Sub- Mechatronics
Branch - Automobile Engg.

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1. **Answer all the questions.** **[2x5]**

(a) What is Mechatronics ?
(b) What is proximity sensor ?
(c) Which device is used for measurement of angular velocity ?
(d) Write specification and control of stepper motor.
(e) What is actuator ?

2. Answer any two. [5x2]

(a) Discuss briefly the mechanical system building block.
(b) What is light sensor and explain.
(c) What is DC Servomotor ? Explain it with proper circuit diagram.

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Sub- Energy Conversion-I
Branch - Electrical Engg.

Answer any two. **[10x2]**

1. Derive E.M.F. equation of D.C. generator ?
2. Why parallel operation D.C. generator required ? How parallel operation of generator is made ?
3. A shunt generator has a full load current of 196A at 220V. The stray losses are 720 watt and shunt field resistance 55Ω. If it has a full load efficiency of 88%, Find the armature resistance. Also find the load current corresponding to maximum efficiency.

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Sub- Digital Electronics
Branch - Electrical Engg.

Answer any two. **[10]**

1.a) Convert decimal to binary number.

$(26)_{10}$ $(0.75)_{10}$

b) Convert the following binary number to their octal equivalent.

$(10010111)_2$ $(0.0110101)_2$

2. Subtract 9-8 using 2'S compliment method. **[10]**

3. Add 917 to 215 using BCD addition. **[10]**

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Sub- Theory of Machine
Branch - Mechanical Engg.

Answer all multiple choice. **[2x10]**

1. A link must be a
   (a) Resistant body (b) Rigid body
   (c) Rigid as well as resistant (d) None
2. Flat belt running over a pulley forms
   (a) Closed pair (b) Open pair
   (c) Spherical pair (d) Circular pair
3. The relation between no. of links (l) and no. of pairs (P) is given as
   (a) l = 2p-1 (b) l = 2p-4
   (c) p=2l-2 (d) p=2l-1
4. The tension produced in the belt by centrifugal force
   (a) $\frac{wu^2}{g}$ (b) $\frac{wu^2}{2g}$ (c) $\frac{2wu^2}{g}$ (d) $\frac{1}{2}x\frac{u^2}{2g}$
5. For maximum power transmission the velocity of belt should be
   (a) $\sqrt{\frac{Tm}{3w}}$ (b) $\sqrt{\frac{Tw}{3m}}$ (c) $\sqrt{\frac{Tmg}{3w}}$ (d) $\sqrt{\frac{Tmg}{w}}$
6. In case of journal bearing frictional torque is expressed as
   (a) T =μw.r (b) $T=\frac{W.r}{\mu}$ (c) $T=\frac{\mu.w}{r}$ (d) $T=\frac{\mu.r}{w}$
7. Sensitiveness of Governor is given by relation
   (a) $\frac{W_1-W_2}{W}$ (b) $\frac{W_1+W_2}{W}$ (c) $\frac{W_1W_2}{W}$ (d)) $\frac{N_1+N_2}{N}$
8. The unit of whirling speed is
   (a) Cycles/s (b) Meters/s (c) Revolutions/s (d) Cycles/m
9. The watt Governor is only suitable for a speed not exceeding
   (a) 200 r.p.m. (b) 500 r.p.m. (c) 75 r.p.m. (d) 300 r.p.m.
10. The maximum of a screw jack is given by relation
    (a) $\frac{1+\sin\theta}{1-\sin\theta}$ (b) $\frac{1-\sin\theta}{1+\sin\theta}$ (c) $\frac{1+\cos\theta}{1-\cos\theta}$ (d) $\frac{1+\sin\theta}{1-\cos\theta}$

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Sub- Electrical Measurement & Measuring Instrument
Branch - Electrical Engg.

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1. Answer all questions [2x5]

a) Define accuracy and precision ?

b) Define controlling torque ? Write its type ?

c) What do you mean by damping torque ? Write its type ?

d) Proof that T_d = BINA for pmmc instrument ?

e) What do you mean by multiplication factor ?

2. Answer any two [5x2]

a) Explain the construction and working principle of pmmc instrument with the help of a neat diagram ?

b) Explain the construction and working principle of moving iron attraction type instrument ?

c) A moving coil ammeter has a fixed shunt of 0.02&! with a coil circuit resistance of R=1k &! and need potential difference of 0.5v across it for full scale deflection.

1) to what total current does this correspond ?

2) Calculate the shunt to give full scale deflection when the total current is 10A & 75A ?

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Sub- Instrumentation & Control System
Branch - Electrical Engg.

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1. Answer all questions [2x5]

a) Define sensing element and transduction element ?

b) What do you mean by inverse transducer ? Give one example ?

c) Write the working formula of capacitive transducer ? Write it's type ?

d) Why delay line is used in CRO ?

e) Why aquadag coating is used in CRT ?

