



نام:

نام خانوادگی :

محل امضاء:



دفترچه شماره ۱ عصر پنجشنبه ۹۳/۱۱/۱۶



جمهوری اسلامی ایران وزارت علوم، تحقیقات و فناوری سازمان سنجش آموزش کشور اگر دانشگاه اصلاح شود مملکت اصلاح می شود.

## **آزمون ورودی دورههای کارشناسی ارشد ناپیوسته داخل ـ سال ۱۳۹۴**

مجموعه مهندسی برق ـ کد 1251

مدت پاسخگویی: ۱۰۵ دقیقه

تعداد سؤال: ۵۴

#### عنوان مواد امتحاني، تعداد و شماره سؤالات

رديف	مواد امتحاني	تعداد سؤال	از شماره	تا شماره
1	زبان عمومی و تخصصی	۲٠	À	۲.
1	ریاضیات(معادلات دیفراتسیل، ریاضیات مهندسی، آمار و احتمالات) ۱۲		77	41
۲	مدارهای الکتریکی ۱ و ۲	17	44	24

این آزمون نمره منفی دارد.

استفاده از ماشین حساب مجاز نیست.

بهمن ماه ـ سال ۱۳۹۳

يق جاب، تكثير و انتشار سوالات به هر روش (الكترونيكي و ...) پس از برگزاري آزمون، براي تمامي اشخاص حقيقي و حقوقي تنها يا مجوز اين سازمان مجاز ميباشد و با متخلفين برابر مقررات رفتار ميشود.

407C صفحه ۲

andia macili:

### PART A: Vocabulary

<u>Directions:</u> Choose the word or phrase (1), (2), (3), or (4) that best completes each sentence. Then mark your answer sheet.

1- Jane was terribly bore	ed, but she in	terest so as not to hui	t her friend's feelings.
1) admitted 2- Having a kno	2) validated	3) endeavored	4) feigned
2- Having a kno	owledge of economics	s, I did not understa	nd anything out of the
speaker's speech.	2)	201	45.4
1) rudimentary 3- In the hands of inc	2) superfluous	3) hazardous	4) clandestine
3- In the hands of in-	experienced drivers,	high-powered cars	are actually
weapons.	2) 1-4-1	23	68
1) inflexible 4- The many in t	2) lethal	3) regrettui	4) spontaneous
1) sefering to	2) variables	ct from its real value	· Almanaiatanaiaa
1) safeguards 5- The human brain is v	2) Variables	3) digressions	4) consistencies
5- The numan brain is v	ven known to unier o	considerably from the	e chimpanzee brain in
1) light	2) regarde	3) terms	1) penant
light     Irrigation is essentia	1 to most high yield	forming but many	aguifage that supply
irrigated crops are be	ing drawn down fasta	r then rain con	them
irrigated crops are be 1) deplete	ng drawn down laste	2) vanish	A) racharge
7- It is a pity that he	between the tu	o neighboring count	rise is wall rooted and
hard to remove.	between the tw	o neighboring count	ries is wen rooted and
1) misonthropy	2) antipothy	2) (manager)	A) vaguanace
1) misanthropy 8- Hair that's thick and -	2) antipatity	trimming	4) vagueness
1) luvuriant	2) arbitrary	3) evenesive	4) fragmented
luxuriant     Their lack of qualific	ations them	to a lifetime of borin	g usually poorly-paid
THOME			
1) devoted 10-The of dif	2) conveyed	3) condemned	4) captivated
10.The of dif	forences among cul	tures clearly show	that mental health
professionals are ill s	dvised to early their	r electifications of n	ersonality disorders to
people from other cur	ui cs.		
1) dispersal	2) dicarray	3) ignorance	4) multitude
1) dispersal	2) disarray	3) ignorance	4) multitude
1) dispersal	2) disarray	3) ignorance	4) multitude
1) dispersal PART B: Cloze Passa	2) disarray	3) ignorance	4) multitude
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1) dispersal PART B: Cloze Passa	2) disarray  ige  lowing passage and d	. (φ.	
1) dispersal  PART B: Cloze Passa  Directions: Read the following parts of the following pa	2) disarray  ige  lowing passage and d	. (φ.	
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15-1) those of his competitors

3) what did his competitors

- 2) his competitors4) the one in his competitors

#### PART C: Reading Comprehension

<u>Directions</u>: Read the following three passages and answer the questions by choosing the best choice (1), (2), (3), or (4) and then mark the correct choice on your answer sheet.

#### PASSAGE 1:

Remote sensing refers to obtaining information about objects or areas using electromagnetic radiation without being in direct contact with them. In remote sensing various types of tools and devices are utilized to make electromagnetic radiation outside this range visible to the human eye.

