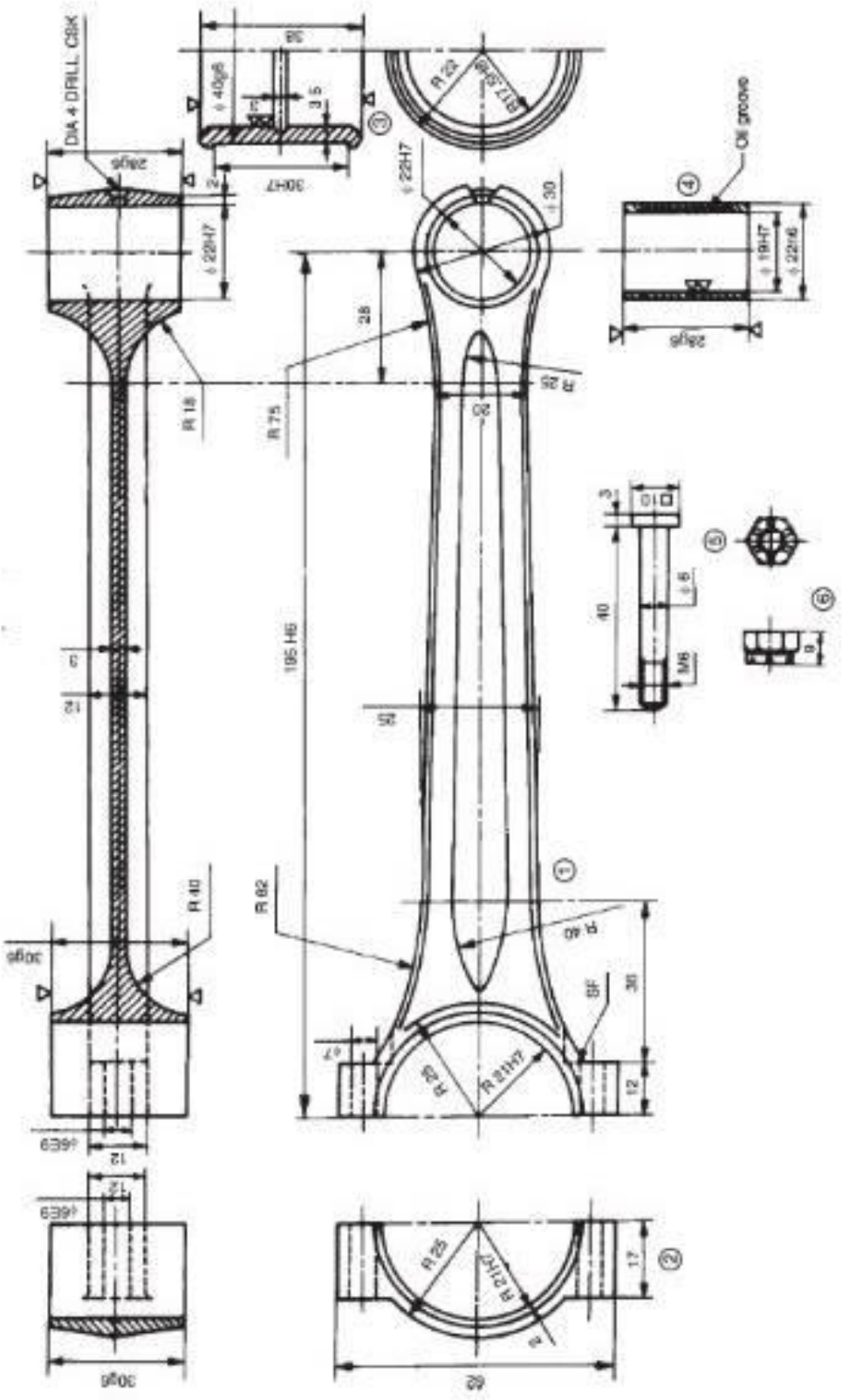
(a) Half sectional view from the front with left half in section and

(b) View from above of a solid journal bearing suitable for supporting a shaft of diameter 25mm.

