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**3024**

**B. Tech. (Civil Engineering) 3rd Semester  
Examination – February, 2022**

**ECONOMICS FOR ENGINEERS**

**Paper : HSMC-01-G**

*Time : Three Hours ]*

*[ Maximum Marks : 75*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt *five* questions in all, selecting *one* question from each Unit. Question Number 1 is *compulsory*. All questions carry equal marks.

1. (a) Define Demand. 2.5 × 6 = 15
- (b) What is Production Possibility Curve ?
- (c) Define Privatization.

3024-6400-(P-3)(Q-9)(22)

P. T. O.

- (d) Define Opportunity Cost.
- (e) What is Law of Supply ?
- (f) What is Elasticity of Demand ?

**UNIT – I**

- 2. What are Economic Laws ? Explain the relationship of Economics between Science, Engineering Technology and Economic Development. 15
- 3. Explain the meaning of Elasticity of Demand. Explain the factors affecting Elasticity of Demand. 15

**UNIT – II**

- 4. What is Production ? Explain Law of Variable proportion in detail. 15
- 5. What is Return to Scale ? Explain various economies and diseconomies of scale. 15

**UNIT – III**

- 6. Explain the term market. Discuss the various types of market in detail. 15

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- 7. Explain the Law of Supply. Discuss the role of demand and supply in price determination. 15

**UNIT – IV**

- 8. What do you understand by Globalisation ? Explain its merits and demerits. 15
- 9. What is Indian Economy ? Discuss the nature of Mixed Economy. 15

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**3237**

**B. Tech (EE) 5th Semester  
Examination – February, 2022**

**POWER SYSTEMS-I**

**Paper : PCC-EE-301-G**

*Time : Three hours ]*

*[ Maximum Marks : 75*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

*Note : Question No. 1 is compulsory from Section-A. Attempt **four** questions remaining four sections, selecting **one** from each section. Use of non-programmable calculator is allowed.*

**SECTION – A**

1. (a) Define primary and backup protection.
- (b) Write the expression for per unit impedance in a three phase system.
- (c) Define complex power.
- (d) What are symmetrical component ?
- (e) Explain Neutral grounding.
- (f) Explain structure of DC transmission.

2.5 × 6 = 15

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**SECTION – B**

2. Explain in details the steady state model of synchronous machine. 15
3. (a) Draw and explain the impedance diagram of power system.  $7.5 \times 2 = 15$
- (b) Explain the per unit representation of a transformer.

**SECTION – C**

4. (a) Determine the symmetrical components of three voltages,  $V_a = 220 \angle 0^\circ \text{V}$ ,  $V_b = 220 \angle 245^\circ \text{V}$  and  $V_c = 220 \angle 105^\circ \text{V}$ .
- (b) Show that symmetrical component transformation is power invariant.  $2.5 \times 6 = 15$
5. Develop the zero sequence networks of 3 phase transformer with following connections a)  $\Delta$ - $\Delta$  transformer bank, b) Y-Y transformer with neutral grounded c) Y - $\Delta$ . transformer with grounded Y neutral, d) Y- $\Delta$ . transformer with ungrounded Y and e) Y-Y transformer with any one neutral grounded. 15

**SECTION – D**

6. Explain the phenomenon of current chopping and resistance chopping. 15

7. Illustrate operating principle and area of application of directional over current relay. 15

**SECTION – E**

8. Comparisons between Line Commutated Converters and Voltage Source Converters. 15
9. Explain PV modules and their characteristics like open circuit voltage, short circuit current, fill factor and efficiency. What are I-V and P- V characteristics of PV module ? 15

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**3242**

**B. Tech. 5th Semester (EE) (Elective – I)  
Examination – February, 2022**

**ELECTRICAL DRIVES**

**Paper : PEC-EE-03-G**

*Time : Three hours ] [ Maximum Marks : 75*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt *five* questions in all, selecting *one* question from each Section. Question 1 is *compulsory*. All questions carry equal marks.

1. (a) List advantages of Electric drives. 2.5 × 6  
(b) Write an expression for emf equation of DC machine.  
(c) Discuss short time rating.  
(d) Define duty cycle of DC chopper.  
(e) What is the basic principal of v/f control.  
(f) List the conventional methods of speed control of three phase induction motor from stator side.