2. Answer any two. [5x2]

a) Explain the construction and working principle of LVDT ?

b) Explain the principle of operation of CRO with the help of block diagram ?

c) Derive gauge factor (G_f) = 1 + 2γ ?

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Sub- Heat Power Engg.
Branch - Automobile Engg.

Short questions : **[2x5]**

1. Classify the Gas turbines.
2. Describe the uses of Gas turbines.
3. Describe the necessity of air compressor.
4. Draw the centrifugal air compressor.
5. Draw the closed cycle Gas turbine.

Long Questions: **[5x2]**

1. A single stage reciprocating air compressor takes in 7.5 m^3/min of air at 1 bar and 30^0c and delivers it at 5 bar. The clearance is 5% of stroke. The expansion and compression are polytropic, n=1.3

   Calculate :

   i) The temperature of delivered air.
   ii) Volumetric efficiency.
   iii) Power of the compressor.

2. Air enters the compressor of a gas turbine plant operating on Brayton cycle at 1 bar and 27^0c. The pressure ratio in the cycle is 6. Calculate the maximum temperature in the cycle & cycle efficiency assume the turbine work as 2.5 times the compressor work. Take $\gamma = 1.4$.

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Sub- Soil Mechanics & Geotech. Engg.
Branch - Civil Engg.

Answer any two.

1. Describe the factors affecting the permeability of soil. [10]
2. Enumerate the assumptions of Terzaghi's theory of one dimensional consolidation. [10]
3. Write briefly about field compaction method. [10]

***** Best of Luck *****

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Sub- Estimating & Costing
Branch - Civil Engg.

Answer all the questions : [5x2=10]

1. Answer the following :

a) Abstract of estimates.

b) What is lump-sum item.

c) Measuring unit of wood work.

d) Measuring unit of D.P.C.

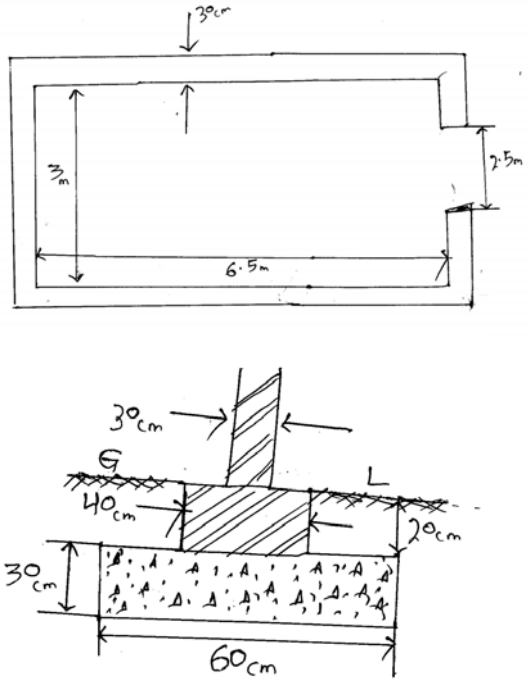
e) Actual size of standard modular brick.

2. Answer any two of the following questions using figures. [5x2=10]

a) Earthwork excavation in foundation.

b) Line concrete in foundation.

c) 1st class brick work in foundation.



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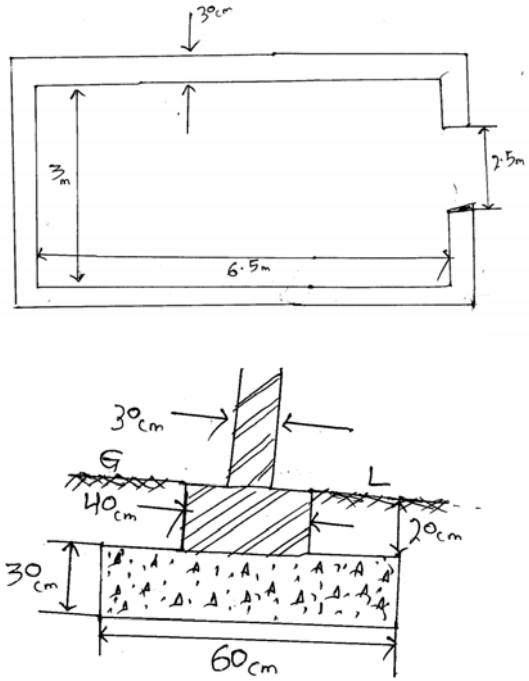

Sub- Irrigation Engg.
Branch - Civil Engg.