Since the first launch of an earth observation satellite, remote sensing is increasingly used to acquire information about environmental processes such as agricultural crops, land cover, vegetation dynamics, water quality, urban growth, seabed topography, etc. Remote sensing helps us to increase our understanding of the ecological system of the earth. Remote sensing helps us to measure the size of the ozone hole in the atmosphere, to notice the differences of atmospheric ozone concentrations between the southern and northern hemisphere. Remote sensing is playing a key role in our efforts to understand the complex dynamics of ocean circulation: the Northern Atlantic Oscillation and to assess their effects on global and regional climates and extreme events. Long-term remote sensing observations of the Sahel region made us at least partly understand the complex cyclic pattern radar that were developed at that time: SLAR: side-looking airborne radar and SAR: Synthetic Aperture Radar. Either development aimed at the acquisition of images at the highest possible resolution. Crucial to the SAR development was the ability to finely resolve the Doppler frequencies using a frequency analysis algorithm on the returning radar signal by the US Air Force research centre.

#### 16- The word "Urban" in the second paragraph means:

- 1) Country
- 2) Rural area
- 3) The area with higher population density
- 4) The area surrounding cities

#### 17- "Cyclic patterns" can be replaced by:

- 1) Periodic schemes
- 2) Plainness diagrams
- 3) Motifs which are complex to understand
- 4) Patterns which should be studied more extensively

#### 18- According to the Passage, the critical point in designing SAR is:

- 1) to be used in remote sensing
- 2) to develop an aperture for the radar
- 3) to combat the effect of Doppler frequency
- 4) to use the Doppler frequency to design a frequency analyzer

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#### 19- According to the Passage, what is the purpose of remote sensing?

- 1) A method restricted to use radar systems for sensing
- 2) Making electromagnetic radiations visible to human eyes
- 3) Analysis of dynamics of ozone concentration in the atmosphere using radars.
- 4) The use of aerial sensors to detect and classify objects or their alternations which are mostly on Earth.

#### 20- What does the sentence "Either development aimed at the acquisition of images at the highest possible resolution." mean?

- 1) Radar systems are required to acquire the picture of a target.
- 2) The goal of both SAR and SLAR is to forfeit high resolution pictures.
- The high resolution pictures have an important role in remote sensing.
- The high resolution image of every developed radar system might be captured as a target.

#### PASSAGE 2:

Renewable energy is generally defined as energy that comes from resources which are naturally replenished on a human timescale such as sunlight, wind, rain, tides, waves and geothermal heat. Renewable energy replaces conventional fuels in four distinct areas: electricity generation, hot water/space heating, motor fuels, and rural (off-grid) energy services. Renewable energy resources exist over wide geographical areas, in contrast to other energy sources, which are concentrated in a limited number of countries. Rapid deployment of renewable energy and energy efficiency is resulting in significant energy security, climate change mitigation, and economic benefits. In international public opinion surveys, there is strong support for promoting renewable sources such as solar power and wind power. At the national level, at least 30 nations around the world already have renewable energy contributing more than 20 percent of energy supply. National renewable energy markets are projected to continue to grow strongly in the coming decade and beyond.

		C 199000 AND		
~ .	FT'1 1 1 1 1 1 1			
21-	The underlined	word in the	naccade can	be replaced by:
	THE UNION HIELD	WOLD IN THE	Duggage can	De replaced by

- 1) Studies
- 2) storage
- 3) Supplies
- Standards

آزمون مجموعه مهندسي برق

# 22- Which one of the following cases is NOT a reason for renewable energy development?

- 1) It can be replenished.
- It can lead to undesirable climate change.
- 3) It is more reasonable financially.
- It is distributed more evenly throughout the world compared with other types of recourses.

#### 23- The word "conventional" in the third line of the passage can be replaced by?

- 1) electrical
- modern
- 3) solar
- 4) traditional

#### 24- What is the distinct feature and characteristic of renewable energies?

- 1) They are not depleted over time.
- 2) They should be produced synthetically.
- 3) They cannot be consumed very quickly.
- 4) They are available only in certain circumstances.

#### زمون مجموعه مهندسي برق

#### PASSAGE 3:

Vacuum-channel transistor is the result of a marriage between traditional vacuum-tube technology and modern semiconductor-fabrication techniques. This curious hybrid combines the best aspects of vacuum tubes and transistors and can be made as small and as cheap as any solidstate device. Indeed, making them small is what eliminates the well-known <u>drawbacks</u> of vacuum tubes.

In a vacuum tube, an electric filament is used to heat the cathode sufficiently for it to emit electrons. This is why vacuum tubes need time to warm up and consume so much power. It is also the reason they frequently burn out. However, vacuum-channel transistors do not need a filament or hot cathode. If the device is made small enough, the electric field across it is sufficient to draw electrons from the source by a process known as field emission. Eliminating the power-sapping heating element reduces the area each device takes upon a chip and makes this new kind of transistor energy efficient. Another weak point of tubes is that they must maintain a high vacuum to avoid collisions between electrons and gas molecules. Under such low pressure, the electric field causes positive ions generated from the residual gas in a tube to accelerate and bombard the cathode, creating sharp, nanometer-scale protrusions, which degrade and, ultimately, destroy it.

These long-standing problems of vacuum electronics are not <u>insurmountable</u>. If the distance between cathode and anode were less than the average distance an electron travels before hitting a gas molecule, a distance known as the mean free path, and the working voltage is low enough, the device can operate just fine at atmospheric pressure. That is, you do not, in fact, need to maintain any sort of vacuum at all for what is nominally a miniaturized piece of vacuum electronics.