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**SECTION – A**

2. (a) Discuss the current status of dc and ac drives. 7.5  
(b) Discuss general configuration and essential parts of electric drive. 7.5
3. Discuss close loop control of multi -motor Drives. 15

**SECTION – B**

4. Discuss the following :
- (i) Heating curve 7.5  
(ii) Cooling curve 7.5
5. List and explain various classes of motor duty cycle. 15

**SECTION – C**

6. Explain Chopper control of separately excited DC motors. 15
7. Discuss speed control of three phase induction motor. 15

**SECTION – D**

8. Discuss PWM VSI squirrel cage induction motor drive. 15

9. Explain slip power recovery scheme for speed control of three phase induction motor. 15

**SECTION – D**

8. (a) Explain in detail the concept of controllability and observability. 8  
(b) Discuss the solution of state equation. 7
9. Write short notes on :
- (a) Concept of state variables 8  
(b) Diagonalization of state matrix 7

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**3238**

**B. Tech. (EE) 5th Semester  
Examination – February, 2022**

**CONTROL SYSTEM**

**Paper : PCC-EE-305-G**

*Time : Three Hours ]*

*[ Maximum Marks : 75*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt *five* questions in all taking *one* question from each Section. Question No. 1 is *compulsory*.

1. (a) Define open loop system. 1.5  
(b) What are the components of feedback control systems ? 1.5  
(c) What is signal flow graph ? 1.5  
(d) What is transmittance ? 1.5

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- (e) What are the basic components of block diagram? 1.5
- (f) Explain in brief the benefits of feedback. 1.5
- (g) Why negative feedback is preferred in closed loop system. 1.5
- (h) What is linear system? 1.5
- (i) Define transfer function. 1.5
- (j) Define unit step signal. 1.5

#### SECTION - A

2. (a) Distinguish between open loop and closed loop system with examples. 8
- (b) Using routh Hurwitz criterion determine the stability : 7

$$S^6 + S^5 + 5S^4 + 3S^3 + 2S^2 - 4S - 8 = 0$$

3. Sketch the root locus for : 15

$$G(S) = \frac{K(s+1)}{s^2(s+3.6)}, H(S) = 1$$

3238-1300-(P-4)(Q-9)(22) (2)

#### SECTION - B

4. Draw the Bode plot of : 15

$$G(S) = \frac{16(1+0.5s)}{s^2(1+0.125s)(1+0.1s)}$$

- (a) G. M.
- (b) P. M.
- (c) Stability of the system

5. Sketch the polar plot for : 15

$$G(S) = \frac{20}{s(s+1)(s+2)}$$

#### SECTION - C

6. Explain P, I, D, PI, PD and PID controllers with their circuit diagrams and output equations. 15
7. (a) Explain in detail the insensitivity and robustness of control system. 7
- (b) Discuss the analog and digital implementation of controller. 8

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**3239**

**B. Tech. 5th Semester (EE)  
Examination – February, 2022**

**MICROPROCESSOR & MICROCONTROLLER**

**Paper : PCC-EE-309-G**

**Time : Three hours ]**

**[ Maximum Marks : 75**

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt *five* questions in all, selecting *one* question from each section. Question 1 is *compulsory*. All questions carry equal marks.

1. (a) Explain Flag register in 8086. 3
- (b) Define DMA. 2
- (c) Discuss Pipelining in microprocessor. 2
- (d) Explain about Embedded memory devices 3
- (e) Discuss Memory structure of 8051 microcontroller. 3
- (f) What are ADCs ? 2

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**SECTION – A**

2. (a) What do you understand by microprocessor.  
Explain the various types of microprocessor used. 5  
(b) Explain the various instruction formats of 8086  
microprocessor. 10
3. Draw and explain the pin diagram of 8086  
microprocessor. Also explain its working in detail. 15

**SECTION – B**

4. Describe the working of PPI. Also draw its block  
diagram and pin diagram. 15
5. Explain the working of interrupt controller with the  
help of suitable diagram. 15

**SECTION – C**

6. (a) Distinguish between RISC and CISC. 8  
(b) What are different interrupts used in  
microcontrollers. 7
7. (a) Differentiate between Harvard and Princeton  
Architectures of microcontroller. 10  
(b) What are embedded microcontrollers. 5

3239- (P-3)(Q-9)(22) (2)

**SECTION – D**

8. Draw the pin diagram of 8051 and explain its working  
in detail. 15
9. Write short note on the following : 15  
(a) Stepper motor  
(b) LCD interfacing with microcontroller

3239- (P-3)(Q-9)(22) (3)

Assume : Specific magnetic loading = 0.45 Tesla

Specific electric loading = 17500 ampere conductor per meter

Ratio of gross axial length to pole pitch = 0.68.

9. (a) Explain the role of CAD in designing of electrical machines. 7.5
- (b) Discuss any one approach of CAD in designing of electrical machines with proper flow chart. 7.5

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**3240**

**B. Tech (EE) 5th Semester  
Examination – February, 2022  
COMPUTER AIDED ELECTRICAL MACHINE DESIGN  
Paper : PCC-EE-313G**

*Time : Three hours ]*

*[ Maximum Marks : 75*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Q. 1 is **compulsory**. Students have to attempt **five** questions in total at least **one** questions from each section. All questions carry equal marks.