Answer all the questions : **[2x5]**

1.a) What is hydrograph ?
b) What is Dicken's & Ryve's formulae ?
c) What is field capacity ?
d) In an irrigation project, the base period of the crop is 5 week & the water requirement by the crop is 60 cm. Find the types of irrigation ?
e) What is irrigation ? Write the types of irrigation ?

Answer any two. **[5x2]**

2. Define the term duty ? Delta & base period & derive the relationship between them.
3. What do you mean by water logging ? State its effect.
4. Explain unit hydrograph briefly.

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Branch - Civil Engg.

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Sub- Water supply & Sanitary Engg.
Branch - Civil Engg.

Answer all the questions : **[2x5]**

1.a) What is per capita demand ?

b) What are the different types of methods of supply ?

c) What do you mean by BOD & COD ?

d) Write any two water borne diseases ?

e) What are the types of intake ?

Answer any two ? **[5x2]**

2. Write the different methods of forecasting population ? Estimate the population of tower by arithmetic & geometrical increase method for the year 2040.

Year	Population
1980	22600
1990	27900
2000	32800
2010	35900
2020	39700

3. Explain with neat sketches the construction & working principle of slow sand filter ?

4. Draw the flow sheet showing the different layouts of water treatment plant ?

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Sub- Analysis of structures
Branch - Civil Engg.

Answer all the questions. **[2x10]**

1. A member under compression is called as
   (a) Strut (b) Tie (c) Compression member (d) Tension member
2. A frame in which the no. of members less than 2j-3 is known as
   (a) Redundant (b) Perfect frame (c) Deficient frame (d)None
3. A simply supported beam carries a point load at its centre. The slope at its supports is
   (a) $\frac{wl^2}{16EI}$ (b) $\frac{wl^3}{16EI}$ (c) $\frac{wl^2}{48EI}$ (d) $\frac{wl^3}{48EI}$
4. Maximum deflection of a cantilever with u.d.l.w. is equal to
   (a) $\frac{wl^4}{2EI}$ (b) $\frac{wl^4}{3EI}$ (c) $\frac{wl^4}{8EI}$ (d) $\frac{wl^4}{16EI}$
5. The deflection at the centre of a propped cantilena of spam 'l' carrying a u.d.l. of w/length is
   (a) $\frac{wl^4}{48EI}$ (b) $\frac{wl^4}{96EI}$ (c) $\frac{wl^4}{128EI}$ (d) $\frac{wl^4}{192EI}$
6. A fixed beam AB of length 'l' is loaded with u.d.l. (W). The support moments are
   (a) $\frac{-wl^2}{8}$ (b) $\frac{-wl^2}{12}$ (c) $\frac{-wl^2}{24}$ (d) $\frac{-wl^2}{48}$
7. Fixing moment over a simply supported end is
   (a) Negative (b) Positive (c) Infinity (d) None
8. A column of length 'C' is hinged at both ends. Its equivalent length will be
   (a) 2l (b) l (c) 0.5l (d) 0.707l
9. The value of Rankine's constant for mild steel
   (a) $\frac{1}{9000}$ (b) $\frac{1}{7500}$ (c) $\frac{1}{1600}$ (d) $\frac{1}{750}$
10. A simply supported beam AB of length 'l' carries a point load (W) at C at a distance (a) from the left end A, such that $a < b$. The maximum deflection will be
    (a) At C (b) Between A & C
    (c) Between C & B (d) Any where between A & B

Sub- Analysis of structures
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Sub- GTD

Branch - Electrical Engg.

QUS 1 ANSWER ALL THE QUESTIONS (2X5)

A. Define corona in transmission line?
B. Write 2 advantages and Disadvantages of Hydro Electric power plant?
C. What are the types of Insulators used in transmission line?
D. State Kelvin's law for Economic size of conductors?
E. What are the types of Transmission and Distribution?

QUS 1 ANSWER ANY TWO (5X2)

A. Draw and explain the layout of Hydro Electric power plant.
B. Draw and explain layout of transmission and distribution scheme.
C. The towers of height 30 m and 90 m respectively support a transmission line conductor at water crossing. The horizontal distance between the towers is 500 m. If the tension in the conductor is 1600 kg, find the minimum clearance of the conductor mid-way between the supports. Weight of conductor is 1·5 kg/m. Bases of the towers can be considered to be at water level.

Sub- GTD

Branch - Electrical Engg.

QUS 1 ANSWER ALL THE QUESTIONS (2X5)

A. Define corona in transmission line?
B. Write 2 advantages and Disadvantages of Hydro Electric power plant?
C. What are the types of Insulators used in transmission line?
D. State Kelvin's law for Economic size of conductors?
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Sub- Electrical Technology
Branch - Mechanical Engg.

QUS 1 ANSWER ALL THE QUESTIONS (2X5)

A. What are the common methods for generation of Electrical Power?
B. Write the name of 5 parts of DC Motor?
C. What are the types of DC Motor?
D. What are the functions of AC and DC Voltmeter?
E. Write 2 advantages and Disadvantages of Hydro Electric power plant?