25-	What is the main idea of the above passage?					
	1) main problems of vacuum electronics.					
	2) solutions for drawbacks of vacuum tubes.					
	3) vacuum-tube technology and its applications.					
	4) combination of an extinct device with a new technology.					
26-	Which of the following is NOT stated in the passage as a vacuum tube problem?					
	1) low longevity.		2) long setup time.			
	3) high fabrication cost.		4) low energy efficiency.			
27-			ons are drawn from	the source by a process		
	called	•				
	1) field emission.		<ol><li>power-sapping.</li></ol>			
	3) mean free path.		4) nanometer-scale protrusions.			
28-	The pronoun "it" in the second paragraph refers to					
	1) tube	2) cathode	3) residual gas	4) electric field		
29-	The word "insurmountable" in the last paragraph is closest in meaning to					
	<ol> <li>unsolvable</li> </ol>	<ol><li>inaccessible</li></ol>	3) invaluable	4) unpredictable		
30-	The word "drawback" in the first paragraph cannot be replaced by					
	1) benefits	2) problems	3) impairments	4) adverse aspects		

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### رياضيات(معادلات ديفرانسيل، رياضيات مهندسي، آمار و احتمالات):

۳۱ - جعبه I شامل ۵ مهره سفید و ۷ مهره سیاه است. جعبه II شامل ۲ مهره سفید و ۲ مهره سیاه است. دو مهره به تصادف و بدون جایگذاری از جعبه I انتخاب و بدون مشاهده رنگ مهرهها در جعبه II قرار میدهیم. سپس دو مهره از جعبه II به تصادف و بدون جایگذاری انتخاب میکنیم. احتمال پیشامد دو مهره سفید از جعبه II كدام است؟

- 150
- 17 (1
- 150 (F 105 (F

٣٢ - تابع چگالي احتمال يک قطعه الکترونيکي بر

$$f(x) = \begin{cases} \frac{C}{x^{\gamma}} & x > 1 \\ 0 & x \le 1 \end{cases}$$

احتمال آنکه از ۶ قطعهٔ الکترونیکی حداکثر ۲ قطعه برای حداقل ۱۵ ساعت کار کنند (با فرض مستقل بودن پیشامد خراب شدن قطعات)، کدام است؟

- <del>ه</del> (۱

g مربوط به توابع g و g برابر  $f(t)=e^{\Upsilon t}$  و g برابر g و g برابر w(f,g) باشد، در این صورت کلیه توابع gممكن كدام است؟

- (ft+c)eft (1
- (rt+c)ert (r
- $(\Upsilon t + c)e^{\Upsilon t}$  ( $\Upsilon$ 
  - rt+c (4

اگر  $y_1(x)=e^X$  یک جواب معادله دیفرانسیل  $y_1(x+n)y'+ny=0$  ، و  $y_2(x)=n\in\mathbb{N}$  باشد، جواب  $y_3(x)=e^X$ مستقل دیگر کدام گزینه می تواند باشد؟

$$\sum_{k=0}^{n} \frac{1}{k!} x^{k}$$
 (1

$$\sum_{k=0}^{n-1} \frac{1}{k!} x^k$$
 (7

$$\sum_{k=1}^{n} \frac{1}{k!} x^{k} \alpha^{n}$$

$$\sum_{k=1}^{n+1} \frac{1}{k!} x^k \quad (f$$

70 - جواب مسأله مقدار اولیه  $y'(\circ) = Y$  ,  $y(\circ) = 1$  ,  $(x+1)^Yy'' + (x+1)y' + y = 0$  کدام است  $(x+1)^Y$  (1

$$(x+1)^{r}$$
 (1

$$\cos(\ln(x+1)^{T}) + \sin(\ln(x+1)^{T})$$
 (7

$$cos(ln(x+1)) + rsin(ln(x+1))$$
 (r

$$\cos(\ln(x+1)) + 7\sin(\ln(x+1))$$

$$\cos^{7}(\ln(x+1)^{7}) + \sin(\ln(x+1)^{7})$$
(\*

معادله ديفرانسيل y = x + (1+x)y = 0 ، x > 0 ، x > 0 ، x > 0 ، x > 0 ، x > 0 ، x > 0 هروبنيوس،  $(n \ge 1)$  کدام است؟ ( $n \ge 1$ ) کدام است؟ ( $n \ge 1$ ) و رابطه بازگشتی بین ضرایب آن،  $a_{n-1}$ ,  $a_n$  کدام است؟  $a_n = \frac{-a_{n-1}}{n(\tau n-1)}$ ,  $a_n = \frac{-a_{n-1}}{n(\tau n+1)}$ ,  $\tau r^{\tau} - \tau r + 1 = \circ$  ( $n = \frac{-a_{n-1}}{(\tau n-1)n}$ ,  $n = \frac{-a_{n-1}}{(\tau n-1)(n+1)}$ ,  $n = \frac{-a_{n-1}}{(\tau n-1)(n+1)}$ 