Section-III

Answer the following question **1X42=42M**

7. Details of Petrol Engine connecting rod are shown in figure. Assemble all parts and draw:
   i) Front view
   ii) Sectional plan
   iii) Right side view



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Hall Ticket Number :										

R-11 / R-13

Code: 1GC31

II B.Tech. I Semester Supplementary Examinations November 2019

Mathematics-II

(Common to CE & ME)

Max. Marks: 70 Time: 3 Hours

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

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1. Find the Eigen values and eigenvectors of the matrix $\begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$ 14M

2. Express $f(x) = x$ as half range sine and cosine series in $0 < x < 2$ 14M

3. a) Form a partial differential equation by eliminating the arbitrary constants $z = ax + by + a^2 + b^2$. 7M

   b) Form a partial differential equation by eliminating the arbitrary functions $f(x)$ and $g(y)$ from $z = y\,f(x) + x\,g(y)$. 7M

4. Using Lagrange is interpolation formula find the value of $f(10)$ from the following table

x	5	6	9	11
y	12	13	14	16

14M

5. Apply Runge –Kutta method to find an approximate value of y for $x = 0.2$ in step of 0.1 if $\frac{dy}{dx} = y^2 + x$, given that $y = 1$, when x=0. 14M

6. Evaluate $\int_0^6 \frac{1}{1+x}\,dx$ by using

   (i) Trapezoidal rule , ii) Simpson's 1/3 rd rule, iii) Simpson's 3/8 rd rule 14M

7. If $f(z)$ regular function of z, prove that $\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right)\left|f(z)\right|^2 = 4\left|f'(z)\right|^2$ 14M

8. Evaluate $\int_c \frac{e^{2z}}{(z-1)(z-2)}\,dz$ with C: $|z| = 3$ using Cauchy's Integral Formula 14M

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Hall Ticket Number :										

R-11 / R-13

Code: 1G531

II B.Tech. I Semester Supplementary Examinations November 2019

Mechanics of Solids

(Mechanical Engineering)

Max. Marks: 70 Time: 3 Hours

Answer any **five** questions

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

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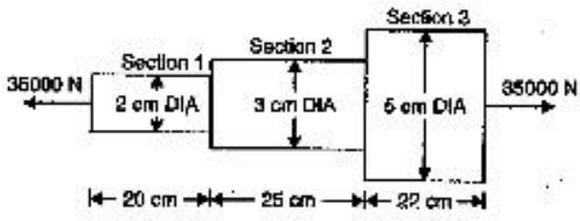
1. a) Draw the stress-strain diagram of mild steel specimen subjected to tensile test and explain the salient points. 7M

   b) An axial pull of 35000N is acting on a bar consisting of three lengths as shown in Fig.1.If the Young's modulus=2.1X 10^5 N/mm^2, determine:

   (i)stresses in each section and (ii)total extension of the bar.



   7M

2. a) Define the following :

   i. Beam ii. Bending Moment. iii. Shear force. iv. Point of contraflexure. 7M

   b) A cantilever beam of length 2m carries an uniformly distributed load of 3KN/m over a length of 1.5m from its fixed end and a point load 5 KN at its free end. Draw the shear force and bending moment diagrams. 7M

3. A square beam 20 mm x 20 mm in section and 2 m long is supported at the ends. The beam fails when a point load of 400 N is applied at the centre of the beam. What uniformly distributed load per metre length will break a cantilever of the same material 40 mm wide, 60 mm deep and 3 m long? 14M

4. A circular beam of 105 mm diameter is subjected to a shear force of 5kN. Calculate: (i) average Shear stress, and (ii)maximum shear stress. Also sketch the variation of the shear stress along the depth of the beam. 14M