1. (a) Outline the features of electrical machine design. 2.5 × 6
- (b) Discuss the effects on the performance of a three phase squirrel cage Induction-motor when stator turns per phase are slightly reduced.
- (c) Explain the term 'Short Circuit Ratio' as applied in synchronous machine.
- (d) Derive an output equation for a single phase transformer.
- (e) Discuss the term output coefficient in case of DC machine.
- (f) Explain the Optimization in CAD.

### SECTION – A

2. (a) Discuss Modern trends in design and manufacturing techniques. 7.5  
(b) Explain the factors influencing the size of rotating electrical machine. 7.5
3. (a) Define the following : 7.5  
(i) Specific electric loading  
(ii) Specific Magnetic loading  
(b) Discuss the factors on which choice of specific electric and specific magnetic loading depends. 7.5

### SECTION – B

4. (a) Discuss the various considerations in the selection of specific electric and magnetic loading, for a design of a three phase of Induction motor. How the improper selection of these values affect the design and performance of the machine. 7.5  
(b) Design the following information for a 15 KW, 440V, 3 phase, 6 pole, 1425 rpm induction motor. 7.5  
(i) Main dimensions  
(ii) Number of turns per phase in the stator winding  
(iii) Number of stator slots  
(iv) Number of conductors per slot.

Assume specific magnetic loading = 0.48 tesla

Specific electric loading = 25000 ampere Conductor per meter

Full load efficiency = 88 per cent

Full load power factor = 0.88

5. Discuss in detail the rotor design of three phase induction motor. 15

### SECTION – C

6. (a) Deduce an expression between volts per turn and KVA rating of a transformer. 7.5  
(b) Discuss the effect of stepping of core of transformer on its performance. 7.5
7. Discuss in detail the design of the field system for salient pole alternator. 15

### SECTION – D

8. (a) Discuss the procedure in detail for obtaining suitable main dimensions for the armature core of a d.c. machine. 7.5  
(b) Design a 4 pole, 10KW, 220V, 1000rpm., d.c. shunt motor with respect to the following : 7.5  
(i) Output coefficient  
(ii) The diameter and length of armature

9. Explain the construction and working of geo thermal power plant and tidal power plants. 15

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3247

B. Tech. 5th Semester (EE) (Elective – II)  
Examination – February, 2022

POWER PLANT ENGINEERING

Paper : OEC-EE-07-G

Time : Three hours ] [ Maximum Marks : 75

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt five questions in all, selecting one question from each Section. Question 1 is compulsory. All questions carry equal marks.

1. (a) What is bio gas ? Give the advantages. 1.5 × 10  
(b) What do you understand by the term boiler draught ?  
(c) What are the factors to be considered in selecting turbines ?  
(d) Write the function of draft tube in turbine outlet.

- (e) What is "half life" of nuclear fuels?
- (f) Why thermal plants are not suitable for supplying fluctuating loads ?
- (g) What is super heater ? How boiler efficiency improves by super heater ?
- (h) What is reheating and regeneration of gas turbine ?
- (i) Name the three moderators commonly used in nuclear power reactor.
- (j) What is critical mass of nuclear fuel ?

**SECTION – A**

- 2. With the help of a neat sketch describe the working of any one type of ash handling system. 15
- 3. Differentiate between forced draught and induced draught cooling tower. 15

**SECTION – B**

- 4. Explain the construction and working of gas turbine power plant with a layout. 15

3247- (P-4)(Q-9)(22) ( 2 )

- 5. (a) Derive an expression for the work ratio using Brayton cycle. 7.5
- (b) Discuss the working of any one type of combined cycle power plant. 7.5

**SECTION – C**

- 6. Explain CANDU (Canadian-Deuterium-Uranium) reactor with neat diagram also mention its merits and demerits. 15
- 7. (a) Discuss about the safety measures adopted in modern nuclear plant. 7.5
- (b) Explain the working of pressurized water reactor. 7.5

**SECTION – D**

- 8. (a) Explain the site selection criterion of hydro power plant. 5
- (b) A peak load on the thermal power plant is 75 MW. The loads having maximum demands of 35 kW, 20 MW, 15 MW and 18 MW are connected to the power plant. The capacity of the plant is 90 MW and annual load factor is 0.53. Calculate the average load on power plant, energy supplied per year, demand factor and diversity factor. 10

3247- (P-4)(Q-9)(22) ( 3 )

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