$$a_n = \frac{-a_{n-1}}{n(\gamma_{n-1})}, a_n = \frac{-a_{n-1}}{n(\gamma_{n+1})}, \gamma_r - \gamma_r + 1 = 0$$
 (1)

$$a_n = \frac{-a_{n-1}}{(\tau_{n-1})_n}$$
,  $a_n = \frac{-a_{n-1}}{(\tau_{n+1})(n+1)}$ ,  $\tau r^{\tau} - \tau r + 1 = 0$  ( $\tau$ 

$$a_n = \frac{-a_{n-1}}{(r_{n-1})(n+1)}$$
,  $a_n = \frac{-a_{n-1}}{(r_{n+1})n}$ ,  $rr^r - rr + 1 = 0$  ( $rr^r - rr + 1 = 0$ )

$$a_n = \frac{-a_{n-1}}{n(rn-1)}$$
,  $a_n = \frac{-a_{n-1}}{(rn+1)n}$ ,  $rr^r - rr + 1 = 0$  (4)

g(x) در این صورت ,  $g(x) = \int_{0}^{+\infty} \omega \frac{dA(\omega)}{d\omega} \cos(\omega x) d\omega$  ,  $f(x) = \int_{0}^{+\infty} A(\omega) \cos(\omega x) d\omega$  -  $\pi V$ 

كدام است؟

$$-f(x) - xf'(x)$$
 ()

$$f(x) - xf'(x)$$
 (Y

$$f(x) - xf''(x)$$
 (\*

$$f(x) + xf''(x)$$
 (\*

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$$\begin{cases} u_{tt} - u_{xx} = \sin^{\tau}(\pi x) \ , & \circ < x < 1 \ , \ t > \circ \\ u(\circ, t) = \circ = u(1, t) \ , & t > \circ & \\ u(x, \circ) = \circ \ , \ u_t(x, \circ) = \circ & \\ & \text{in } u(x, \circ) = \circ \ , \end{cases}$$

$$\frac{r}{r\pi^r}\sin(\pi x) + \frac{1}{9\pi^r}\sin^r(\pi x)$$
 (1)

$$\frac{r}{\pi^r}\sin(\pi x) + \frac{1}{r\pi^r}\sin^r(\pi x)$$
 (7

$$\frac{r}{r\pi^{r}}\sin(\pi x) + \frac{1}{9\pi^{r}}\sin^{r}(\pi x)$$
 ( $r$ 

$$x(1-x) + \frac{r}{r\pi^r}\sin(\pi x) + \frac{1}{9\pi^r}\sin^r(\pi x)$$
 (\*

$$\frac{\tau}{\pi^{\tau}}\sin(\pi x) + \frac{1}{\tau \pi^{\tau}}\sin^{\tau}(\pi x) \text{ (Y}$$

$$\frac{\tau}{\tau \pi^{\tau}}\sin(\pi x) + \frac{1}{\eta \pi^{\tau}}\sin^{\tau}(\pi x) \text{ (Y}$$

$$x(1-x) + \frac{\tau}{\tau \pi^{\tau}}\sin(\pi x) + \frac{1}{\eta \pi^{\tau}}\sin^{\tau}(\pi x) \text{ (f}$$

$$x(1-x) + \frac{\tau}{\tau \pi^{\tau}}\sin(\pi x) + \frac{1}{\eta \pi^{\tau}}\sin^{\tau}(\pi x) \text{ (f}$$

$$x(1-x) + \frac{\tau}{\tau \pi^{\tau}}\sin(\pi x) + \frac{1}{\eta \pi^{\tau}}\sin^{\tau}(\pi x) \text{ (f}$$

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$$x(1-x) + \frac{\tau}{\tau \pi^{\tau}}\sin(\pi x) + \frac{1}{\eta \pi^{\tau}}\sin^{\tau}(\pi x) \text{ (f}$$

$$u(x) + \frac{1}{\eta \pi^{\tau}}\sin^{\tau}(\pi x)$$

$$\sum_{k=0}^{\infty} \frac{f}{k\pi} t^{-k^{\gamma}} \sin kx$$
 (1)

$$\sum_{k=0}^{\infty} \frac{f}{k\pi} e^{-k^{7}t} \sin kx$$
 (7

$$u(x,t) = 1$$

$$\sum_{k=0}^{\infty} \frac{f}{k\pi} t^{-k^{\gamma}} \sin kx \quad (1)$$

$$\sum_{k=0}^{\infty} \frac{f}{k\pi} e^{-k^{\gamma}t} \sin kx \quad (1)$$

$$\sum_{k=0}^{\infty} \frac{f}{(\tau k+1)\pi} e^{-(\tau k+1)^{\gamma}t} \sin(\tau k+1)x \quad (\tau k+1)x \quad (\tau$$

$$\sum_{k=0}^{\infty} \frac{f}{(\gamma k + 1)\pi} t^{-(\gamma k + 1)^{\gamma}} \sin(\gamma k + 1) x \quad (f$$