QUS 1 ANSWER ANY TWO (5X2)

A. A shunt motor required 45 A at 230V and the resistance of the shunt field and armature are 50 Ω and 0.03 respectively. Calculate the Armature current and generated EMF.
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C. Write the difference between AC supply and DC supply.

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Sub- HYDRAULICS & PNEUMATIC CONTROL

Branch - Automobile Engg.

Aanswer all the questions. **[2x10]**

1. Define fluid pressure at any point in a pipe.
2. What is vena-contracta ?
3. Define Bernoulli's Theorem.
4. What is the function of pitot tube ?
5. Write the expression for discharge through an orifice meter.
6. Difference between laminar & Turbulent flow.
7. What is continuity equation for incompressible fluid.
8. Define dynamic viscosity.
9. What is Cc, Cv & Cd (Definition) & what is the relation between them ?
10. What do you mean by priming in a pump ?

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Sub- Machine Dynamics
Branch - Automobile Engg.

Answer all multiple choice. **[2x10]**

1. The screw jack has maximum efficiency when
   (a) $2\alpha = 180^0 + \emptyset$ (b) $2\alpha = 90^0 - \emptyset$ (c) $\alpha = 90^0 - \emptyset$ (d) $2\alpha = 180^0 - \emptyset$
2. The frictional torque in a flat pivot bearing for uniformly distributed pressure is
   (a) μWR (b) $\frac{3}{2}\mu WR$ (c) $\frac{2}{23}\mu WR$ (d) $\frac{1}{4}\mu WR$
3. The part fitted on the shaft of an engine to control variation of speed during each cycle is known as
   (a) Fly wheel (b) Governor (c) Pulley (d) Speed controller
4. The variation of energy above and below the mean torque line is called
   (a) Maximum fluctuation of energy (b) Fluctuation of energy
   (c) Average torque (d) None
5. The efficiency of screw jack is equal to
   (a) $\frac{\tan(\alpha+\emptyset)}{\tan\alpha}$ (b) $\frac{\tan\emptyset}{\tan(\alpha+\emptyset)}$ (c) $\frac{\tan(\alpha)}{\tan(\alpha+\emptyset)}$ (d) $\frac{\tan\emptyset}{\tan(\alpha-\emptyset)}$
6. The relation between module and circular pitch of a gear
   (a) $m = \frac{I}{P}$ (b) $m = \frac{P}{\prod}$ (c) $m = \frac{\prod}{P}$ (d) $m = P.\prod$
7. The power transmitted by a belt drive is maximum when the centrifugal tension as compared to maximum tension is
   (a) Equal (b) One third (c) Double (d) 3 times
8. In slider crank chain the no. of possible inversion are
   (a) 3 (b) 4 (c) 5 (d) 6
9. When 2 elements have surface contact and relative motion between them, it is called as
   (a) Higher pair (b) Turning pair (c) Lower pair (d) Sliding pair
10. The natural frequency of free transverse vibration due to point load acting on a simply supported shaft is
    (a) $\frac{4.567}{\sqrt{\delta}}$ (b) $\frac{4.843}{\sqrt{\delta}}$ (c) $\frac{4.987}{\sqrt{\delta}}$ (d) $\frac{4.789}{\sqrt{\delta}}$

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Sub- Thermal Engg.
Branch - Mechanical Engg.

1.	**Define the followings.**	**[1x5]**
a)	I.C. Engine.	
b)	Compression ratio.	
c)	Swept volume.	
d)	Octane number.	
e)	Stoichiometric combustion.	
2.	Derive an expression for the air standard efficiency of an otto cycle mentioning P-V & T-S diagram.	**[7]**
3.	A steam turbine receives superheated steam at a pressure of 15 bar and having a degree of superheat of 100^0C. The exhaust pressure is 0.09 bar and the expansion of steam takes place isentropically calculate (i) heat supplied (ii) heat rejected (iii) the net work done and (iv) the thermal efficiency of the cycle.	**[8]**

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Sub- MANUFACTURING TECHNOLOGY-II
Branch - Automobile Engg.

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1. Write all the questions. [2x5]

a) Name four different operation perform on Lathe.
b) Name at least four cutting tool material & give the composition of high speed steel.
c) Why cutting fluid / coolant is used & give it's composition ?
d) What is multi point tool holder ?
e) Write about speed, feed & depth of cut.

2. Write any two. [5x2]

a) Differentiate between engine lathe capstan & turret lathe.
b) Explain quick return mechanism of shaper with net sketch.
c) Explain table feed mechanism of shaper.

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b) Give basic difference between shaper & planer.

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