5. a) Derive the equation for a circular shaft subjected to torque $T/J=q/r=N_\theta/l$. 7M

   b) A solid steel shaft has to transmit 75. KW at 200 r.p.m. Taking allowable shear stress as 70 N/mm^2, find suitable diameter for the shaft, if the maximum torque transmitted at each revolution exceeds the mean by 30%. 7M

6. a) Derive the differential equation of the deflection curve of beam. 5M

   b) A simply supported beam of length 5m, which is carrying a point Load of 5 KN at a distance of 3m from the left end. Determine: (i) slope at the left support, (ii) deflection under the load and (iii)maximum deflection of beam. Take E ;2x10^5 N/mm^2 and I = 1 X10^8mm^4.. 9M

7. a) Explain the assumptions made in Euler's column theory. 5M

   b) A column of timber section 10 cm x 15 cm is 5m long both ends being fixed. If the Young's modulus for timber = 17.5 KN/mm^2, determine:

   (i) Crippling load, and. (ii) Safe load for the column if factor of safety =. 3. 9M

8. A steel tube of 200 mm external diameter is to be shrunk to another tube of 60 mm internal diameter. The diameter at the junction after shrinking is 120 mm. Before shrinking on, the difference of diameters at the junction is 0.08 mm. Calculate the radial

   Pressure at the junction and the hoop stresses developed in the two tubes after shrinking on. Take E as 2X 10^5 N/mm^2. 14M

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Hall Ticket Number :										

R-11 / R-13

Code: 1G533

II B.Tech. I Semester Supplementary Examinations November 2019

Thermodynamics

(Mechanical Engineering)

Max. Marks: 70 Time: 3 Hours

Answer any **five** questions

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

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1. a) Classify thermodynamics systems with a suitable example for each. 8M

   b) What do you understand by macroscopic and microscopic viewpoints? Explain. 6M

2. Explain clearly the difference between a non-flow and a steady flow process. Derive Steady Flow Energy Equation for Turbine. 14M

3. a) An engine operating on a Carnot cycle works with in temperature limits of 600 K and 300 K. If the engine receives 2000 KJ of heat, evaluate the work done and thermal efficiency of the engine. 6M

   b) What is second law of thermodynamics? State its corollaries. 8M

4. a) Calculate the entropy change of the universe as a result of the following processes: i) A copper block of 600 grams mass and with Cp of 150 J/kg-K at 100^0C is placed in a lake at 8^0C. ii) Two such blocks at 100^0C and 0^0C are joined together. 8M

   b) Using Maxwell's relations deduce the two Tds equations 6M

5. a) What is a pure substance? Draw and explain P-T diagram for pure substance. 6M

   b) Find the internal energy of 1 kg of steam at 20 bar when i) it is superheated, its temperature being 400 ^{0}C ii) it is wet dryness being 0.9 8M

6. A vessel of capacity $3m^3$ contains 1 kg mole of N_2 at 90°C.

   i) Calculate pressure and the specific volume of the gas. ii) If the ratio of specific heats is 1.4, evaluate the values of C_0 and c_v. iii) Subsequently, the gas cools to the atmospheric temperature of 20°C; evaluate the final pressure of gas. iv) Evaluate the increase in specific internal energy, increase in specific entropy and magnitude and sign of heat transfer. 14M

7. a) An ideal-gas mixtures consists of 10 percent hydrogen, 50 percent oxygen and 40 percent carbon monoxide by weight. Calculate the volumetric analysis in percent. 8M

   b) A gas mixture consists of 0.4 kg CO, 1.1 kg of CO_2 and1.5 kg of N_2. Determine i) Mass fraction of each component .ii) Mole fraction of each component. iii) Average molar mass of the mixture.iv) Gas constant of the mixture. 6M

8. a) With the help of P-V and T-S diagrams explain OTTO cycle and derive an expression for air standard efficiency. 8M

   b) A diesel engine has a compression ratio of 14 and cut-off takes place at 6% of the stroke. Find the air standard efficiency. 6M

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