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۴۰ می دانیم پاسخ معادلهٔ حرارت به صورت:

$$rac{\partial u}{\partial t} = c^\intercal rac{\partial^\intercal u}{\partial x^\intercal}$$
,  $\circ < x < l$ ,  $t > \circ$ 
 $\frac{\partial u}{\partial x} = c^\intercal rac{\partial u}{\partial x^\intercal}$ ,  $c < x < l$ ,  $t > \circ$ 
 $\frac{\partial u}{\partial x} = c^\intercal rac{\partial u}{\partial x} + hu(l,t) = \circ$ 
 $\frac{\partial u}{\partial x} = c^\intercal rac{\partial u}{\partial x} + hu(l,t) = \circ$ 
 $\frac{\partial u}{\partial x} = c^\intercal rac{\partial u}{\partial x} + hu(l,t) = \circ$ 
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 $\frac{\partial u}{\partial x} = c^\intercal \frac{\partial u}{\partial x} + hu(l,t) = \circ$ 

。 در این صورت k ها در کدام معادله زیر صدق میکنند؟

$$k_n \tan k_n l = -h$$
 (1)

$$k_n \cot k_n l = -h$$
 (Y

$$k_n \cot k_n l = h$$
 (\*

$$k_n \tan k_n l = h$$
 (\*

$$-\pi^{\tau}$$
 ( $\tau$ 

ه منده است. برابر کدام گزینه است برابر کدام کزار خواند کرد برابر کدام است برابر کدام است برابر کدام است برابر کدام است برابر کدام کزار خواند کرد برابر کدام کزار کرد برابر کرد برابر کدام کزار کرد برابر کر

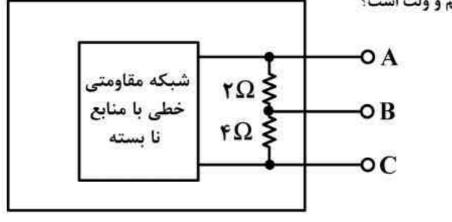
$$r\pi i \left[\frac{\pi}{r} + i \ln(r + \sqrt{r})\right]$$
 (7)

$$\forall \pi i [-\frac{\pi}{\tau} + i \ln(\tau + \sqrt{\tau})] \ (\nabla$$

$$r\pi i \left[\frac{\pi}{r} - i \ln(r + \sqrt{r})\right]$$
 (\*

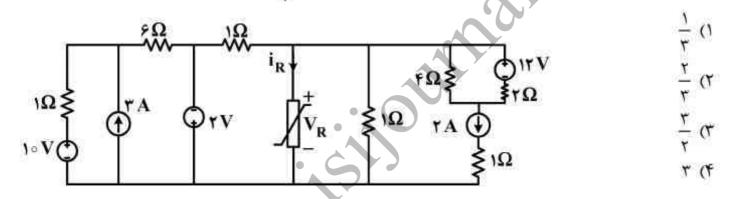
مدارهای الکتریکی (۱ و ۲):

C و B را B میگذرد. و اگر بین B و B را A از A از A به B میگذرد. و اگر بین B و C را A از B بین B و C اتصال کوتاه کنیم جریان C از C به C از C به C از سرهای C انسان کوتاه کنیم جریان C از C به C از C به C از C به C و C به C از راست به چپ چند اهم و ولت است؟

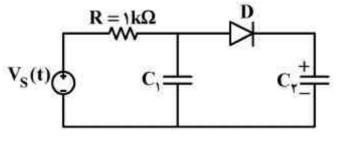


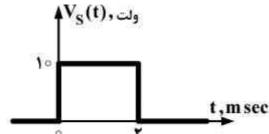
- $r, \frac{r}{r}$  ()
- 17,7 (7
- ۲,۳ (۳
- F. T (F

است؟  $V_{R}=rac{r}{r}i_{R}^{r}$  در مدار شکل زیر، توان مصرفی مقاومت غیر خطی با مشخصه  $V_{R}=rac{r}{r}$  چند وات است؟



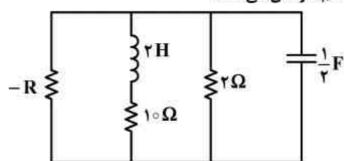
در مدار شکل زیر، خازن  $C_1 = 1 \mu F$  و بیبار است، خازن  $C_7 = 7 \mu F$  و به میزان ۲۵ میکرو ژول انرژی  $C_7 = 1 \mu F$  د مدار شده با پلاریته داده شده دارد. با ورودی منبع ولتاژ  $V_s(t)$  شکل زیر، کدام گزینه در مورد بازه زمانی هدایت دیود ایده آل D بر حسب میلی ثانیه صحیح است؟





- $\ln \frac{r}{r} \le t \le r$  (1
- $\ln \tau \le t \le \tau$  ( $\tau$
- $\ln \frac{r}{r} \le t \le r \ln r$  (r
- lnr≤t≤rlnr (F

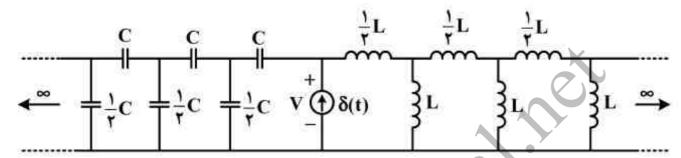
۴۶ مدار شکل زیر، به ازای چه مقدار مقاومت R (بر حسب اهم) نوسان میکند؟



4 (4

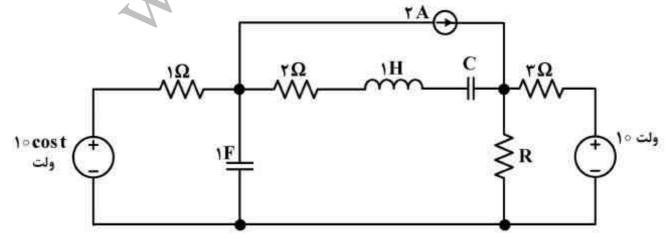
۴) به ازای هیچ مقدار R نوسان نمی کند.

۴۷ مدار شکل زیر، از هر دو طرف به سمت بینهایت میرود. با شرایط اولیه صفر، معادلهٔ ولتاژ دو سر منبع جریان ضربه برای د < t برابر کدام است؟



- $\frac{1}{C}\sin\frac{t}{\sqrt{LC}}$  (1)
- $\frac{1}{C}\cos\frac{t}{\sqrt{LC}}$  (7
- $\frac{r}{C}\sin\sqrt{\frac{r}{LC}}t$  (r
- $\frac{r}{C}\cos\sqrt{\frac{r}{LC}}t$  (\*

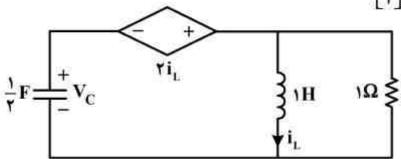
۴۸ در شبکهٔ شکل زیر، که در حالت دائمی قرار دارد، مقدار ظرفیت خازن C باید چند فاراد باشد تا حداکثر توان متوسط به مقاومت R برسد؟



- 1 (1
- <u>τ</u> (τ 1 (τ

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 $\mathbf{x}(\circ) = \begin{bmatrix} \circ \\ \mathbf{v} \end{bmatrix}, \ \mathbf{x} \triangleq \begin{bmatrix} \mathbf{i_L} \\ \mathbf{v_C} \end{bmatrix}$  در مدار شکل زیر، بردار حالت  $\mathbf{x}(\circ) = \begin{bmatrix} \circ \\ \mathbf{v} \end{bmatrix}$ 



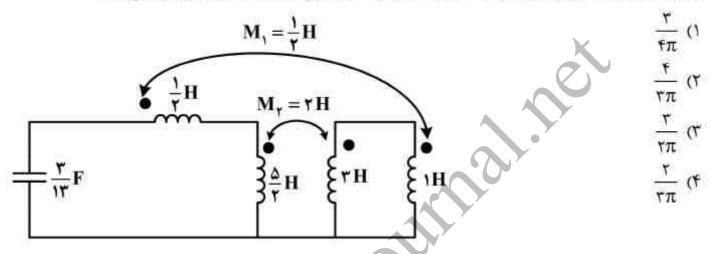
$$\mathsf{T} \mathbf{v}_{\mathbf{C}}^{\mathsf{T}} + \mathbf{i}_{\mathbf{L}}^{\mathsf{T}} - \mathsf{T} \mathbf{v}_{\mathbf{C}} \mathbf{i}_{\mathbf{L}} = \lambda \ \, (\mathsf{N})$$

$$v_C^{\gamma} + \epsilon i_L^{\gamma} + \epsilon v_C i_L = \epsilon$$
 (7

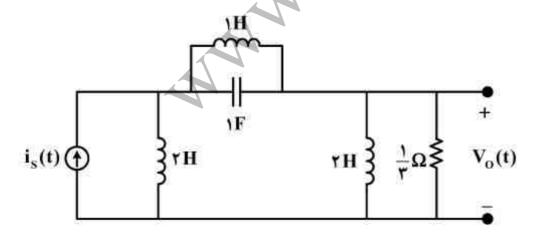
$$v_C^{r} + si_L^{r} + fv_Ci_L = f$$
 (r

$$\epsilon v_C^{r} + i_L^{r} - \epsilon v_C i_L = \epsilon$$
 (\*

۵۰ مدار شکل زیر، به ازای شرایط اولیه غیر صفر، در چه فرکانسی (برحسب هر تز) نوسان میکند؟



در مدار شکل زیر، تابع انتقال شبکهی  $\frac{V_{o}(s)}{I_{s}(s)}$  دارای چند قطب است و چه تعداد از آنها صفر  $-\Delta 1$  است  $+\Delta 1$ 



- ۱) ۳، یکی
- ۲) ۳، هیچکدام صفر نیستند.
  - ۴ (۳) ، یکے
- ۴) ۴، هیچکدام صفر نیستند.

و دهنهٔ خطی و  $\mathbf{T} = \begin{bmatrix} \mathbf{A} & \mathbf{B} \\ \mathbf{C} & \mathbf{D} \end{bmatrix}$  برای دو دهنهٔ خطی و  $\mathbf{Y}_{Y1}$  برای دو دهنهٔ خطی و  $\mathbf{Y}_{Y1}$  برای دو دهنهٔ خطی و تغییرناپذیر با زمان  $\mathbf{N}$  به صورت زیر داده شدهاند:

$$Y_{Y1} = \frac{-s}{s+Y}$$
,  $A = \frac{1}{s}$ 

پاسخ حالت صفر برای خروجی  $V_{_{\mathrm{o}}}(t)$  در آزمایش شکل زیر، کدام است؟



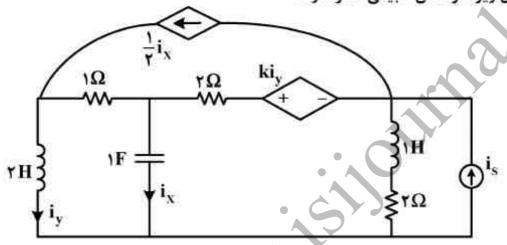
 $e^{-\Upsilon t}u(t)$  (1)

 $e^{-rt}u(t)$  (7

 $(1-e^{-\Upsilon t})u(t)$  ( $\Upsilon$ 

 $(1-e^{-rt})u(t)$  (f

۵۳ - به ازای چه مقدار ۱۲ مدار شکل زیر، فرکانس طبیعی صفر دارد؟



-\frac{1}{2} (1

۵

-0 (4

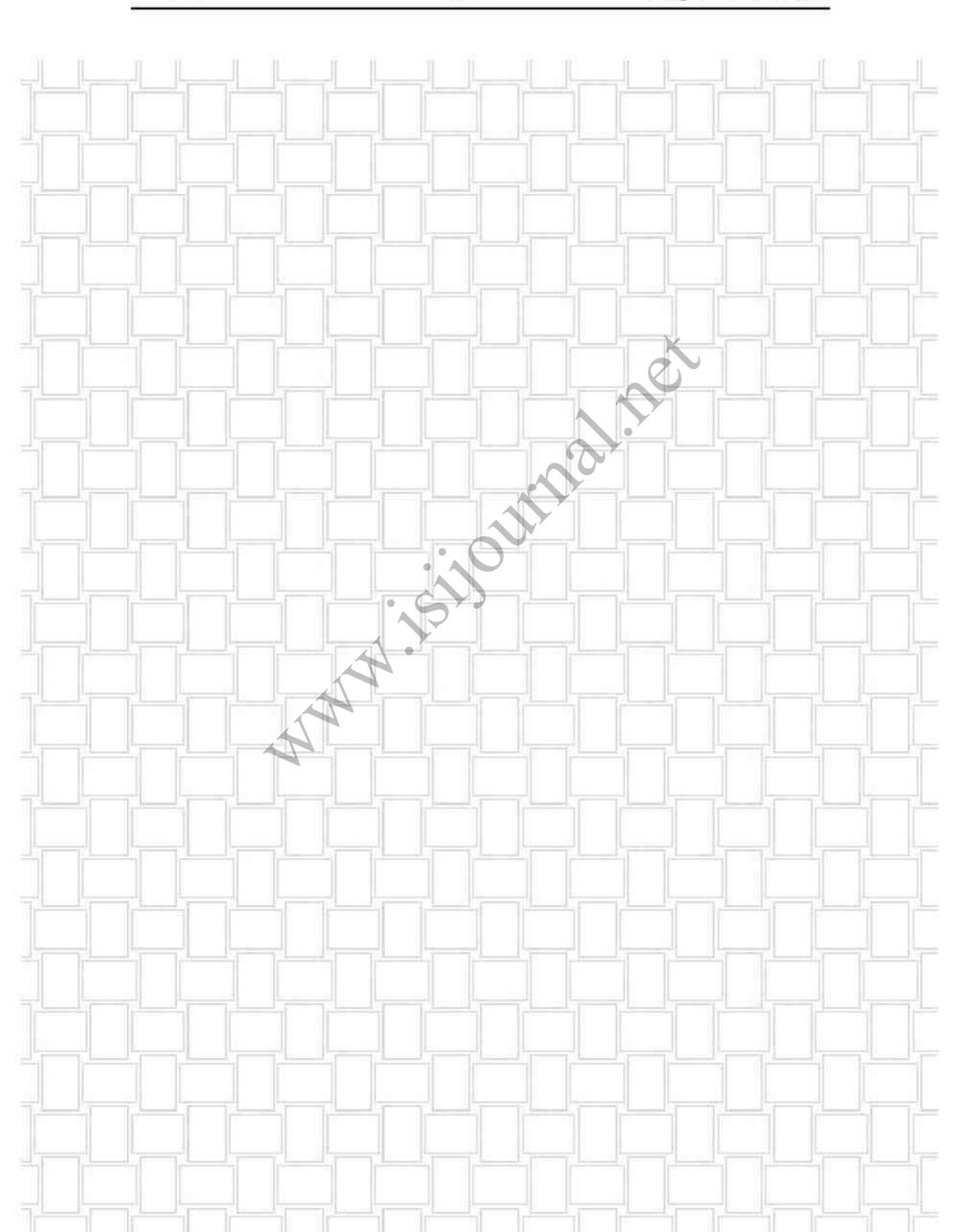
حر شکل زیر، ۲ شبکه RLC یکسان در قطب دوم به واسطه یک ترانسفورماتور ایده آل به یکدیگر متصل  $p(t)=\sin Tt$  معادل  $n_1$  باشد، جریان  $p(t)=\sin Tt$  معادل  $i_{sc}(t)$  باشد، جریان اتصال کوتاه  $i_{sc}(t)$  کدام است؟

- ircost (1
  - sint (T
- −acost (\*
- -Ircost (f

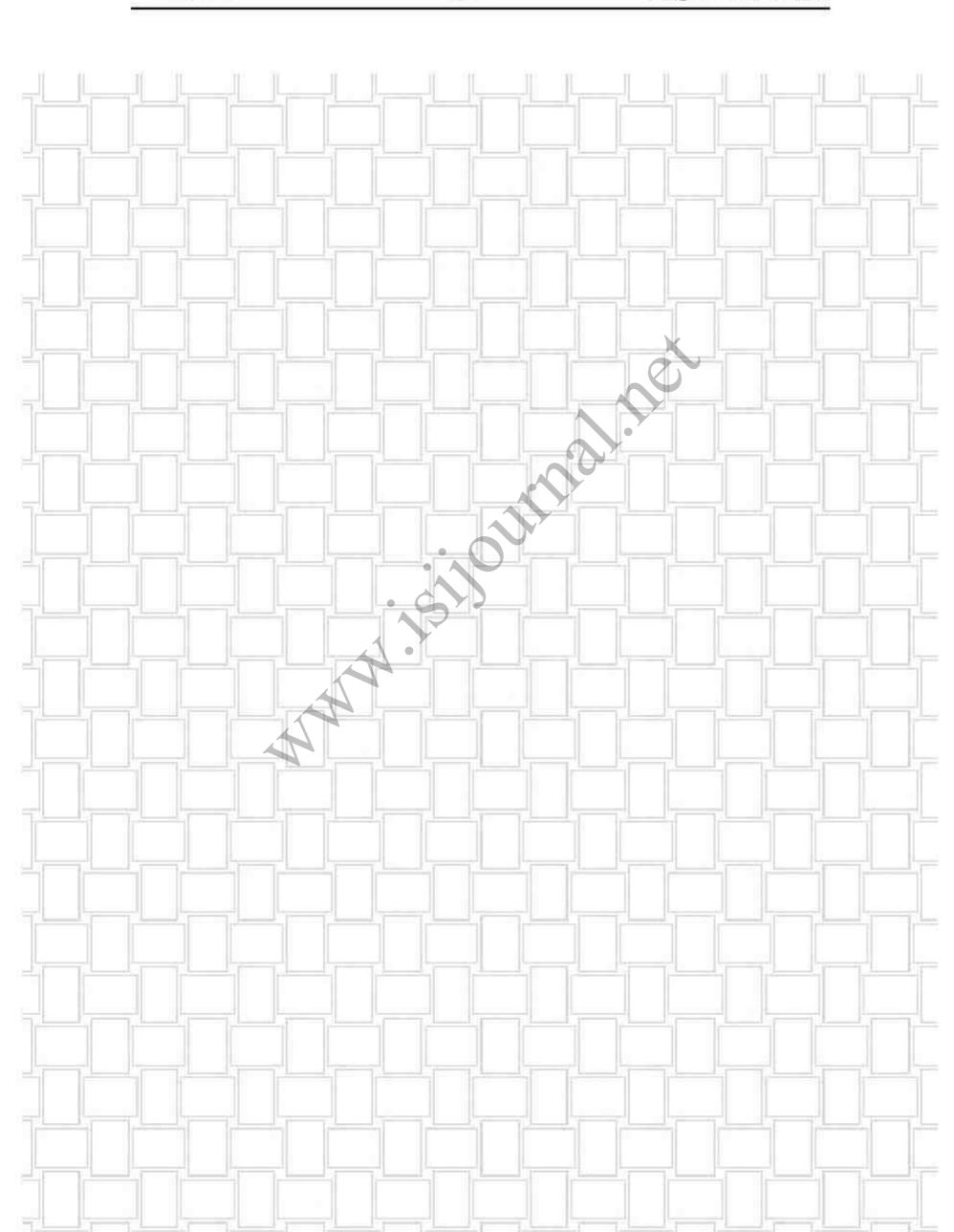
$$\frac{1}{\pi} \sin t$$
 $I \quad RLC \quad II$ 
 $n_1$ 
 $i_{SC}(t)$ 
 $I \quad RLC \quad II$ 
 $n_{T}$ 

$$\frac{\mathbf{n}_1}{\mathbf{n}_{\Upsilon}} = \frac{\Upsilon}{\Upsilon}$$

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آزمون مجموعه مهندسی برق طفحه ۱۵ مفحه ۱۵



آزمون مجموعه مهندسی برق طفحه ۱۶ صفحه ۱۶

